

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM 10-K

Annual report pursuant to Section 13 or 15(d) of
the Securities Exchange Act of 1934

For the fiscal year ended
December 31, 2016

Commission file
number 1-5805

JPMorgan Chase & Co.

(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

13-2624428

(I.R.S. employer
identification no.)

270 Park Avenue, New York, New York
(Address of principal executive offices)

10017
(Zip code)

Registrant's telephone number, including area code: (212) 270-6000
Securities registered pursuant to Section 12(b) of the Act:

Title of each class

Name of each exchange on which registered

Common stock	The New York Stock Exchange
	The London Stock Exchange
Warrants to purchase shares of Common Stock	The New York Stock Exchange
Depository Shares, each representing a one-four hundredth interest in a share of 5.50% Non-Cumulative Preferred Stock, Series O	The New York Stock Exchange
Depository Shares, each representing a one-four hundredth interest in a share of 5.45% Non-Cumulative Preferred Stock, Series P	The New York Stock Exchange
Depository Shares, each representing a one-four hundredth interest in a share of 6.70% Non-Cumulative Preferred Stock, Series T	The New York Stock Exchange
Depository Shares, each representing a one-four hundredth interest in a share of 6.30% Non-Cumulative Preferred Stock, Series W	The New York Stock Exchange
Depository Shares, each representing a one-four hundredth interest in a share of 6.125% Non-Cumulative Preferred Stock, Series Y	The New York Stock Exchange
Depository Shares, each representing a one-four hundredth interest in a share of 6.10% Non-Cumulative Preferred Stock, Series AA	The New York Stock Exchange
Depository Shares, each representing a one-four hundredth interest in a share of 6.15% Non-Cumulative Preferred Stock, Series BB	The New York Stock Exchange
Alerian MLP Index ETNs due May 24, 2024	NYSE Arca, Inc.
Guarantee of Callable Step-Up Fixed Rate Notes due April 26, 2028 of JPMorgan Chase Financial Company LLC	The New York Stock Exchange

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. ☐ Yes ☒ No
Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. ☐ Yes ☒ No
Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. ☒ Yes ☐ No
Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Website, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). ☒ Yes ☐ No
Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§229.405 of this chapter) is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. ☒ Yes ☐ No
Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See definitions of "large accelerated filer," "accelerated filer," and "smaller reporting company" in Rule 12b-2 of the Exchange Act.

☒ Large accelerated filer ☐ Accelerated filer ☐ Non-accelerated filer ☐ Smaller reporting company
(Do not check if a smaller reporting company)

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). ☐ Yes ☒ No
The aggregate market value of JPMorgan Chase & Co. common stock held by non-affiliates as of June 30, 2016: \$223,144,102,133
Number of shares of common stock outstanding as of January 31, 2017: 3,571,963,160

Documents incorporated by reference: Portions of the registrant's Proxy Statement for the annual meeting of stockholders to be held on May 16, 2017, are incorporated by reference in this Form 10-K in response to Items 10, 11, 12, 13 and 14 of Part III.

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Part I

Item 1. Business.

Overview

JPMorgan Chase & Co., (“JPMorgan Chase” or the “Firm”) a financial holding company incorporated under Delaware law in 1968, is a leading global financial services firm and one of the largest banking institutions in the United States of America (“U.S.”), with operations worldwide; the Firm had \$2.5 trillion in assets and \$254.2 billion in stockholders’ equity as of December 31, 2016. The Firm is a leader in investment banking, financial services for consumers and small businesses, commercial banking, financial transaction processing and asset management. Under the J.P. Morgan and Chase brands, the Firm serves millions of customers in the U.S. and many of the world’s most prominent corporate, institutional and government clients.

JPMorgan Chase’s principal bank subsidiaries are JPMorgan Chase Bank, National Association (“JPMorgan Chase Bank, N.A.”), a national banking association with U.S. branches in 23 states, and Chase Bank USA, National Association (“Chase Bank USA, N.A.”), a national banking association that is the Firm’s credit card-issuing bank. JPMorgan Chase’s principal nonbank subsidiary is J.P. Morgan Securities LLC (“JPMorgan Securities”), the Firm’s U.S. investment banking firm. The bank and nonbank subsidiaries of JPMorgan Chase operate nationally as well as through overseas branches and subsidiaries, representative offices and subsidiary foreign banks. One of the Firm’s principal operating subsidiaries in the U.K. is J.P. Morgan Securities plc, a subsidiary of JPMorgan Chase Bank, N.A.

The Firm’s website is www.jpmorganchase.com. JPMorgan Chase makes available free of charge, through its website, annual reports on Form 10-K, quarterly reports on Form 10-Q and current reports on Form 8-K pursuant to Section 13(a) or Section 15(d) of the Securities Exchange Act of 1934, as soon as reasonably practicable after it electronically files such material with, or furnishes such material to, the U.S. Securities and Exchange Commission (the “SEC”). The Firm has adopted, and posted on its website, a Code of Conduct for all employees of the Firm and a Code of Ethics for its Chairman and Chief Executive Officer, Chief Financial Officer, Principal Accounting Officer and all other professionals of the Firm worldwide serving in a finance, accounting, tax or investor relations role.

Business segments

JPMorgan Chase’s activities are organized, for management reporting purposes, into four major reportable business segments, as well as a Corporate segment. The Firm’s consumer business is the Consumer & Community Banking (“CCB”) segment. The Firm’s wholesale business segments are Corporate & Investment Bank (“CIB”), Commercial Banking (“CB”), and Asset & Wealth Management (“AWM”) (formerly Asset Management or “AM”).

A description of the Firm’s business segments and the products and services they provide to their respective client bases is provided in the “Business segment results” section

of Management’s discussion and analysis of financial condition and results of operations (“MD&A”), beginning on page 36 and in Note 33.

Competition

JPMorgan Chase and its subsidiaries and affiliates operate in a highly competitive environment. Competitors include other banks, brokerage firms, investment banking companies, merchant banks, hedge funds, commodity trading companies, private equity firms, insurance companies, mutual fund companies, investment managers, credit card companies, mortgage banking companies, trust companies, securities processing companies, automobile financing companies, leasing companies, e-commerce and other Internet-based companies, financial technology companies, and other companies engaged in providing similar products and services. The Firm’s businesses generally compete on the basis of the quality and variety of the Firm’s products and services, transaction execution, innovation, reputation and price. Competition also varies based on the types of clients, customers, industries and geographies served. With respect to some of its geographies and products, JPMorgan Chase competes globally; with respect to others, the Firm competes on a national or regional basis. The Firm’s ability to compete also depends on its ability to attract and retain professional and other personnel, and on its reputation.

It is likely that competition in the financial services industry will become even more intense as the Firm’s businesses continue to compete with other financial institutions that may have a stronger local presence in certain geographies or that operate under different rules and regulatory regimes than the Firm, or with companies that provide new or innovative products or services that the Firm does not provide.

Supervision and regulation

The Firm is subject to regulation under state and federal laws in the U.S., as well as the applicable laws of each of the various jurisdictions outside the U.S. in which the Firm does business.

As a result of regulatory reforms enacted and proposed in the U.S. and abroad, the Firm has been experiencing a period of significant change in regulation which has had and could continue to have significant consequences for how the Firm conducts business. The Firm continues to work diligently in assessing the regulatory changes it is facing, and is devoting substantial resources to comply with all the new regulations, while, at the same time, endeavoring to best meet the needs and expectations of its customers, clients and shareholders. These efforts include the implementation of new policies, procedures and controls, and appropriate adjustments to the Firm’s business and operations, legal entity structure, and capital and liquidity management. The combined effect of numerous rule-makings by multiple governmental agencies and regulators, and the potential conflicts or inconsistencies among such

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rules, present challenges and risks to the Firm's business and operations. Given the current status of the regulatory developments, the Firm cannot currently quantify all of the possible effects on its business and operations of the significant changes that are underway. For more information, see Risk Factors on pages 8–21.

Financial holding company:

Consolidated supervision by the Board of Governors of the Federal Reserve System (the "Federal Reserve"). As a bank holding company ("BHC") and a financial holding company, JPMorgan Chase is subject to comprehensive consolidated supervision, regulation and examination by the Federal Reserve. The Federal Reserve acts as an "umbrella regulator" and certain of JPMorgan Chase's subsidiaries are regulated directly by additional authorities based on the particular activities of those subsidiaries. For example, JPMorgan Chase's national bank subsidiaries, including JPMorgan Chase Bank, N.A., and Chase Bank USA, N.A., are subject to supervision and regulation by the Office of the Comptroller of the Currency ("OCC") and, with respect to certain matters, by the Federal Reserve and the Federal Deposit Insurance Corporation (the "FDIC"). Certain non-bank subsidiaries, such as the Firm's U.S. broker-dealers, are subject to supervision and regulation by the SEC, and subsidiaries of the Firm that engage in certain futures-related and swaps-related activities are subject to supervision and regulation by the Commodity Futures Trading Commission ("CFTC"). J.P. Morgan Securities plc, is a U.K. bank licensed within the European Economic Area (the "EEA") to undertake all banking activity and is regulated by the U.K. Prudential Regulation Authority (the "PRA"), a subsidiary of the Bank of England which has responsibility for prudential regulation of banks and other systemically important institutions, and by the Financial Conduct Authority ("FCA"), which regulates prudential matters for firms that are not so regulated by the PRA and conduct matters for all market participants. The Firm's other non-U.S. subsidiaries are regulated by the banking and securities regulatory authorities in the countries in which they operate. See Securities and broker-dealer regulation, Investment management regulation and Derivatives regulation below. In addition, the Firm's consumer activities are subject to supervision and regulation by the Consumer Financial Protection Bureau ("CFPB") and to regulation under various state statutes which are enforced by the respective state's Attorney General.

Scope of permissible business activities. The Bank Holding Company Act generally restricts BHCs from engaging in business activities other than the business of banking and certain closely related activities. Financial holding companies generally can engage in a broader range of financial activities than are otherwise permissible for BHCs, including underwriting, dealing and making markets in securities, and making merchant banking investments in non-financial companies. The Federal Reserve has the authority to limit a financial holding company's ability to conduct otherwise permissible activities if the financial

holding company or any of its depository institution subsidiaries ceases to meet the applicable eligibility requirements (including requirements that the financial holding company and each of its U.S. depository institution subsidiaries maintain their status as "well-capitalized" and "well-managed"). The Federal Reserve may also impose corrective capital and/or managerial requirements on the financial holding company and may, for example, require divestiture of the holding company's depository institutions if the deficiencies persist. Federal regulations also provide that if any depository institution controlled by a financial holding company fails to maintain a satisfactory rating under the Community Reinvestment Act, the Federal Reserve must prohibit the financial holding company and its subsidiaries from engaging in any activities other than those permissible for bank holding companies. In addition, a financial holding company must obtain Federal Reserve approval before engaging in certain banking and other financial activities both in the U.S. and internationally, as further described under Regulation of acquisitions below.

Activities restrictions under the Volcker Rule. Section 619 of the Wall Street Reform and Consumer Protection Act (the "Dodd-Frank Act") (the "Volcker Rule") prohibits banking entities, including the Firm, from engaging in certain "proprietary trading" activities, subject to exceptions for underwriting, market-making, risk-mitigating hedging and certain other activities. In addition, the Volcker Rule limits the sponsorship of, and investment in, "covered funds" (as defined by the Volcker Rule) and imposes limits on certain transactions between the Firm and its sponsored funds (see JPMorgan Chase's subsidiary banks — Restrictions on transactions with affiliates below). The Volcker Rule requires banking entities to establish comprehensive compliance programs reasonably designed to help ensure and monitor compliance with the restrictions under the Volcker Rule, including, in order to distinguish permissible from impermissible risk-taking activities, the measurement, monitoring and reporting of certain key metrics.

Capital and liquidity requirements. The Federal Reserve establishes capital and leverage requirements for the Firm and evaluates its compliance with such requirements. The OCC establishes similar capital and leverage requirements for the Firm's national banking subsidiaries. For more information about the applicable requirements relating to risk-based capital and leverage in the U.S. under the most recent capital framework established by the Basel Committee on Banking Supervision (the "Basel Committee") ("Basel III"), see Capital Risk Management on pages 76–85 and Note 28. Under Basel III, bank holding companies and banks are required to measure their liquidity against two specific liquidity tests: the liquidity coverage ratio ("LCR") and the net stable funding ratio ("NSFR"). The U.S. banking regulators have approved the final LCR rule ("U.S. LCR"), which became effective on January 1, 2015. In April 2016, the U.S. banking regulators issued a proposed rule for NSFR. For additional information on these ratios, see Liquidity Risk Management on pages 110–115. On December 19, 2016 the Federal Reserve published final

U.S. LCR public disclosure requirements. Starting with the second quarter of 2017, the Firm will be required to disclose quarterly its consolidated LCR pursuant to the U.S. LCR rule, including the Firm's average LCR for the quarter and the key quantitative components of the average LCR in a standardized template, along with a qualitative discussion of material drivers of the ratio, changes over time, and causes of such changes. On September 8, 2016 the Federal Reserve published the framework that will apply to the setting of the countercyclical capital buffer. As of October 24, 2016 the Federal Reserve reaffirmed setting the U.S. countercyclical capital buffer at 0%, and stated that it will review the amount at least annually. Banking supervisors continue to consider refinements and enhancements to the Basel III capital framework for financial institutions. The Basel Committee finalized revisions to market risk capital for trading books and the treatment of interest rate risk in the banking book; other proposals being contemplated by the Basel Committee include revisions to, among others, standardized credit and operational risk capital frameworks, a recalibration of the leverage ratio, revisions to the securitization framework, and changes to the definition of defaulted assets. In January 2017, the Basel Committee announced that the review of the proposals to finalize the post-crisis regulatory reforms has been postponed. After a proposal is finalized by the Basel Committee, U.S. banking regulators would then need to propose requirements applicable to U.S. financial institutions. In March 2016, the Federal Reserve Board released a revised proposal to establish single-counterparty credit limits for large U.S. bank holding companies and foreign banking organizations.

Stress tests. The Federal Reserve has adopted supervisory stress tests for large bank holding companies, including JPMorgan Chase, which form part of the Federal Reserve's annual Comprehensive Capital Analysis and Review ("CCAR") framework. Under the framework, the Firm must conduct semi-annual company-run stress tests and, in addition, must submit an annual capital plan to the Federal Reserve, taking into account the results of separate stress tests designed by the Firm and the Federal Reserve. In reviewing the Firm's capital plan, the Federal Reserve considers both quantitative and qualitative factors. Qualitative assessments include, among other things, the comprehensiveness of the plan, the assumptions and analysis underlying the plan, and the extent to which the Firm has satisfied certain supervisory matters related to the Firm's processes and analyses, including the design and operational effectiveness of the controls governing such processes. Moreover, the Firm is required to receive a notice of non-objection from the Federal Reserve before taking capital actions, such as paying dividends, implementing common equity repurchase programs or redeeming or repurchasing capital instruments. The OCC requires JPMorgan Chase Bank, N.A. to perform separate, similar annual stress tests. The Firm publishes each year the results of its mid-cycle stress tests under the Firm's internally-developed "severely adverse" scenario and the results of its

(and its two primary subsidiary banks') annual stress tests under the supervisory "severely adverse" scenarios provided by the Federal Reserve and the OCC. The Firm will file its 2017 annual CCAR submission on April 5. Results will be published by the Federal Reserve by June 30, with disclosures of results by BHCs, including the Firm, to follow within 15 days. The mid-cycle capital stress test submissions are due on October 5 and BHCs, including the Firm, will publish results by November 4. For additional information on the Firm's CCAR, see Capital Risk Management on pages 76–85.

Enhanced prudential standards. The Financial Stability Oversight Council ("FSOC"), among other things, recommends prudential standards and reporting and disclosure requirements to the Federal Reserve for systemically important financial institutions ("SIFIs"), such as JPMorgan Chase. The Federal Reserve has adopted several rules to implement the heightened prudential standards, including final rules relating to risk management and corporate governance of subject BHCs. BHCs with \$50 billion or more in total consolidated assets are required to comply with enhanced liquidity and overall risk management standards, and their boards of directors are required to conduct appropriate oversight of their risk management activities. For information on liquidity measures, see Liquidity Risk Management on pages 110–115. Several additional proposed rules are still being considered, including an "early remediation" framework to address financial distress or material management weaknesses.

Orderly liquidation authority and resolution and recovery. As a BHC with assets of \$50 billion or more, the Firm is required to submit annually to the Federal Reserve and the FDIC a plan for resolution under the Bankruptcy Code in the event of material distress or failure (a "resolution plan"). The FDIC also requires each insured depository institution with \$50 billion or more in assets, such as JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A., to provide a resolution plan. For more information about the Firm's resolution plan, see Risk Factors on pages 8–21 as well as Business Overview on pages 37–38 for information regarding the Firm's 2016 Resolution Submission. In addition, certain financial companies, including JPMorgan Chase and certain of its subsidiaries, can be subjected to resolution under an "orderly liquidation authority." The U.S. Treasury Secretary, in consultation with the President of the United States, must first make certain extraordinary financial distress and systemic risk determinations, and action must be recommended by the FDIC and the Federal Reserve. Absent such actions, the Firm, as a BHC, would remain subject to resolution under the Bankruptcy Code. In December 2013, the FDIC issued a draft policy statement describing its "single point of entry" strategy for resolution of systemically important financial institutions under the orderly liquidation authority. This strategy seeks to keep operating subsidiaries of the BHC open and impose losses on shareholders and creditors of the holding company in

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receivership according to their statutory order of priority. For further information see Risk Factors on pages 8–21.

The Firm has a comprehensive recovery plan detailing the actions it would take to avoid failure by remaining well-capitalized and well-funded in the case of an adverse event. JPMorgan Chase has provided the Federal Reserve with comprehensive confidential supervisory information and analyses about the Firm’s businesses, legal entities and corporate governance and about its crisis management governance, capabilities and available alternatives to raise liquidity and capital in severe market circumstances. The OCC has published guidelines establishing standards for recovery planning by insured national banks, and JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A. have submitted their recovery plans to the OCC. For further information see Risk Factors on pages 8–21. In addition, certain of the Firm’s non-U.S. subsidiaries are subject to resolution and recovery planning requirements in the jurisdictions in which they operate.

Regulators in the U.S. and abroad continue to be focused on developing measures designed to address the possibility or perception that large financial institutions, including the Firm, may be “too big to fail,” and to provide safeguards so that, if a large financial institution does fail, it can be resolved without the use of public funds. Higher capital surcharges on global systemically important banks (“GSIBs”), requirements for certain large bank holding companies to maintain a minimum amount of long-term debt to facilitate orderly resolution of those firms, and the International Swaps and Derivatives Association (“ISDA”) protocol relating to the “close-out” of derivatives transactions during the resolution of a large cross-border financial institution, are examples of initiatives to address “too big to fail.” For further information on the GSIB framework and Total Loss Absorbing Capacity (“TLAC”), see Capital Risk Management on pages 76–85 and Risk Factors on pages 8–21, and on the ISDA close-out protocol, see Derivatives regulation below.

Holding company as source of strength for bank subsidiaries. JPMorgan Chase & Co. is required to serve as a source of financial strength for its depository institution subsidiaries and to commit resources to support those subsidiaries. This support may be required by the Federal Reserve at times when the Firm might otherwise determine not to provide it.

Regulation of acquisitions. Acquisitions by bank holding companies and their banks are subject to multiple requirements by the Federal Reserve and the OCC. For example, financial holding companies and bank holding companies are required to obtain the approval of the Federal Reserve before they may acquire more than 5% of the voting shares of an unaffiliated bank. In addition, acquisitions by financial companies are prohibited if, as a result of the acquisition, the total liabilities of the financial company would exceed 10% of the total liabilities of all financial companies. In addition, for certain acquisitions, the Firm must provide written notice to the Federal Reserve prior to acquiring direct or indirect ownership or control of

any voting shares of any company with over \$10 billion in assets that is engaged in activities that are “financial in nature.”

JPMorgan Chase’s subsidiary banks:

The Firm’s two primary subsidiary banks, JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A., are FDIC-insured national banks regulated by the OCC. As national banks, the activities of JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A. are limited to those specifically authorized under the National Bank Act and related interpretations by the OCC.

FDIC deposit insurance. The FDIC deposit insurance fund provides insurance coverage for certain deposits and is funded through assessments on banks, such as JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A. Changes in the methodology used to calculate such assessments, resulting from the enactment of the Dodd-Frank Act, significantly increased the assessments that the Firm’s bank subsidiaries pay annually to the FDIC. The FDIC instituted a new assessment surcharge on insured depository institutions with total consolidated assets greater than \$10 billion in order to raise the reserve ratio for the FDIC deposit insurance fund. Future FDIC rule-making could further increase such assessments.

FDIC powers upon a bank insolvency. Upon the insolvency of an insured depository institution, such as JPMorgan Chase Bank, N.A., the FDIC could be appointed as the conservator or receiver under the Federal Deposit Insurance Act (“FDIA”). The FDIC has broad powers to transfer any assets and liabilities without the approval of the institution’s creditors. For further information on the impact to creditors, see Risk Factors on pages 8–21.

Cross-guarantee. An FDIC-insured depository institution can be held liable for any loss incurred or expected to be incurred by the FDIC if another FDIC-insured institution that is under common control with such institution is in default or is deemed to be “in danger of default” (commonly referred to as “cross-guarantee” liability). An FDIC cross-guarantee claim against a depository institution is generally superior in right of payment to claims of the holding company and its affiliates against such depository institution.

Prompt corrective action and early remediation. The Federal Deposit Insurance Corporation Improvement Act of 1991 requires the relevant federal banking regulator to take “prompt corrective action” with respect to a depository institution if that institution does not meet certain capital adequacy standards. While these regulations apply only to banks, such as JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A., the Federal Reserve is authorized to take appropriate action against the parent BHC, such as JPMorgan Chase & Co., based on the undercapitalized status of any bank subsidiary. In certain instances, the BHC would be required to guarantee the performance of the capital restoration plan for its undercapitalized subsidiary.

OCC Heightened Standards. The OCC has established guidelines setting forth heightened standards for large banks. The guidelines establish minimum standards for the design and implementation of a risk governance framework for banks. While the bank can use certain components of the parent company's risk governance framework, the framework must ensure that the bank's risk profile is easily distinguished and separate from the parent for risk management purposes. The bank's board or risk committee is responsible for approving the bank's risk governance framework, providing active oversight of the bank's risk-taking activities, and holding management accountable for adhering to the risk governance framework.

Restrictions on transactions with affiliates. The bank subsidiaries of JPMorgan Chase (including subsidiaries of those banks) are subject to certain restrictions imposed by federal law on extensions of credit to, investments in stock or securities of, and derivatives, securities lending and certain other transactions with, JPMorgan Chase & Co. and certain other affiliates. These restrictions prevent JPMorgan Chase & Co. and other affiliates from borrowing from such subsidiaries unless the loans are secured in specified amounts and comply with certain other requirements. For more information, see Note 27. In addition, the Volcker Rule imposes a prohibition on such transactions between any JPMorgan Chase entity and covered funds for which a JPMorgan Chase entity serves as the investment manager, investment advisor, commodity trading advisor or sponsor, as well as, subject to a limited exception, any covered fund controlled by such funds.

Dividend restrictions. Federal law imposes limitations on the payment of dividends by national banks, such as JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A. See Note 27 for the amount of dividends that the Firm's principal bank subsidiaries could pay, at January 1, 2017, to their respective bank holding companies without the approval of their banking regulators.

In addition to the dividend restrictions described above, the OCC and the Federal Reserve have authority to prohibit or limit the payment of dividends of the bank subsidiaries they supervise, if, in the banking regulator's opinion, payment of a dividend would constitute an unsafe or unsound practice in light of the financial condition of the bank.

Depositor preference. Under federal law, the claims of a receiver of an insured depository institution for administrative expense and the claims of holders of U.S. deposit liabilities (including the FDIC and foreign deposits that are payable in the U.S. as well as in a foreign branch) have priority over the claims of other unsecured creditors of the institution, including public noteholders and depositors in non-U.S. offices. As a result, such persons could receive substantially less than the depositors in U.S. offices of the depository institution.

CFPB regulation and supervision, and other consumer regulations. JPMorgan Chase and its national bank subsidiaries, including JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A., are subject to supervision and

regulation by the CFPB with respect to federal consumer protection laws, including laws relating to fair lending and the prohibition of unfair, deceptive or abusive acts or practices in connection with the offer, sale or provision of consumer financial products and services. These laws include the Truth-in-Lending, Equal Credit Opportunity Act ("ECOA"), Fair Credit Reporting, Fair Debt Collection Practice, Electronic Funds Transfer, Credit Card Accountability, Responsibility and Disclosure ("CARD") and Home Mortgage Disclosure Acts. The CFPB has authority to impose new disclosure requirements for any consumer financial product or service. The CFPB's rule-making efforts have addressed mortgage-related topics, including ability to repay and qualified mortgage standards, mortgage servicing standards, loan originator compensation standards, high-cost mortgage requirements, Home Mortgage Disclosure Act requirements, appraisal and escrow standards and requirements for higher-priced mortgages. The CFPB continues to issue informal guidance on a variety of topics (such as the collection of consumer debts and credit card marketing practices). Other areas of focus include sales incentives, pre-authorized electronic funds transfers, "add-on" products, matters involving consumer populations considered vulnerable by the CFPB (such as students), credit reporting, and the furnishing of credit scores to individuals. As part of its regulatory oversight, the CFPB has taken enforcement actions against certain financial institutions, including the Firm.

Securities and broker-dealer regulation:

The Firm conducts securities underwriting, dealing and brokerage activities in the U.S. through J.P. Morgan Securities LLC and other broker-dealer subsidiaries, all of which are subject to regulations of the SEC, the Financial Industry Regulatory Authority and the New York Stock Exchange, among others. The Firm conducts similar securities activities outside the U.S. subject to local regulatory requirements. In the U.K., those activities are conducted by J.P. Morgan Securities plc and are regulated PRA and the FCA. Broker-dealers are subject to laws and regulations covering all aspects of the securities business, including sales and trading practices, securities offerings, publication of research reports, use of customers' funds, the financing of clients' purchases, capital structure, record-keeping and retention, and the conduct of their directors, officers and employees. For information on the net capital of J.P. Morgan Securities LLC, and the applicable requirements relating to risk-based capital for J.P. Morgan Securities plc, see Broker-dealer regulatory capital on page 85. In addition, rules adopted by the Department of Labor would impose (among other things) a new standard of care applicable to broker-dealers when dealing with customers. For more information see - Investment management regulation below.

Investment management regulation:

The Firm's asset management businesses are subject to significant investment management regulation in numerous jurisdictions around the world relating to, among other things, the safeguarding of client assets, offerings of funds, marketing activities, transactions among affiliates and management of client funds. Certain of the Firm's subsidiaries are registered with, and subject to oversight by, the SEC as investment advisers. As such, the Firm's registered investment advisers are subject to the fiduciary and other obligations imposed under the Investment Advisers Act of 1940 and the rules and regulations promulgated thereunder, as well as various state securities laws. For information regarding investigations and litigation in connection with disclosures to clients related to proprietary products, see Note 31.

The Firm's asset management businesses continue to be affected by ongoing rule-making and implementation of new regulations. The SEC amendments to rules that govern money-market funds, requiring a floating net asset value for institutional prime money-market funds became effective October 14, 2016. In addition, the SEC adopted amendments regarding enhanced liquidity risk management for open-end mutual funds and exchange-traded funds ("ETFs") and enhanced reporting for funds and advisors. The Department of Labor ("DOL") "fiduciary" rule would significantly expand the universe of persons viewed as investment advice fiduciaries to retirement plans and individual retirement accounts ("IRAs") under the Employee Retirement Income Security Act of 1974, as amended ("ERISA"). Among the most significant impacts of the rule and related prohibited transaction exemptions would be the impact on the fee and compensation practices at financial institutions that offer investment advice to retail retirement clients. The related exemptions would require new client contracts, adherence to "impartial conduct" standards (including a requirement to act in the "best interest" of retirement clients), implementation of policies and procedures, websites and other disclosures to both investors and the DOL. The rule was due to become applicable from April 10, 2017; however following a recent memorandum from the White House directing review of the rule, the DOL announced that it is considering legal options for delaying the rule's applicability.

Derivatives regulation:

The Firm is subject to comprehensive regulation of its derivatives businesses. The regulations impose capital and margin requirements (including the collecting and posting of variation margin and initial margin in respect of non-centrally cleared derivatives), require central clearing of standardized over-the-counter ("OTC") derivatives, require that certain standardized over-the-counter swaps be traded on regulated trading venues, and provide for reporting of certain mandated information. In addition, the Dodd-Frank Act requires the registration of "swap dealers" and "major swap participants" with the CFTC and of "security-based swap dealers" and "major security-based swap participants" with the SEC. JPMorgan Chase Bank, N.A., J.P. Morgan

Securities LLC, J.P. Morgan Securities plc and J.P. Morgan Ventures Energy Corporation have registered with the CFTC as swap dealers, and JPMorgan Chase Bank, N.A., J.P. Morgan Securities LLC and J.P. Morgan Securities plc may be required to register with the SEC as security-based swap dealers. As a result of their registration as swap dealers or security-based swap dealers, these entities will be subject to a comprehensive regulatory framework applicable to their swap or security-based swap activities, which includes capital requirements, rules regulating their swap activities, rules requiring the collateralization of uncleared swaps, rules regarding segregation of counterparty collateral, business conduct and documentation standards, record-keeping and reporting obligations, and anti-fraud and anti-manipulation requirements. Further, some of the rules for derivatives apply extraterritorially to U.S. firms doing business with clients outside of the U.S., as well as to the overseas activities of non-U.S. subsidiaries of the Firm that either deal with U.S. persons or that are guaranteed by U.S. subsidiaries of the Firm; however, the full scope of the extra-territorial impact of the U.S. swaps regulation has not been finalized and therefore remains unclear. The effect of these rules may require banking entities, such as the Firm, to modify the structure of their derivatives businesses and face increased operational and regulatory costs. In the European Union (the "EU"), the implementation of the European Market Infrastructure Regulation ("EMIR") and the revision of the Markets in Financial Instruments Directive ("MiFID II") will result in comparable, but not identical, changes to the European regulatory regime for derivatives. The combined effect of the U.S. and EU requirements, and the potential conflicts and inconsistencies between them, present challenges and risks to the structure and operating model of the Firm's derivatives businesses.

The Firm and other financial institutions have agreed to adhere to an updated Resolution Stay Protocol developed by ISDA in response to regulator concerns that the close-out of derivatives and other financial transactions during the resolution of a large cross-border financial institution could impede resolution efforts and potentially destabilize markets. The Resolution Stay Protocol provides for the contractual recognition of cross-border stays under various statutory resolution regimes and a contractual stay on certain cross-default rights.

In the U.S., one subsidiary of the Firm is registered as a futures commission merchant, and other subsidiaries are either registered with the CFTC as commodity pool operators and commodity trading advisors or are exempt from such registration. These CFTC-registered subsidiaries are also members of the National Futures Association.

Data regulation:

The Firm and its subsidiaries are subject to federal, state and international laws and regulations concerning the use and protection of certain customer, employee and other personal and confidential information, including those imposed by the Gramm-Leach-Bliley Act and the Fair Credit

Reporting Act, as well as the EU Data Protection Directive. In addition, various U.S. regulators, including the Federal Reserve, the OCC and the SEC, have increased their focus on cybersecurity through guidance, examinations and regulations.

In May 2018, the General Data Protection Regulation (“GDPR”) will replace the EU Data Protection Directive, and it will have a significant impact on how businesses can collect and process the personal data of EU individuals. In addition, numerous proposals regarding privacy and data protection are pending before U.S. and non-U.S. legislative and regulatory bodies.

The Bank Secrecy Act and Economic Sanctions:

The Bank Secrecy Act (“BSA”) requires all financial institutions, including banks and securities broker-dealers, to, among other things, establish a risk-based system of internal controls reasonably designed to prevent money laundering and the financing of terrorism. The BSA includes a variety of record-keeping and reporting requirements (such as cash transaction and suspicious activity reporting), as well as due diligence/know your customer documentation requirements. In January 2013, the Firm entered into Consent Orders with its banking regulators relating to the Firm’s Bank Secrecy Act/Anti-Money Laundering policies, procedures and controls; the Firm has taken significant steps to modify and enhance its processes and controls with respect to its Anti-Money Laundering procedures and to remediate the issues identified in the Consent Order. The Firm is also subject to the regulations and economic sanctions programs administered by the U.S. Treasury’s Office of Foreign Assets Control (“OFAC”).

Anti-Corruption:

The Firm is subject to laws and regulations relating to corrupt and illegal payments to government officials and others in the jurisdictions in which it operates, including the U.S. Foreign Corrupt Practices Act and the U.K. Bribery Act. For more information on the Firm’s consent judgment and non-prosecution agreement relating to referral hiring practices, see Note 31.

Compensation practices:

The Firm’s compensation practices are subject to oversight by the Federal Reserve, as well as other agencies. The Federal Reserve has issued guidance jointly with the FDIC and the OCC that is designed to ensure that incentive compensation paid by banking organizations does not encourage imprudent risk-taking that threatens the organizations’ safety and soundness. In addition, under the Dodd-Frank Act, federal regulators, including the Federal Reserve, must issue regulations or guidelines requiring covered financial institutions, including the Firm, to report the structure of all incentive-based compensation arrangements and prohibit incentive-based payment arrangements that encourage inappropriate risks by providing compensation that is excessive or that could lead to material financial loss to the institution. Proposed regulations were issued in 2016, and the public comment period has closed. Final regulations have not yet been

published. The Federal Reserve has conducted a review of the incentive compensation policies and practices of a number of large banking institutions, including the Firm. In addition to the Federal Reserve, the Financial Stability Board has established standards covering compensation principles for banks. In Europe, the Fourth Capital Requirements Directive (“CRD IV”) includes compensation provisions and the European Banking Authority has instituted guidelines on compensation policies under CRD IV. In the U.K., compensation standards are governed by the Remuneration Code of the PRA and the FCA. The implementation of the Federal Reserve’s and other banking regulators’ guidelines regarding compensation are expected to evolve over the next several years, and may affect the manner in which the Firm structures its compensation programs and practices.

Significant international regulatory initiatives:

In the EU, there is an extensive and complex program of final and proposed regulatory enhancement that reflects, in part, the EU’s commitments to policies of the Group of Twenty Finance Ministers and Central Bank Governors (“G-20”) together with other plans specific to the EU. The EU operates a European Systemic Risk Board that monitors financial stability, together with European Supervisory Agencies that set detailed regulatory rules and encourage supervisory convergence across the 28 Member States. The EU has also created a Single Supervisory Mechanism for the euro-zone, under which the regulation of all banks in that zone will be under the auspices of the European Central Bank, together with a Single Resolution Mechanism and Single Resolution Board, having jurisdiction over bank resolution in the zone. At both the G-20 and EU levels, various proposals are under consideration to address risks associated with global financial institutions. Some of the initiatives adopted include increased capital requirements for certain trading instruments or exposures and compensation limits on certain employees located in affected countries.

Guided by the G20 policy framework, the EU and national financial regulators have proposed or adopted several market reforms, including EMIR, which requires, among other things, the central clearing of standardized derivatives; and MiFID II, which gives effect to the G-20 commitment to trading of derivatives through central clearing houses and exchanges and also includes significantly enhanced requirements for pre- and post-trade transparency and a significant reconfiguration of the regulatory supervision of execution venues. Key aspects of EMIR and MiFID II have been finalized, although the implementation date of MiFID II has been delayed to 2018.

The EU is also currently considering or implementing significant revisions to laws covering depositary activities; credit-rating activities; resolution of banks, investment firms and market infrastructures; anti-money laundering controls; data security and privacy; corporate governance in financial firms; and implementation in the EU of the Basel III capital and liquidity standards, including the introduction of

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an intermediate holding company requirement for foreign banks and the implementation of the standard for TLAC.

The EU is also considering proposed legislation providing for a proprietary trading ban and mandatory separation of other trading activities within certain banks; various EU Member States have separately enacted similar measures. In the U.K., legislation was adopted that mandates the separation (or “ring-fencing”) of deposit-taking activities from securities trading and other analogous activities within banks, subject to certain exemptions. The legislation includes the supplemental recommendation of the Parliamentary Commission on Banking Standards (the “Tyrie Commission”) that such ring-fences should be “electrified” by the imposition of mandatory forced separation on banking institutions that are deemed to test the limits of the safeguards. Parallel but distinct provisions have been enacted by the French and German governments. These measures may separately or taken together have significant implications for the Firm’s organizational structure in Europe, as well as its permitted activities and capital deployment in the EU.

Much of the G20 policy framework has been finalized; however, the Basel Committee is currently reviewing the framework, and proposing recalibrations of certain requirements. As such, the EU is considering or implementing significant revisions to laws covering: bank and investment firm recovery and resolution; bank structure; securities settlement; transparency and disclosure of securities financing transactions; benchmarks; resolution of market infrastructures (central counterparties (“CCPs”)); anti-money laundering controls; data security and privacy; and corporate governance in financial firms; together with new amendments to capital and liquidity standards.

Consistent with the G20 and EU policy frameworks, U.K. regulators have adopted a range of policy measures that have significantly changed the markets and prudential regulatory environment in the U.K. In addition to broad recommendations made by the Fair and Effective Markets Review which focused on fixed income currencies and commodities markets, U.K. regulators are considering measures to raise standards and accountability of individuals, and promote forward-looking conduct risk identification and mitigation, including by introducing the new Senior Managers and Certification Regimes.

On June 23, 2016, the U.K. voted by referendum to leave the European Union (“Brexit”). The U.K. Government has since announced that it will invoke Article 50 of the Lisbon Treaty and will start the formal exit negotiations by the end of March 2017, giving an expected exit date of the end of March 2019. More recently, the British Prime Minister laid out twelve “negotiation objectives” for Brexit, which confirmed the U.K. will not remain a member of the Single Market, but will pursue a Free Trade Agreement that provides the greatest possible access to the Single Market. Further, the U.K. Government will seek a phased arrangement to ensure the orderly transition of the legal

and regulatory framework for financial services, and promote stability and market confidence. Following a recent ruling by the U.K. Supreme Court, the House of Commons approved legislation on February 8, 2017 that allows the British Prime Minister to invoke Article 50. The legislation must now be approved by the House of Lords before it is signed into law.

Many international banks, including the Firm, operate substantial parts of their European Union businesses from entities based in the U.K. Upon the U.K. leaving the European Union, the regulatory and legal environment that would then exist, and to which the Firm’s U.K. operations would then be subject, will depend on, in certain respects, the nature of the arrangements the U.K. agreed with the European Union and other trading partners. These arrangements cannot be predicted, but currently the Firm does not believe any of the likely identified scenarios would threaten the viability of the Firm’s business units or the Firm’s ability to serve clients across the European Union and in the U.K. However, it is possible that under some scenarios, changes to the Firm’s legal entity structure and operations would be required, which might result in a less efficient operating model across the Firm’s European legal entities.

The Firm is in the process of evaluating plans to ensure its continued ability to operate in the U.K. and the EU beyond the expected exit date.

Item 1A. Risk Factors.

The following discussion sets forth the material risk factors that could affect JPMorgan Chase’s financial condition and operations. Readers should not consider any descriptions of such factors to be a complete set of all potential risks that could affect the Firm.

Regulatory Risk

JPMorgan Chase operates within a highly regulated industry, and the Firm’s businesses and results are significantly affected by the laws and regulations to which the Firm is subject.

As a global financial services firm, JPMorgan Chase is subject to extensive and comprehensive regulation under federal and state laws in the U.S. and the laws of the various jurisdictions outside the U.S. in which the Firm does business. The financial services industry has in recent years experienced an unprecedented increase in regulations and supervision, both in the U.S. and globally. The cumulative effect of the new and currently proposed legislation and regulations could require the Firm to make further changes to its businesses or operations, which could result in a significant loss of revenue for the Firm and impose additional compliance and other costs on the Firm or otherwise reduce the Firm’s profitability. These changes could also: limit the products and services that the Firm offers; reduce the liquidity that the Firm is able to offer its clients or counterparties through its market-making activities; impede the Firm’s ability to pursue business opportunities in which it might otherwise consider engaging; require the Firm to dispose of or curtail certain

businesses; affect the value of assets that the Firm holds; require the Firm to increase its prices and therefore reduce demand for its products; or otherwise adversely affect the Firm's businesses. To the extent that these initiatives have been, or continue to be, imposed on a limited subset of financial institutions (based on size, activities, geography or other criteria), the requirements to which the Firm may be subject under such laws and regulations could require the Firm to restructure further its businesses, or further re-price or curtail the products or services that it offers to customers, which could result in the Firm not being able to compete effectively with other institutions that are not impacted in the same way.

Authorities in some non-U.S. jurisdictions in which the Firm has operations have enacted legislation or regulations requiring that certain subsidiaries of the Firm operating in those countries maintain independent capital and liquidity. In addition, some non-U.S. regulators have proposed that large banks which conduct certain businesses in their jurisdictions operate through separate subsidiaries located in those countries. These requirements, and any future laws or regulations that seek to impose restrictions on the way the Firm organizes its business units or increase the capital or liquidity requirements on non-U.S. subsidiaries of the Firm, could hinder the Firm's ability to efficiently manage its operations, increase its funding and liquidity costs and thereby decrease the Firm's net income. In addition, there can be significant differences in the ways that similar regulatory initiatives affecting the financial services industry are implemented in the U.S. and in different countries and regions in which JPMorgan Chase does business. For example, recent legislative and regulatory initiatives within the EU, including those relating to the resolution of financial institutions, the establishment by non-EU financial institutions of intermediate holding companies in the EU, the separation of trading activities from core banking services, mandatory on-exchange trading, position limits and reporting rules for derivatives, governance and accountability regimes, conduct of business requirements and restrictions on compensation, could require the Firm to make significant modifications to its non-U.S. business, operations and legal entity structure in order to comply with these requirements. These differences in implemented or proposed non-U.S. regulations and initiatives may be inconsistent or may conflict with current or proposed regulations in the U.S., which could subject the Firm to increased compliance and legal costs, as well as higher operational, capital and liquidity costs, all of which could have an adverse effect on the Firm's business, results of operations and profitability.

Recent political developments in the U.S. and abroad have increased the uncertainty regarding the regulatory environment in which the Firm will operate. Although certain of the proposals being mentioned in the U.S. include the possibility of regulatory reform related to the financial services industry, it is too early to determine the full extent to which these measures will ultimately modify or reduce the regulatory requirements currently imposed on the Firm, and the resulting possible effect on the Firm and its business and operations. In addition, the U.K.'s planned

departure from the EU has engendered significant uncertainty concerning the regulatory framework under which global financial services institutions, including JPMorgan Chase, will need to conduct their business and operations in the EU after the U.K.'s departure.

Expanded regulatory and governmental oversight of JPMorgan Chase's businesses may continue to increase the Firm's costs and risks.

The Firm's businesses and operations are subject to heightened governmental and regulatory oversight and scrutiny. The Firm has paid significant fines (or has provided significant monetary and other relief) to resolve a number of investigations or enforcement actions by governmental agencies. The Firm continues to devote substantial resources to satisfying the requirements of regulatory consent orders and other settlements to which it is subject, which increases the Firm's operational and compliance costs.

Certain regulators have taken measures in connection with specific enforcement actions against financial institutions (including the Firm) that require admissions of wrongdoing and compliance with other conditions in connection with settling such matters. Such admissions and conditions can lead to, among other things, greater exposure in civil litigation, harm to reputation, disqualification from providing business to certain clients and in certain jurisdictions, and other direct and indirect adverse effects.

In addition, U.S. government officials have indicated and demonstrated a willingness to bring criminal actions against financial institutions, including the Firm, and have increasingly sought, and obtained, resolutions that include criminal pleas or other admissions of wrongdoing from those institutions, such as the Firm's agreement in May 2015 to plead guilty to a single violation of federal antitrust law in connection with its settlements with certain government authorities relating to its foreign exchange sales and trading activities and controls related to those activities, and the non-prosecution agreement entered into by a subsidiary of the Firm with the U.S. Department of Justice in November 2016 in connection with settlements to resolve various governmental investigations relating to a former hiring program for candidates referred by clients, potential clients and government officials in the Asia Pacific region. Such resolutions, whether with U.S. or non-U.S. authorities, could have significant collateral consequences for a subject financial institution, including loss of customers and business, or the inability to offer certain products or services, or losing permission to operate certain businesses, for a period of time (absent the forbearance of, or the granting of waivers by, applicable regulators).

The Firm expects that it and the financial services industry as a whole will continue to be subject to regulatory scrutiny and governmental investigations and enforcement actions and that violations of law will more frequently be met with formal and punitive enforcement action, including the imposition of significant monetary and other sanctions, rather than with informal supervisory action. In addition, if the Firm fails to meet the requirements of the various governmental settlements to which it is subject, or more

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generally, to maintain risk and control procedures and processes that meet the heightened standards established by its regulators and other government agencies, it could be required to enter into further orders and settlements, pay additional fines, penalties or judgments, or accept material regulatory restrictions on its businesses. The extent of the Firm's exposure to legal and regulatory matters may be unpredictable and could, in some cases, substantially exceed the amount of reserves that the Firm has established for such matters.

Requirements for the orderly resolution of the Firm could require JPMorgan Chase to restructure or reorganize its businesses.

Under Title I of the Dodd-Frank Act ("Title I") and Federal Reserve and FDIC rules, the Firm is required to prepare and submit periodically to the Federal Reserve and the FDIC a detailed plan (the "Resolution Plan") for the rapid and orderly resolution, without extraordinary government support, of JPMorgan Chase & Co. and certain of its subsidiaries under the U.S. Bankruptcy Code and other applicable insolvency laws in the event of future material financial distress of the Firm.

In April 2016, the Federal Reserve and the FDIC jointly provided firm-specific feedback on the 2015 Resolution Plans of eight systemically important domestic banking institutions, and determined that five of these 2015 Resolution Plans, including that of the Firm, were not credible or would not facilitate an orderly resolution under the U.S. Bankruptcy Code. In addition to the identified deficiencies, the Federal Reserve and the FDIC also identified certain shortcomings which were required to be satisfactorily addressed in the Firm's Resolution Plan due on July 1, 2017. On October 1, 2016, the Firm filed with the Federal Reserve and the FDIC its submission (the "2016 Resolution Submission") describing how the Firm remediated the identified deficiencies and providing a status report of its actions to address the identified shortcomings.

On December 13, 2016, the Federal Reserve and the FDIC advised the Firm of their determinations that the Firm's 2016 Resolution Submission adequately remediated the deficiencies in the Firm's 2015 Resolution Plan identified by the agencies. On July 1, 2017, the Firm will file with the Federal Reserve and the FDIC its 2017 Resolution Plan which will, among other things, describe how the Firm has remediated the remaining shortcomings identified by the agencies in April 2016. If the Federal Reserve and the FDIC were to jointly determine that the Firm did not remediate the identified shortcomings, or that the Firm's 2017 Resolution Plan, or any future update of that plan, is not credible, and the Firm is unable to remedy the identified deficiencies in a timely manner, the regulators may jointly impose more stringent capital, leverage or liquidity requirements on the Firm or restrictions on growth, activities or operations of the Firm, and could, if such deficiencies are not remedied within two years after such a determination, require the Firm to restructure, reorganize or divest businesses, legal entities, operational systems and/or intercompany transactions in ways that could

materially and adversely affect the Firm's operations and strategy. In addition, in order to continue to maintain a Title I Resolution Plan that the Federal Reserve and FDIC determine is credible, the Firm may need to make additional changes to its legal entity structure and to certain intercompany and external activities, which could result in increased funding or operational costs.

Holders of JPMorgan Chase's debt and equity securities will absorb losses if JPMorgan Chase were to enter into a resolution.

The Federal Reserve has issued final rules (the "TLAC rules") regarding the minimum levels of unsecured external long-term debt and other loss-absorbing capacity that bank holding companies are required to have issued and outstanding, as well as guidelines defining the terms of qualifying debt instruments, to ensure that adequate levels of debt are maintained at the holding company level for purposes of recapitalizing the Firm's operating subsidiaries ("eligible LTD"). If JPMorgan Chase & Co. were to enter into a resolution, either in a proceeding under Chapter 11 of the U.S. Bankruptcy Code or in a receivership administered by the FDIC under Title II of the Dodd-Frank Act, holders of eligible LTD and other debt and equity securities of the Firm will absorb the losses of JPMorgan Chase & Co. and its affiliates.

Under the Firm's Resolution Plan, the Firm's preferred resolution strategy contemplates that only JPMorgan Chase & Co. would enter bankruptcy proceedings under Chapter 11 of the U.S. Bankruptcy Code pursuant to a "single point of entry" recapitalization strategy. JPMorgan Chase & Co.'s subsidiaries would be recapitalized as needed so that they could continue normal operations or subsequently be wound down in an orderly manner. As a result, JPMorgan Chase & Co.'s losses and any losses incurred by its subsidiaries would be imposed first on holders of JPMorgan Chase & Co.'s equity securities and thereafter on unsecured creditors, including holders of JPMorgan Chase & Co.'s eligible LTD and other debt securities. Claims of holders of those debt securities would have a junior position to the claims of creditors of JPMorgan Chase & Co.'s subsidiaries and to the claims of priority (as determined by statute) and secured creditors of JPMorgan Chase & Co. Accordingly, in a resolution of JPMorgan Chase & Co. under Chapter 11 of the U.S. Bankruptcy Code, holders of eligible LTD and other debt securities of JPMorgan Chase & Co. would realize value only to the extent available to JPMorgan Chase & Co. as a shareholder of JPMorgan Chase Bank, N.A. and its other subsidiaries, and only after any claims of priority and secured creditors of JPMorgan Chase & Co. have been fully repaid. If JPMorgan Chase & Co. were to enter into a resolution, none of JPMorgan Chase & Co., the Federal Reserve or the FDIC is obligated to follow the Firm's preferred resolution strategy under its Resolution Plan.

The FDIC has similarly indicated that a single point of entry recapitalization model could be a desirable strategy to resolve a systemically important financial institution, such as JPMorgan Chase & Co., under Title II of the Dodd-Frank Act. Pursuant to that strategy, the FDIC would use its power to create a "bridge entity" for JPMorgan Chase & Co.;

transfer the systemically important and viable parts of its business, principally the stock of JPMorgan Chase & Co.'s main operating subsidiaries and any intercompany claims against such subsidiaries, to the bridge entity; recapitalize those subsidiaries using assets of JPMorgan Chase & Co. that have been transferred to the bridge entity; and exchange external debt claims against JPMorgan Chase & Co. for equity in the bridge entity. Under this Title II resolution strategy, the value of the stock of the bridge entity that would be redistributed to holders of eligible LTD and other debt securities of JPMorgan Chase & Co. may not be sufficient to repay all or part of the principal amount and interest on such securities. To date, the FDIC has not formally adopted a single point of entry resolution strategy and it is not obligated to follow such a strategy in a Title II resolution of JPMorgan Chase & Co.

Market Risk

JPMorgan Chase's results of operations have been, and may continue to be, adversely affected by U.S. and global financial market and economic conditions and political developments.

JPMorgan Chase's businesses are materially affected by economic and market conditions, including the liquidity of the global financial markets; the level and volatility of debt and equity prices, interest rates, currency and commodities prices (including oil prices) and other market indices; investor, consumer and business sentiment; events that reduce confidence in the financial markets; inflation and unemployment; the availability and cost of capital and credit; the economic effects of natural disasters, health emergencies or pandemics, severe weather conditions, outbreaks of hostilities, terrorism or other geopolitical instabilities; monetary policies and actions taken by the Federal Reserve and other central banks; and the health of the U.S. and global economies.

Recent political developments in the U.S. and abroad have increased the uncertainty regarding the economic environment in which the Firm will operate. Although certain of the proposals being considered in the U.S., such as tax reform or increased expenditure on infrastructure projects, could lead to higher levels of U.S. economic activity and more expansive U.S. domestic economic growth, others, such as protectionist trade policies or isolationist foreign policies, could contract economic growth. The uncertainty around the manner and extent to which these economic policies are ultimately enacted could impact market volatility and affect the Firm's businesses, both directly and through their impact on the businesses and activities of the Firm's clients and customers. In addition, the effects of various referenda in Europe, including the vote by the U.K. electorate to leave the EU, as well as the uncertainties regarding the outcome of Eurozone presidential elections in 2017, have triggered political and economic uncertainty in the Eurozone. There is no assurance that such uncertainty, and any resultant market volatility, will not adversely affect the Firm's results of operations.

In the Firm's wholesale businesses, market and economic factors can affect the volume of transactions that the Firm

executes for its clients and, therefore, the revenue that the Firm receives, as well as the willingness of other financial institutions and investors to participate in loan syndications or underwritings managed by the Firm.

The Firm generally maintains market-making positions in the fixed income, currency, commodities, credit and equity markets to facilitate client demand and provide liquidity to clients. The revenue derived from these positions is affected by many factors, including the Firm's success in effectively hedging its market and other risks; volatility in interest rates and equity, debt and commodities markets; interest rate and credit spreads; and the availability of liquidity in the capital markets, all of which are affected by global economic and market conditions, political events and regulatory restrictions on market-making activities. In addition, the Firm's market-making businesses can expose the Firm to unexpected market, credit and operational risks that could cause the Firm to suffer unexpected losses. Severe declines in asset values, unanticipated credit events, or unforeseen circumstances that may cause previously uncorrelated factors to become correlated (and vice versa) may create losses resulting from risks not having been appropriately taken into account in the development, structuring or pricing of a financial instrument.

The Firm may be adversely affected by declining asset values. This is particularly true for businesses that earn fees for managing third-party assets or receive or post collateral. For example, a higher level of U.S. or non-U.S. interest rates or a downturn in financial markets could affect the valuations of the client assets that the Firm manages or holds in custody, which, in turn, could affect the Firm's revenue from fees that are based on the amount of assets under management or custody. Macroeconomic or market concerns, as well as legislative and regulatory developments (such as, for example, the recently-adopted SEC rules relating to money-market funds), may also prompt outflows from the Firm's funds or accounts or cause clients to invest funds in products that generate lower revenue.

Changes in interest rates will affect the level of assets and liabilities held on the Firm's balance sheet and the revenue that the Firm earns from net interest income. An increasing or high interest rate environment, while generally increasing the net interest income earned by the Firm, may under certain circumstances also result in lower levels of commercial and residential loan originations and diminished returns on the investment securities portfolio (to the extent that the Firm is unable to reinvest contemporaneously in higher-yielding assets), thereby adversely affecting the Firm's revenues and capital levels. Conversely, a low interest rate environment may compress net interest margins, reducing the amounts that the Firm earns on its investment securities portfolio, or reducing the value of its mortgage servicing rights ("MSRs") asset, thereby reducing the Firm's net interest income and other revenues.

The Firm's consumer businesses are particularly affected by U.S. domestic economic conditions, including U.S. interest

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rates, the rate of unemployment, housing prices, the level of consumer confidence, changes in consumer spending and the number of personal bankruptcies. Sustained low growth in the U.S. economy could diminish demand for the products and services offered by the Firm's consumer businesses, or increase the cost to provide such products and services. In addition, adverse economic conditions, such as economic dislocations in certain geographies due to high levels of unemployment resulting from declining industrial or manufacturing activity, or other market or economic factors, could lead to an increase in mortgage, credit card, auto, student and other loan delinquencies and higher net charge-offs, which can reduce the Firm's earnings. The Firm's earnings from its consumer businesses could also be adversely affected by changes in government policies that affect consumers, including those relating to medical insurance, immigration, employment status and taxation, as well as governmental policies aimed at the economy more broadly, such as infrastructure spending and global trade, which could result in, among other things, higher inflation or reductions in consumer disposable income.

Widening of credit spreads makes it more expensive for the Firm to borrow on both a secured and unsecured basis, and may adversely affect the credit markets and the Firm's businesses. Credit spreads widen or narrow not only in response to Firm-specific events and circumstances, but also as a result of general economic and geopolitical events and conditions. Changes in the Firm's credit spreads will impact, positively or negatively, the Firm's earnings on certain liabilities that are recorded at fair value.

Sudden and significant volatility in the prices of securities and other assets (including loans and derivatives) may curtail the trading markets for such securities and assets, make it difficult to sell or hedge such securities and assets, adversely affect the Firm's profitability, capital or liquidity, or increase the Firm's funding costs. The Federal Reserve has recently observed that market volatility may be exacerbated by regulatory restrictions, as market participants that are subject to the Volcker Rule are likely to decrease their market-making activities, and thereby constrain market liquidity, during periods of market stress. In addition, in a difficult or less liquid market environment, the Firm's risk management strategies may not be effective because other market participants may be attempting to use the same or similar strategies to deal with the challenging market conditions. In such circumstances, it may be difficult for the Firm to reduce its risk positions due to the activity of such other market participants or widespread market dislocations. Sustained volatility in the financial markets may also negatively affect consumer or investor confidence, which could lead to lower client activity and decreased revenue for the Firm.

Credit Risk

The financial condition of JPMorgan Chase's clients and counterparties, particularly other financial institutions, could adversely affect the Firm.

The Firm routinely executes transactions with clients and counterparties in the financial services industry, including brokers and dealers, commercial banks, investment banks, mutual and hedge funds, investment managers and other types of financial institutions. Many of these transactions expose the Firm to the credit risk of its counterparties and, in some cases, disputes and litigation in the event of a default by the counterparty or client. Disputes with counterparties may also arise regarding the terms or the settlement procedures of derivative contracts, including with respect to the value of underlying collateral, which could cause the Firm to incur unexpected costs, including transaction, operational, legal and litigation costs, or result in credit losses, all of which may impair the Firm's ability to manage effectively its credit risk exposure from these products.

The failure of a significant market participant, or concerns about a default by such an institution, could also lead to significant liquidity problems for, or losses or defaults by, other institutions, which in turn could adversely affect the Firm. In addition, in recent years the perceived interrelationship among financial institutions has also led to claims by other market participants and regulators that the Firm and other financial institutions have allegedly violated anti-trust or anti-competition laws by colluding to manipulate markets, prices or indices, and there is no assurance that such allegations will not arise in the same or similar contexts in the future.

As part of providing clearing services, the Firm is a member of a number of CCPs, and may be required to pay a portion of the losses incurred by such organizations as a result of the default of other members. As a clearing member, the Firm is also exposed to the risk of non-performance by its clients, which it seeks to mitigate through the maintenance of adequate collateral. In addition, the Firm can be exposed to intra-day credit risk of its clients in connection with providing cash management, clearing, custodial and other transaction services to such clients. If a client for which the Firm provides such services becomes bankrupt or insolvent, the Firm may suffer losses, become involved in disputes and litigation with various parties, including one or more CCPs, or the client's bankruptcy estate and other creditors, or involved in regulatory investigations. All of such events can increase the Firm's operational and litigation costs and may result in losses if any collateral received by the Firm is insufficient to cover such losses.

During periods of market stress or illiquidity, the Firm's credit risk also may be further increased when the Firm cannot realize the fair value of the collateral held by it or when collateral is liquidated at prices that are not sufficient to recover the full amount of the loan, derivative or other exposure due to the Firm. Further, disputes with obligors concerning the valuation of collateral could increase in

times of significant market stress, volatility or illiquidity, and the Firm could suffer losses during such periods if it is unable to realize the fair value of collateral or manage declines in the value of collateral.

Concentration of credit and market risk could increase the potential for significant losses.

JPMorgan Chase has exposure to increased levels of risk when clients or counterparties are engaged in similar business activities or activities in the same geographic region, or when they have similar economic features that would cause their ability to meet contractual obligations to be similarly affected by changes in economic conditions. For example, a significant deterioration in the credit quality of one of the Firm's borrowers or counterparties could lead to concerns about the credit quality of other borrowers or counterparties in similar, related or dependent industries and thereby could exacerbate the Firm's credit risk exposure and potentially increase its losses, including mark-to-market losses in its trading businesses. Similarly, challenging economic conditions affecting a particular industry or geographic area could lead to concerns about the credit quality of the Firm's borrowers or counterparties, not only in that particular industry or geography but in related or dependent industries, wherever located, or about the ability of customers of the Firm's consumer businesses living in such areas or working in such affected industries or related or dependent industries to meet their obligations to the Firm. Although the Firm regularly monitors various segments of its exposures to assess potential concentration or contagion risks, the Firm's efforts to diversify or hedge its exposures against concentration risks may not be successful.

In addition, disruptions in the liquidity or transparency of the financial markets may result in the Firm's inability to sell, syndicate or realize the value of its positions, thereby leading to increased concentrations. The inability to reduce the Firm's positions may not only increase the market and credit risks associated with such positions, but may also increase the level of risk-weighted assets ("RWA") on the Firm's balance sheet, thereby increasing its capital requirements and funding costs, all of which could adversely affect the operations and profitability of the Firm's businesses.

Liquidity Risk

If JPMorgan Chase does not effectively manage its liquidity, its business could suffer.

JPMorgan Chase's liquidity is critical to its ability to operate its businesses. Some potential conditions that could impair the Firm's liquidity include markets that become illiquid or are otherwise experiencing disruption, unforeseen cash or capital requirements (including, among others, commitments that may be triggered to special purpose entities ("SPEs") or other entities), difficulty in selling or inability to sell assets, default by a CCP or other counterparty, unforeseen outflows of cash or collateral, and lack of market or customer confidence in the Firm or financial markets in general. These conditions may be caused by events over which the Firm has little or no control. The widespread crisis in investor confidence and

resulting liquidity crisis experienced in 2008 and into early 2009 increased the Firm's cost of funding and limited its access to some of its traditional sources of liquidity (such as securitized debt offerings backed by mortgages, credit card receivables and other assets) during that time, and there is no assurance that these severe conditions could not occur in the future.

If the Firm's access to stable and low cost sources of funding, such as bank deposits, is reduced, the Firm may need to raise alternative funding which may be more expensive or of limited availability. In addition, the Firm's cost of funding could be affected by actions that the Firm may take in order to satisfy applicable liquidity coverage ratio and net stable funding ratio requirements, to lower its GSIB systemic risk score, to satisfy the amount of eligible LTD that the Firm must have outstanding under the TLAC rules, to address obligations under the Firm's Resolution Plan or to satisfy regulatory requirements in non-U.S. jurisdictions relating to the pre-positioning of liquidity in subsidiaries that are material legal entities.

JPMorgan Chase is a holding company and depends on the cash flows of its subsidiaries to fund payments of dividends on its equity securities, principal and interest payments on its debt securities and redemptions and repurchases of its outstanding securities.

As a holding company, JPMorgan Chase & Co. is dependent on the earnings of its subsidiaries to meet its payment obligations. Under the arrangements contemplated by the Firm's Resolution Plan, JPMorgan Chase & Co. has established a new intermediate holding company, JPMorgan Chase Holdings LLC (the "IHC"), and has contributed to the IHC the stock of substantially all of its direct subsidiaries (other than JPMorgan Chase Bank, N.A.) as well as other assets and intercompany indebtedness owing to it. Under these arrangements, JPMorgan Chase & Co. is obligated to contribute to the IHC substantially all the net proceeds received by it from securities issuances (including, without limitation, issuances of senior and subordinated debt securities and of preferred and common stock). As a result of these arrangements, JPMorgan Chase & Co.'s ability to pay interest on its debt securities and dividends on its equity securities, to redeem or repurchase its outstanding securities and to fulfill its other payment obligations is dependent on it receiving dividends from JPMorgan Chase Bank, N.A. and dividends and extensions of credit from the IHC. JPMorgan Chase Bank, N.A. is subject to restrictions on its dividend distributions, capital adequacy and liquidity coverage requirements, and other regulatory restrictions on its ability to make payments to JPMorgan Chase & Co., and the IHC is prohibited from paying dividends or extending credit to JPMorgan Chase & Co. if certain capital or liquidity "thresholds" are breached or if limits are otherwise imposed by the Firm's management or Board of Directors. These regulatory restrictions and limitations on the payments that JPMorgan Chase & Co. is permitted to receive from JPMorgan Chase Bank, N.A. and the IHC could reduce or hinder its ability to pay dividends and satisfy its debt and other obligations, or result in JPMorgan Chase & Co. seeking protection under bankruptcy laws at a time earlier than

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would have been the case absent the existence of such thresholds.

Reductions in JPMorgan Chase's credit ratings may adversely affect its liquidity and cost of funding, as well as the value of debt obligations issued by the Firm.

JPMorgan Chase & Co. and certain of its principal subsidiaries are currently rated by credit rating agencies. Rating agencies evaluate both general and firm- and industry-specific factors when determining their credit ratings for a particular financial institution, including economic and geopolitical trends, regulatory developments, future profitability, risk management practices, legal expenses, assumptions surrounding government support, and ratings differentials between bank holding companies and their bank and non-bank subsidiaries. Although the Firm closely monitors and manages, to the extent it is able, factors that could influence its credit ratings, there is no assurance that the Firm's credit ratings will not be lowered in the future, or that any such downgrade would not occur at times of broader market instability when the Firm's options for responding to events may be more limited and general investor confidence is low.

Furthermore, a reduction in the Firm's credit ratings could reduce the Firm's access to capital markets, materially increase the cost of issuing securities, trigger additional collateral or funding requirements, and decrease the number of investors and counterparties willing or permitted, contractually or otherwise, to do business with or lend to the Firm, thereby curtailing the Firm's business operations and reducing its profitability. In addition, any such reduction in credit ratings may increase the credit spreads charged by the market for taking credit risk on JPMorgan Chase & Co. and its subsidiaries and, as a result, could adversely affect the value of debt and other obligations that JPMorgan Chase & Co. and its subsidiaries have issued or may issue in the future.

Legal Risk

JPMorgan Chase faces significant legal risks, both from regulatory investigations and proceedings and from private actions brought against the Firm.

JPMorgan Chase is named as a defendant or is otherwise involved in various legal proceedings, including class actions and other litigation or disputes with third parties. Actions currently pending against the Firm may result in judgments, settlements, fines, penalties or other results adverse to the Firm, which could materially and adversely affect the Firm's business, financial condition or results of operations, or cause serious harm to the Firm's reputation. As a participant in the financial services industry, it is likely that the Firm will continue to experience a high level of litigation related to its businesses and operations.

In addition, and as noted above, the Firm's businesses and operations are also subject to heightened regulatory oversight and scrutiny, which may lead to additional regulatory investigations or enforcement actions. Regulators and other government agencies examine the operations of the Firm and its subsidiaries on both a routine- and targeted-exam basis, and there is no assurance

that they will not pursue additional regulatory settlements or other enforcement actions against the Firm in the future. A violation of law or regulation by another financial institution is likely to give rise to an investigation by regulators and other governmental agencies of the same or similar practices by the Firm. For example, various regulatory and governmental agencies have made inquiries to the Firm about its sales practices with retail customers, including, among other matters, the Firm's incentive compensation structures related to such practices. In addition, a single event may give rise to numerous and overlapping investigations and proceedings, either by multiple federal and state agencies and officials in the U.S. or, in some instances, regulators and other governmental officials in non-U.S. jurisdictions. These and other initiatives from U.S. and non-U.S. governmental authorities and officials may subject the Firm to further judgments, settlements, fines or penalties, or cause the Firm to be required to restructure its operations and activities or to cease offering certain products or services, all of which could harm the Firm's reputation or lead to higher operational costs, thereby reducing the Firm's profitability, or result in collateral consequences as discussed above.

Other Business Risks

Any significant failure by the Firm's management to anticipate and respond quickly and appropriately to changes in the Firm's operating environment or trends affecting the financial services industry, to make prudent decisions regarding the Firm's strategy or to execute on that strategy could adversely affect the Firm's competitive standing and its earnings and future results of operations.

The Firm operates in many jurisdictions and offers a wide variety of products and services to its clients and customers. The Firm's strategies concerning the products and services that it will offer, the geographies in which it will operate, the types of clients and customers that it will serve and the counterparties with which it will do business, and the methods and distribution channels by which it will offer its products and services, will all affect the Firm's competitive standing and its results of operations. If the Firm's management makes choices about the Firm's business strategies and goals that later prove to have been incorrect, does not accurately assess the competitive landscape and the industry trends affecting the Firm or does not formulate effective business plans to address the Firm's near- and longer-term strategic priorities, as well as the changing regulatory and market environments in which the Firm operates both in the U.S. and abroad, the franchise values and growth prospects of the Firm's businesses will suffer and revenues will decline. The prospects of the Firm will also depend on management's ability to execute effectively against the Firm's strategic plans and to manage the Firm's resources to grow revenues, control expenses and return capital to the Firm's shareholders. Any significant failure by the Firm's Board of Directors to exercise appropriate oversight of management's strategic decisions, or any significant failure by the Firm's management to develop and execute on the Firm's strategic plans and business initiatives, or the ineffectual

implementation of business decisions, the failure of the Firm's products or services or dealings with customers to meet customer expectations, inadequate responses to regulatory requirements, the failure to react quickly to changes in market conditions or structure, or the failure to develop the necessary operational, technology, risk, financial, and managerial resources necessary to grow and manage the Firm and its various businesses could adversely affect the Firm's competitive standing and negatively affect the Firm's earnings and future results of operations.

JPMorgan Chase's operations are subject to risk of loss from unfavorable economic, monetary and political developments in the U.S. and around the world.

JPMorgan Chase's businesses and earnings are affected by the fiscal and other policies that are adopted by various U.S. and non-U.S. regulatory authorities and agencies. The Federal Reserve regulates the supply of money and credit in the U.S. and its policies determine in large part the cost of funds for lending and investing in the U.S. and the return earned on those loans and investments. Changes in Federal Reserve policies (as well as the fiscal and monetary policies of non-U.S. central banks or regulatory authorities and agencies, such as "pegging" the exchange rate of their currency to the currencies of others) are beyond the Firm's control and may be difficult to predict, and consequently, unanticipated changes in these policies could have a negative impact on the Firm's activities and results of operations.

The Firm's businesses and revenue are also subject to risks inherent in investing and market-making in securities, loans and other obligations of companies worldwide. These risks include, among others, negative effects from slowing growth rates or recessionary economic conditions, or the risk of loss from unfavorable political, legal or other developments, including social or political instability, in the countries or regions in which such companies operate, as well as the other risks and considerations as described further below.

Several of the Firm's businesses engage in transactions with, or trade in obligations of, U.S. and non-U.S. governmental entities, including national, state, provincial, municipal and local authorities. These activities can expose the Firm to enhanced sovereign, credit-related, operational and reputation risks, including the risks that a governmental entity may default on or restructure its obligations, claim that actions taken by government officials were beyond the legal authority of those officials or repudiate transactions authorized by a previous incumbent government, any or all of which could adversely affect the Firm's financial condition and results of operations.

Further, various countries or regions in which the Firm operates or invests, or in which the Firm may do so in the future, have in the past experienced severe economic disruptions particular to those countries or regions. In some cases, concerns regarding the fiscal condition of one or more countries can cause a contraction of available credit and reduced activity among trading partners or create market volatility that could lead to "market contagion" affecting other countries in the same region or beyond the

region. In addition, governments in particular countries or regions in which the Firm or its client do business may choose to adopt protectionist economic or trade policies in response to concerns about domestic economic conditions which could lead to diminished cross-border trade and financing activity within that country or region, all of which could negatively affect the Firm's business and earnings in those jurisdictions.

Political and economic uncertainty can also undermine consumer, business and investor confidence, and thereby contribute to market volatility. For example, uncertainties concerning the timing and terms of the U.K.'s planned departure from the EU could have an adverse effect on global financial markets and may adversely impact global economic conditions more generally. Furthermore, depending on the nature of the arrangements agreed between the U.K. and the EU, including with respect to the ability of financial services companies to engage in business in the EU from legal entities organized in or operating from the U.K., it is possible that under some scenarios, the Firm may need to make changes to its legal entity structure and operations and the locations in which it operates, which might result in a less efficient operating model across the Firm's European legal entities. Accordingly, it is possible that political or economic developments in certain countries, even in countries in which the Firm does not conduct business or have operations or engages in only limited activities, may adversely affect the Firm.

The Firm must comply with economic sanctions and embargo programs administered by OFAC and similar multi-national bodies and governmental agencies outside U.S., including, most recently, sanctions targeted at individuals and companies in Russia. A violation of a sanction or embargo program could subject the Firm, and individual employees, to regulatory enforcement actions as well as significant civil and criminal penalties.

JPMorgan Chase's operations in emerging markets may be hindered by local political, social and economic factors, and may be subject to additional compliance costs and risks.

Some of the countries in which JPMorgan Chase conducts its businesses have economies or markets that are less developed and more volatile, and may have legal and regulatory regimes that are less established or predictable, than the U.S. and other developed markets in which the Firm currently operates. Some of these countries have in the past experienced severe economic disruptions, including extreme currency fluctuations, high inflation, low or negative growth, or defaults or potential defaults on sovereign debt, among other negative conditions, or have imposed restrictive monetary policies such as currency exchange controls and other laws and restrictions that adversely affect the local and regional business environment. In addition, these countries, as well as certain more developed countries, have recently been more susceptible to unfavorable political, social or economic developments; these developments have in the past resulted in, and may in the future lead to, social unrest,

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general strikes and demonstrations, crime and corruption, security and personal safety issues, outbreaks of hostilities, overthrow of incumbent governments, terrorist attacks or other forms of internal discord, all of which can adversely affect the Firm's operations or investments in such countries. Political, social or economic disruption or dislocation in certain countries or regions in which the Firm conducts its businesses can hinder the growth and profitability of those operations.

Less developed legal and regulatory systems in certain countries can also have adverse consequences on the Firm's operations in those countries, including, among others, the absence of a statutory or regulatory basis or guidance for engaging in specific types of business or transactions; the promulgation of conflicting or ambiguous laws and regulations or the inconsistent application or interpretation of existing laws and regulations; uncertainty as to the enforceability of contractual obligations; difficulty in competing in economies in which the government controls or protects all or a portion of the local economy or specific businesses, or where graft or corruption may be pervasive; and the threat of arbitrary regulatory investigations, civil litigations or criminal prosecutions, the termination of licenses required to operate in the local market or the suspension of business relationships with governmental bodies.

Revenue from international operations and trading in non-U.S. securities and other obligations may be subject to negative fluctuations as a result of the above considerations, as well as due to governmental actions including monetary policies, expropriation, nationalization, confiscation of assets, price controls, capital controls, exchange controls, and changes in laws and regulations. The impact of these fluctuations could be accentuated as some trading markets are smaller, less liquid and more volatile than larger markets. Also, any of the above-mentioned events or circumstances in one country can affect, and in the past conditions of these types have affected, the Firm's operations and investments in another country or countries, including the Firm's operations in the U.S. As a result, any such unfavorable conditions or developments could have an adverse impact on the Firm's business and results of operations.

Conducting business in countries with less developed legal and regulatory regimes often requires the Firm to devote significant additional resources to understanding, and monitoring changes in, local laws and regulations, as well as structuring its operations to comply with local laws and regulations and implementing and administering related internal policies and procedures. There can be no assurance that the Firm will always be successful in its efforts to conduct its business in compliance with laws and regulations in countries with less predictable legal and regulatory systems or that the Firm will be able to develop effective working relationships with local regulators. In addition, the Firm can also incur higher costs, and face greater compliance risks, in structuring and operating its businesses outside the U.S. to comply with U.S. anti-corruption and anti-money laundering laws and regulations.

JPMorgan Chase relies on the effectiveness and integrity of its processes, operational systems and employees, and those of third parties, and certain failures of such processes or systems, or errors or misconduct by such employees, could materially and adversely affect the Firm's operations.

JPMorgan Chase's businesses are dependent on the Firm's ability to process, record and monitor an increasingly large number of complex transactions and to do so on a faster and more frequent basis. The Firm's front- and back-office trading systems similarly rely on their access to, and on the functionality of, the operational systems maintained by third parties such as clearing and payment systems, central counterparties, securities exchanges and data processing and technology companies. If the Firm's financial, accounting, trading or other data processing systems, or the operational systems of third parties on which the Firm's businesses are dependent, are unable to meet these increasingly demanding standards, or if they fail or have other significant shortcomings, the Firm could be materially and adversely affected. Moreover, as the speed, frequency, volume and complexity of transactions (and the requirements to report such transactions on a real-time basis to clients, regulators and financial intermediaries) increases, the risk of human and/or systems error in connection with such transactions increases, and it becomes more challenging to maintain the Firm's operational systems and infrastructure. The effective functioning of the Firm's operational systems is also dependent on the competence and reliability of its employees, as well as the employees of third parties on whom the Firm relies for technological support, and the Firm could be materially and adversely affected by a significant operational breakdown or failure caused by human error or misconduct by an employee of the Firm or a third party. In addition, when the Firm changes processes or introduces new products and services or new connectivity solutions, the Firm may not fully appreciate or identify new operational risks that may arise from such changes. Any of these occurrences could diminish the Firm's ability to operate one or more of its businesses, or result in potential liability to clients and customers, increased operating expenses, higher litigation costs (including fines and sanctions), damage to reputation, impairment of liquidity, regulatory intervention or weaker competitive standing, any of which could materially and adversely affect the Firm.

Third parties with which the Firm does business, including retailers, data aggregators and other third parties with which the Firm's customers do business, can also be sources of operational risk to the Firm, particularly where activities of customers or such third parties are beyond the Firm's security and control systems, such as through the use of the internet, personal smart phones and other mobile devices or services. As the Firm's interconnectivity with customers and other third parties increases, the Firm increasingly faces the risk of operational failure with respect to their systems. Security breaches affecting the Firm's customers, or systems breakdowns or failures, security breaches or human error or misconduct affecting such other third

parties, may require the Firm to take steps to protect the integrity of its own operational systems or to safeguard confidential information of the Firm or its customers, thereby increasing the Firm's operational costs and potentially diminishing customer satisfaction. Furthermore, the interconnectivity of multiple financial institutions with central agents, exchanges and clearing houses, and the increased importance of these entities, increases the risk that an operational failure at one institution or entity may cause an industry-wide operational failure that could materially impact the Firm's ability to conduct business.

The Firm's businesses are subject to complex and evolving U.S. and non-U.S. laws and regulations governing the privacy and protection of personal information of individuals (including clients, client's clients, employees of the Firm and its suppliers and other third parties). Ensuring that the Firm's collection, use, transfer and storage of personal information complies with all applicable laws and regulations, including where the laws of different jurisdictions are in conflict, can increase the Firm's operating costs, impact the development of new products or services and require significant oversight by management, and may require the Firm to structure its businesses, operations and systems in less efficient ways. Furthermore, the Firm may not be able to ensure that all of its clients, suppliers, counterparties and other third parties have appropriate controls in place to protect the confidentiality of the information exchanged between them and the Firm, particularly where such information is transmitted by electronic means. If personal, confidential or proprietary information of clients, customers, employees or others were to be mishandled or misused (in situations where, for example, such information was erroneously provided to parties who are not permitted to have the information, or where such information was intercepted or otherwise compromised by third parties), the Firm could be exposed to litigation or regulatory sanctions. Concerns regarding the effectiveness of the Firm's measures to safeguard personal information, or even the perception that such measures are inadequate, could cause the Firm to lose customers or potential customers for its products and services and thereby reduce the Firm's revenues. Accordingly, any failure or perceived failure by the Firm to comply with applicable privacy or data protection laws and regulations may subject it to inquiries, examinations and investigations that could result in requirements to modify or cease certain operations or practices or significant liabilities, fines or penalties, and could damage the Firm's reputation and otherwise adversely affect its businesses.

The Firm may be subject to disruptions of its operational systems arising from events that are wholly or partially beyond the Firm's control, which may include, for example, security breaches (as discussed further below); electrical or telecommunications outages; failures of computer servers or other damage to the Firm's property or assets; natural disasters or severe weather conditions; health emergencies or pandemics; or events arising from local or larger-scale political events, including outbreaks of hostilities or terrorist acts. JPMorgan Chase maintains a global resiliency and crisis management program that is intended to ensure

that the Firm has the ability to recover its critical business functions and supporting assets, including staff, technology and facilities, in the event of a business interruption. While the Firm believes that its current resiliency plans are both sufficient and adequate, there can be no assurance that such plans will fully mitigate all potential business continuity risks to the Firm or its customers and clients. Any failures or disruptions of the Firm's systems or operations could give rise to losses in service to customers and clients, adversely affect the Firm's business and results of operations by subjecting the Firm to losses or liability, or require the Firm to expend significant resources to correct the failure or disruption, as well as by exposing the Firm to litigation, regulatory fines or penalties or losses not covered by insurance.

A breach in the security of JPMorgan Chase's systems, or those of other market participants, could disrupt the Firm's businesses, result in the disclosure of confidential information, damage the Firm's reputation and create significant financial and legal exposure for the Firm.

Although JPMorgan Chase devotes significant resources to maintain and regularly upgrade its systems and processes that are designed to protect the security of the Firm's computer systems, software, networks and other technology assets, as well as the confidentiality, integrity and availability of information belonging to the Firm and its customers and clients, there is no assurance that all of the Firm's security measures will provide absolute security. JPMorgan Chase and other companies, as well as governmental and political organizations, have reported significant breaches in the security of their websites, networks or other systems, some of which have involved sophisticated and targeted attacks intended to obtain unauthorized access to confidential information, destroy data, disrupt or degrade service, sabotage systems or cause other damage, including through the introduction of computer viruses or malware, cyberattacks and other means. The Firm is regularly targeted by unauthorized parties using malicious code and viruses, and has experienced several significant distributed denial-of-service attacks from technically sophisticated and well-resourced third parties which were intended to disrupt online banking services.

Despite the Firm's efforts to ensure the security and integrity of its systems, it is possible that the Firm may not be able to anticipate, detect or recognize threats to its systems or to implement effective preventive measures against all security breaches of these types inside or outside the Firm, especially because the techniques used change frequently or are not recognized until launched, and because cyberattacks can originate from a wide variety of sources, including third parties who are or may be involved in organized crime or linked to terrorist organizations or hostile foreign governments, and such third parties may seek to gain access to the Firm's systems either directly or using equipment or security passwords belonging to employees, customers, third-party service providers or other users of the Firm's systems. These risks may increase in the future as the Firm continues to increase its mobile-payment and other internet-based product offerings and

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expands its internal usage of web-based products and applications.

Given the breadth of the Firm's operations, the high volume of transactions that it processes, the large number of customers, counterparties and third-party service providers with which the Firm does business, and the proliferation and increasing sophistication of cyberattacks, a particular cyberattack could occur and persist for an extended period of time before being detected. The extent of a particular cyberattack and the steps that the Firm may need to take to investigate the attack may not be immediately clear, and it may take a significant amount of time before such an investigation could be completed and full and reliable information about the attack is known. During such time the Firm may not necessarily know the extent of the harm or how best to remediate it, and certain errors or actions could be repeated or compounded before they are discovered and remediated, any or all of which could further increase the costs and consequences of a cyberattack.

A successful penetration or circumvention of the security of the Firm's systems or the systems of another market participant could cause serious negative consequences for the Firm, including significant disruption of the Firm's operations and those of its clients, customers and counterparties, misappropriation of confidential information of the Firm or that of its clients, customers, counterparties or employees, or damage to computers or systems of the Firm and those of its clients, customers and counterparties, and could result in violations of applicable privacy and other laws, financial loss to the Firm or to its customers, loss of confidence in the Firm's security measures, customer dissatisfaction, significant litigation exposure and harm to the Firm's reputation, all of which could have a material adverse effect on the Firm.

Risk Management

JPMorgan Chase's framework for managing risks and its risk management procedures and practices may not be effective in identifying and mitigating every risk to the Firm, thereby resulting in losses.

JPMorgan Chase's risk management framework seeks to mitigate risk and loss to the Firm. The Firm has established processes and procedures intended to identify, measure, monitor, report and analyze the types of risk to which the Firm is subject. However, as with any risk management framework, there are inherent limitations to the Firm's risk management strategies because there may exist, or develop in the future, risks that the Firm has not appropriately anticipated or identified. In addition, the Firm relies on data to aggregate and assess its various risk exposures, and any deficiencies in the quality or effectiveness of the Firm's data aggregation and validation procedures could result in ineffective risk management practices or inaccurate risk reporting. Any lapse in the Firm's risk management framework and governance structure or other inadequacies in the design or implementation of the Firm's risk management framework, governance, procedures, practices, models or risk reporting systems could, individually or in the aggregate, cause unexpected losses for the Firm, materially and adversely affect the Firm's

financial condition and results of operations, require significant resources to remediate any risk management deficiency, attract heightened regulatory scrutiny, expose the Firm to regulatory investigations or legal proceedings, subject the Firm to fines, penalties or judgments, harm the Firm's reputation, or otherwise cause a decline in investor confidence.

The Firm establishes allowances for probable credit losses inherent in its credit exposures, and also employs stress testing and other techniques to determine the capital and liquidity necessary to protect the Firm in the event of adverse economic or market events. These processes are critical to the Firm's financial results and condition, and require difficult, subjective and complex judgments, including forecasts of how economic conditions might impair the ability of the Firm's borrowers and counterparties to repay their loans or other obligations. As is the case with any such assessments, there is always the possibility that the Firm will fail to identify the proper factors or that the Firm will fail to accurately estimate the impact of factors that it identifies.

Certain of the Firm's trading transactions require the physical settlement by delivery of securities or other obligations that the Firm does not own; if the Firm is unable to obtain such securities or obligations within the required timeframe for delivery, this could cause the Firm to forfeit payments otherwise due to it and could result in settlement delays, which could damage the Firm's reputation and ability to transact future business. In addition, in situations where trades are not settled or confirmed on a timely basis, the Firm may be subject to heightened credit and operational risk, and in the event of a default, the Firm may be exposed to market and operational losses.

Many of the Firm's risk management strategies or techniques have a basis in historical market behavior, and all such strategies and techniques are based to some degree on management's subjective judgment. For example, many models used by the Firm are based on assumptions regarding correlations among prices of various asset classes or other market indicators. In times of market stress, including difficult or less liquid market environments, or in the event of other unforeseen circumstances, previously uncorrelated indicators may become correlated, or conversely, previously correlated indicators may make unrelated movements. These sudden market movements or unanticipated or unidentified market or economic movements have in some circumstances limited and could again limit the effectiveness of the Firm's risk management strategies, causing the Firm to incur losses.

Many of the models used by the Firm are subject to review not only by the Firm's Model Risk function but also by the Firm's regulators in order that the Firm may utilize such models in connection with the Firm's calculations of market risk RWA, credit risk RWA and operational risk RWA under Basel III. The Firm may be subject to higher capital charges, which could adversely affect its financial results or limit its ability to expand its businesses, if such models do not receive approval by its regulators.

In addition, the Firm must comply with enhanced standards for the assessment and management of risks associated with vendors and other third parties that provide services to the Firm. These requirements apply to the Firm both under general guidance issued by its banking regulators and, more specifically, under certain of the consent orders to which the Firm has been subject. The Firm has incurred and expects to incur additional costs and expenses in connection with its initiatives to address the risks associated with oversight of its third party relationships. Failure by the Firm to appropriately assess and manage third party relationships, especially those involving significant banking functions, shared services or other critical activities, could result in potential liability to clients and customers, fines, penalties or judgments imposed by the Firm's regulators, increased operating expenses and harm to the Firm's reputation, any of which could materially and adversely affect the Firm.

Other Risks

Actions or inaction by employees of the Firm may cause harm to the Firm's clients and customers, damage the Firm's reputation, negatively impact the Firm's culture and lead to liability and regulatory and other governmental actions against the Firm.

JPMorgan Chase's employees interact with clients, customers and counterparties every day, and they are expected through their conduct to demonstrate the Firm's values and exhibit the culture and behaviors that are an integral part of the Firm's How We Do Business Principles, including the Firm's commitment to "do first class business in a first class way". If an employee takes an action (including a failure to act) that does not comply with the Firm's Code of Conduct, is inconsistent with the Firm's How We Do Business Principles or that otherwise harms clients, consumers or the market, such as improperly selling and marketing the Firm's product or services, acting illegally with others to establish market prices, improperly hiring individuals related to "politically exposed persons" or misappropriating Firm property or confidential or proprietary information or technology belonging to the Firm, its customers or third parties, such activities could give rise to litigation, regulatory or other governmental investigations or enforcement actions, and judgments, settlements, fines or penalties, and lead to requirements that the Firm restructure certain of its operations and activities, all of which could harm the Firm's reputation or result in collateral consequences. Although the Firm endeavors to embed culture and conduct risk management throughout an employee's life cycle, including recruiting, onboarding, training and development, and performance management, as well as through the Firm's promotion and compensation processes, employees of the Firm have, from time to time in the past, engaged in improper or illegal conduct resulting in litigation as well as settlements involving consent orders, deferred prosecution agreements and non-prosecution agreements, as well as other civil and criminal settlements with regulators and other governmental entities, and there is no assurance that further inappropriate actions by employees will not occur or

that any such actions will always be deterred or quickly prevented.

The financial services industry is highly competitive, and JPMorgan Chase's inability to compete successfully may adversely affect its results of operations.

JPMorgan Chase operates in a highly competitive environment, and the Firm expects that competition in the U.S. and global financial services industry will continue to be intense. Competitors of the Firm include other banks and financial institutions, trading, advisory and investment management firms, finance companies and technology companies and other firms that are engaged in providing similar products and services. Technological advances and the growth of e-commerce have made it possible for non-depository institutions to offer products and services that traditionally were banking products, and for financial institutions and other companies to provide electronic and internet-based financial solutions, including electronic securities trading, payment processing and online automated algorithmic-based investment advice. New technologies have required and could require the Firm to spend more to modify or adapt its products to attract and retain customers or to match products and services offered by its competitors, including technology companies.

Ongoing or increased competition, on the basis of the quality and variety of products and services offered, transaction execution, innovation, reputation, price or other factors, may put downward pressure on prices and fees for the Firm's products and services or may cause the Firm to lose market share. In addition, the failure of any of the Firm's businesses to meet the expectations of clients and customers, whether due to general market conditions or underperformance (relative to competitors or to benchmarks), could impact the Firm's ability to retain clients and customers or attract new clients and customers, thereby reducing the Firm's revenues. Increased competition also may require the Firm to make additional capital investments in its businesses, or to extend more of its capital on behalf of its clients in order to remain competitive. The Firm cannot provide assurance that the significant competition in the financial services industry will not materially and adversely affect its future results of operations.

Non-U.S. competitors of the Firm's wholesale businesses outside the U.S. are typically subject to different, and in some cases, less stringent, legislative and regulatory regimes. The more restrictive laws and regulations applicable to U.S. financial services institutions, such as JPMorgan Chase, can put the Firm at a competitive disadvantage to its non-U.S. competitors, including prohibiting the Firm from engaging in certain transactions, imposing higher capital and liquidity requirements on the Firm, making the Firm's pricing of certain transactions more expensive for clients or adversely affecting the Firm's cost structure for providing certain products, all of which can reduce the revenue and profitability of the Firm's wholesale businesses.

Part I

JPMorgan Chase's ability to attract and retain qualified employees is critical to its success.

JPMorgan Chase's employees are the Firm's most important resource, and in many areas of the financial services industry, competition for qualified personnel is intense. The Firm endeavors to attract talented and diverse new employees and retain and motivate its existing employees. There is the potential for changes in immigration policies in multiple jurisdictions around the world, including the U.S., and to the extent that immigration policies were to unduly restrict or otherwise make it more difficult for qualified employees to work in, or transfer among, jurisdictions in which the Firm has operations or conducts its business, the Firm could be adversely affected. The Firm also seeks to retain a pipeline of senior employees with superior talent, augmented from time to time by external hires, to provide continuity of succession for the Firm's Operating Committee, including the Chief Executive Officer position, and senior positions below the Operating Committee. The Firm regularly reviews candidates for senior management positions to assess whether they currently are ready for a next-level role. In addition, the Firm's Board of Directors is deeply involved in succession planning, including review of the succession plans for the Chief Executive Officer and the members of the Operating Committee. If the Firm were unable to continue to attract or retain qualified employees, including successors to the Chief Executive Officer or members of the Operating Committee, the Firm's performance, including its competitive position, could be materially and adversely affected.

JPMorgan Chase's financial statements are based in part on estimates and judgments which, if incorrect, could result in unexpected losses in the future.

Under accounting principles generally accepted in the U.S. ("U.S. GAAP"), JPMorgan Chase is required to use estimates and apply judgments in preparing its financial statements, including in determining allowances for credit losses and reserves related to litigation, among other items. Certain of the Firm's financial instruments, including trading assets and liabilities, instruments in the investment securities portfolio, certain loans, MSR, structured notes and certain repurchase and resale agreements, among other items, require a determination of their fair value in order to prepare the Firm's financial statements. Where quoted market prices are not available, the Firm may make fair value determinations based on internally developed models or other means which ultimately rely to some degree on management estimates and judgment. In addition, sudden illiquidity in markets or declines in prices of certain loans and securities may make it more difficult to value certain balance sheet items, which may lead to the possibility that such valuations will be subject to further change or adjustment. If estimates or judgments underlying the Firm's financial statements are incorrect, the Firm may experience material losses.

Lapses in disclosure controls and procedures or internal control over financial reporting could materially and adversely affect the Firm's operations, profitability or reputation.

There can be no assurance that the Firm's disclosure controls and procedures will be effective in every circumstance or that a material weakness or significant deficiency in internal control over financial reporting will not occur. Any such lapses or deficiencies may materially and adversely affect the Firm's business and results of operations or financial condition, restrict its ability to access the capital markets, require the Firm to expend significant resources to correct the lapses or deficiencies, expose the Firm to regulatory or legal proceedings, subject it to fines, penalties or judgments, harm the Firm's reputation, or otherwise cause a decline in investor confidence.

Damage to JPMorgan Chase's reputation could damage its businesses.

Maintaining trust in JPMorgan Chase is critical to the Firm's ability to attract and maintain customers, investors and employees. Damage to the Firm's reputation can therefore cause significant harm to the Firm's business and prospects. Harm to the Firm's reputation can arise from numerous sources, including, among others, employee misconduct, security breaches, compliance failures, litigation or regulatory outcomes or governmental investigations. The Firm's reputation could also be harmed by the failure or perceived failure of an affiliate, joint-venturer or merchant banking portfolio company, or a vendor or other third party with which the Firm does business, to comply with laws or regulations. In addition, the Firm's reputation or prospects may be significantly damaged by adverse publicity or negative information regarding the Firm, whether or not true, that may be posted on social media, non-mainstream news services or other parts of the internet, and this risk can be magnified by the speed and pervasiveness with which information is disseminated through those channels.

Management of potential conflicts of interest has become increasingly complex as the Firm continues to expand its business activities through more numerous transactions, obligations and interests with and among the Firm's clients. The failure or perceived failure to adequately address or appropriately disclose conflicts of interest has given rise to litigation and enforcement actions. Likewise, the failure or perceived failure to deliver appropriate standards of service and quality, to treat customers and clients fairly, to provide fiduciary products or services in accordance with the applicable legal and regulatory standards, or to handle or use confidential information of customers or clients appropriately or in compliance with applicable data protection and privacy laws and regulations has given rise to litigation and enforcement actions. In the future, a failure or perceived failure to appropriately address conflicts or fiduciary obligations could result in customer dissatisfaction, litigation and heightened regulatory scrutiny and enforcement actions, all of which can lead to lost

revenue and higher operating costs and cause serious harm to the Firm's reputation.

Actions by the financial services industry generally or by certain members of or individuals in the industry can also affect the Firm's reputation. For example, the role played by financial services firms during and after the financial crisis, including concerns that consumers have been treated unfairly by financial institutions or that a financial institution had acted inappropriately with respect to the methods employed in offering products to customers, have damaged the reputation of the industry as a whole. Should any of these or other events or factors that can undermine the Firm's reputation occur, there is no assurance that the additional costs and expenses that the Firm may need to incur to address the issues giving rise to the damage to its reputation could not adversely affect the Firm's earnings and results of operations, or that damage to the Firm's reputation will not impair the Firm's ability to retain its existing or attract new customers, investors and employees.

Item 1B. Unresolved Staff Comments.

None.

Item 2. Properties.

JPMorgan Chase's headquarters is located in New York City at 270 Park Avenue, a 50-story office building it owns.

The Firm owned or leased facilities in the following locations at December 31, 2016.

December 31, 2016 (in millions)	Approximate square footage
United States^(a)	
New York City, New York	
270 Park Ave, New York, New York	1.3
All other New York City locations	8.9
Total New York City, New York	10.2
Other U.S. locations	
Columbus/Westerville, Ohio	3.7
Chicago, Illinois	2.9
Wilmington/Newark, Delaware	2.2
Houston, Texas	2.1
Dallas/Fort Worth, Texas	2.0
Phoenix/Tempe, Arizona	1.8
Jersey City, New Jersey	1.5
All other U.S. locations	35.5
Total United States	61.9
Europe, the Middle East and Africa ("EMEA")	
25 Bank Street, London, U.K.	1.4
All other U.K. locations	3.2
All other EMEA locations	0.7
Total EMEA	5.3
Asia Pacific, Latin America and Canada	
India	2.9
All other locations	3.8
Total Asia Pacific, Latin America and Canada	6.7
Total	73.9

(a) At December 31, 2016, the Firm owned or leased 5,258 retail branches in 23 states.

The premises and facilities occupied by JPMorgan Chase are used across all of the Firm's business segments and for corporate purposes. JPMorgan Chase continues to evaluate its current and projected space requirements and may determine from time to time that certain of its properties (including the premises and facilities noted above) are no longer necessary for its operations. There is no assurance that the Firm will be able to dispose of any such excess properties, premises, and facilities or that it will not incur charges in connection with such dispositions. Such disposition costs may be material to the Firm's results of operations in a given period. For information on occupancy expense, see the Consolidated Results of Operations on pages 40–42.

Item 3. Legal Proceedings.

For a description of the Firm's material legal proceedings, see Note 31.

Item 4. Mine Safety Disclosures.

Not applicable.

Part II

Item 5. Market for Registrant’s Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities.

Market for registrant’s common equity

The outstanding shares of JPMorgan Chase common stock are listed and traded on the New York Stock Exchange and the London Stock Exchange. For the quarterly high and low prices of and cash dividends declared on JPMorgan Chase’s common stock for the last two years, see the section entitled “Supplementary information – Selected quarterly financial data (unaudited)” on pages 272–273. For a comparison of the cumulative total return for JPMorgan Chase common stock with the comparable total return of the S&P 500 Index, the KBW Bank Index and the S&P Financial Index over the five-year period ended December 31, 2016, see “Five-year stock performance,” on page 35.

Shares repurchased, on a settlement-date basis, pursuant to the common equity repurchase program during 2016 were as follows.

Year ended December 31, 2016	Total shares of common stock repurchased	Average price paid per share of common stock(a)	Aggregate repurchases of common equity (in millions)(a)	Dollar value of remaining authorized repurchase (in millions)(a)
First quarter	29,153,888	\$ 58.17	\$ 1,696	\$ 2,898
Second quarter	45,855,464	61.93	2,840	58 (b)
Third quarter	35,606,864	64.46	2,295	8,305
October	8,801,283	67.73	596	7,709
November	10,475,045	73.81	773	6,936
December	10,518,754	83.86	882	6,054
Fourth quarter	29,795,082	75.56	2,251	6,054
Year-to-date	140,411,298	\$ 64.68	\$ 9,082	\$ 6,054 (c)

(a) Excludes commissions cost.

(b) The \$58 million unused portion under the prior Board authorization was canceled when the \$10.6 billion repurchase program was authorized by the Board of Directors on June 29, 2016.

(c) Represents the amount remaining under the \$10.6 billion repurchase program.

Item 6. Selected Financial Data.

For five-year selected financial data, see “Five-year summary of consolidated financial highlights (unaudited)” on page 34.

Item 7. Management’s Discussion and Analysis of Financial Condition and Results of Operations.

Management’s discussion and analysis of financial condition and results of operations, entitled “Management’s discussion and analysis,” appears on pages 36–138. Such information should be read in conjunction with the Consolidated Financial Statements and Notes thereto, which appear on pages 141–271.

For information on the common dividend payout ratio, see Capital actions in the Capital Risk Management section of Management’s discussion and analysis on page 84. For a discussion of restrictions on dividend payments, see Note 22 and Note 27. On January 31, 2017, there were 196,792 holders of record of JPMorgan Chase common stock. For information regarding securities authorized for issuance under the Firm’s employee stock-based compensation plans, see Part III, Item 12 on page 25.

Repurchases under the common equity repurchase program

For information regarding repurchases under the Firm’s common equity repurchase program, see Capital actions in the Capital Risk Management section of Management’s discussion and analysis on page 84.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk.

For a discussion of the quantitative and qualitative disclosures about market risk, see the Market Risk Management section of Management’s discussion and analysis on pages 116–123.

Item 8. Financial Statements and Supplementary Data.

The Consolidated Financial Statements, together with the Notes thereto and the report thereon dated February 28, 2017, of PricewaterhouseCoopers LLP, the Firm's independent registered public accounting firm, appear on pages 140–271.

Supplementary financial data for each full quarter within the two years ended December 31, 2016, are included on pages 272–273 in the table entitled “Selected quarterly financial data (unaudited).” Also included is a “Glossary of terms and Acronyms” on pages 279-285.

Item 9. Changes in and Disagreements With Accountants on Accounting and Financial Disclosure.

None.

Item 9A. Controls and Procedures.

The internal control framework promulgated by the Committee of Sponsoring Organizations of the Treadway Commission (“COSO”), “Internal Control — Integrated Framework” (“COSO 2013”) provides guidance for designing, implementing and conducting internal control and assessing its effectiveness. The Firm used the COSO 2013 framework to assess the effectiveness of the Firm's internal control over financial reporting as of December 31, 2016. See “Management's report on internal control over financial reporting” on page 139.

As of the end of the period covered by this report, an evaluation was carried out under the supervision and with the participation of the Firm's management, including its Chairman and Chief Executive Officer and its Chief Financial Officer, of the effectiveness of its disclosure controls and procedures (as defined in Rule 13a-15(e) under the Securities Exchange Act of 1934). Based on that evaluation, the Chairman and Chief Executive Officer and the Chief Financial Officer concluded that these disclosure controls and procedures were effective. See Exhibits 31.1 and 31.2 for the Certification statements issued by the Chairman and Chief Executive Officer and Chief Financial Officer.

The Firm is committed to maintaining high standards of internal control over financial reporting. Nevertheless, because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. In addition, in a firm as large and complex as JPMorgan Chase, lapses or deficiencies in internal controls may occur from time to time, and there can be no assurance that any such deficiencies will not result in significant deficiencies or material weaknesses in internal control in the future. For further information, see “Management's report on internal control over financial reporting” on page 139. There was no change in the Firm's internal control over financial reporting (as defined in Rule 13a-15(f) under the Securities Exchange Act of 1934) that occurred during the three months ended December 31, 2016, that has materially affected, or is reasonably likely to materially affect, the Firm's internal control over financial reporting.

Item 9B. Other Information.

None.

Part III

Item 10. Directors, Executive Officers and Corporate Governance.

Executive officers of the registrant

Name	Age (at December 31, 2016)	Positions and offices
James Dimon	60	Chairman of the Board, Chief Executive Officer and President.
Ashley Bacon	47	Chief Risk Officer since June 2013. He had been Deputy Chief Risk Officer since June 2012, prior to which he had been Global Head of Market Risk for the Investment Bank (now part of Corporate & Investment Bank).
John L. Donnelly	60	Head of Human Resources.
Mary Callahan Erdoes	49	Chief Executive Officer of Asset & Wealth Management.
Stacey Friedman	48	General Counsel since January 1, 2016, prior to which she was Deputy General Counsel since July 2015 and General Counsel for the Corporate & Investment Bank since August 2012. Prior to joining JPMorgan Chase in 2012, she was a partner at the law firm of Sullivan & Cromwell LLP.
Marianne Lake	47	Chief Financial Officer since January 1, 2013, prior to which she had been Chief Financial Officer of Consumer & Community Banking since 2009.
Douglas B. Petno	51	Chief Executive Officer of Commercial Banking since January 2012. He had been Chief Operating Officer of Commercial Banking since October 2010, prior to which he had been Global Head of Natural Resources in the Investment Bank (now part of Corporate & Investment Bank).
Daniel E. Pinto	54	Chief Executive Officer of the Corporate & Investment Bank since March 2014 and Chief Executive Officer of Europe, the Middle East and Africa since June 2011. He had been Co-Chief Executive Officer of the Corporate & Investment Bank from July 2012 until March 2014, prior to which he had been head or co-head of the Global Fixed Income business from November 2009 until July 2012.
Gordon A. Smith	58	Chief Executive Officer of Consumer & Community Banking since December 2012, prior to which he had been Co-Chief Executive Officer since July 2012. He had been Chief Executive Officer of Card Services since 2007 and of the Auto Finance and Student Lending businesses since 2011.
Matthew E. Zames	46	Chief Operating Officer since April 2013 and head of Mortgage Banking Capital Markets since January 2012. He had been Co-Chief Operating Officer from July 2012 until April 2013. He had been Chief Investment Officer from May until September 2012, co-head of the Global Fixed Income business from November 2009 until May 2012 and co-head of Mortgage Banking Capital Markets from July 2011 until January 2012, prior to which he had served in a number of senior Investment Banking Fixed Income management roles.

Unless otherwise noted, during the five fiscal years ended December 31, 2016, all of JPMorgan Chase's above-named executive officers have continuously held senior-level positions with JPMorgan Chase. There are no family relationships among the foregoing executive officers. Information to be provided in Items 10, 11, 12, 13 and 14 of the Form 10-K and not otherwise included herein is incorporated by reference to the Firm's Definitive Proxy Statement for its 2017 Annual Meeting of Stockholders to be held on May 16, 2017, which will be filed with the SEC within 120 days of the end of the Firm's fiscal year ended December 31, 2016.

Item 11. Executive Compensation.

See Item 10.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters.

For security ownership of certain beneficial owners and management, see Item 10.

The following table sets forth the total number of shares available for issuance under JPMorgan Chase's employee stock-based incentive plans (including shares available for issuance to non-employee directors). The Firm is not authorized to grant stock-based incentive awards to non-employees, other than to non-employee directors.

December 31, 2016	Number of shares to be issued upon exercise of outstanding options/stock appreciation rights	Weighted-average exercise price of outstanding options/stock appreciation rights	Number of shares remaining available for future issuance under stock compensation plans
Plan category			
Employee stock-based incentive plans approved by shareholders	30,267,226 (a)	\$ 40.65	77,691,013 (b)
Total	30,267,226	\$ 40.65	77,691,013

(a) Does not include restricted stock units or performance stock units granted under the shareholder-approved Long-Term Incentive Plan ("LTIP"), as amended and restated effective May 19, 2015. For further discussion, see Note 10.

(b) Represents future shares available under the shareholder-approved LTIP.

All future shares will be issued under the shareholder-approved LTIP. For further discussion, see Note 10.

Item 13. Certain Relationships and Related Transactions, and Director Independence.

See Item 10.

Item 14. Principal Accounting Fees and Services.

See Item 10.

Item 15. Exhibits, Financial Statement Schedules.

1	Financial statements The Consolidated Financial Statements, the Notes thereto and the report of the Independent Registered Public Accounting Firm thereon listed in Item 8 are set forth commencing on page 140.	3.8	Certificate of Designations for Fixed-to-Floating Rate Non-Cumulative Preferred Stock, Series S (incorporated by reference to Exhibit 3.1 to the Current Report on Form 8-K of JPMorgan Chase & Co. (File No. 1-5805) filed January 22, 2014).
2	Financial statement schedules	3.9	Certificate of Designations for 6.70% Non-Cumulative Preferred Stock, Series T (incorporated by reference to Exhibit 3.1 to the Current Report on Form 8-K of JPMorgan Chase & Co. (File No. 1-5805) filed January 30, 2014).
3	Exhibits		
3.1	Restated Certificate of Incorporation of JPMorgan Chase & Co., effective April 5, 2006 (incorporated by reference to Exhibit 3.1 to the Current Report on Form 8-K of JPMorgan Chase & Co. (File No. 1-5805) filed April 7, 2006).	3.10	Certificate of Designations for Fixed-to-Floating Rate Non-Cumulative Preferred Stock, Series U (incorporated by reference to Exhibit 3.1 to the Current Report on Form 8-K of JPMorgan Chase & Co. (File No. 1-5805) filed on March 10, 2014).
3.2	Amendment to the Restated Certificate of Incorporation of JPMorgan Chase & Co., effective June 7, 2013 (incorporated by reference to Appendix F to the Proxy Statement on Schedule 14A of JPMorgan Chase & Co. (File No. 1-5805) filed April 10, 2013).	3.11	Certificate of Designations for Fixed-to-Floating Rate Non-Cumulative Preferred Stock, Series V (incorporated by reference to Exhibit 3.1 to the Current Report on Form 8-K of JPMorgan Chase & Co. (File No. 1-5805) filed on June 9, 2014).
3.3	Certificate of Designations for Fixed-to-Floating Rate Non-Cumulative Preferred Stock, Series I (incorporated by reference to Exhibit 3.1 to the Current Report on Form 8-K of JPMorgan Chase & Co. (File No. 1-5805) filed April 24, 2008).	3.12	Certificate of Designations for 6.30% Non-Cumulative Preferred Stock, Series W (incorporated by reference to Exhibit 3.1 to the Current Report on Form 8-K of JPMorgan Chase & Co. (File No. 1-5805) filed on June 23, 2014).
3.4	Certificate of Designations for 5.50% Non-Cumulative Preferred Stock, Series O (incorporated by reference to Exhibit 3.1 to the Current Report on Form 8-K of JPMorgan Chase & Co. (File No. 1-5805) filed August 27, 2012).	3.13	Certificate of Designations for Fixed-to-Floating Rate Non-Cumulative Preferred Stock, Series X (incorporated by reference to Exhibit 3.1 to the Current Report on Form 8-K of JPMorgan Chase & Co. (File No. 1-5805) filed on September 23, 2014).
3.5	Certificate of Designations for 5.45% Non-Cumulative Preferred Stock, Series P (incorporated by reference to Exhibit 3.1 to the Current Report on Form 8-K of JPMorgan Chase & Co. (File No. 1-5805) filed February 5, 2013).	3.14	Certificate of Designations for 6.125% Non-Cumulative Preferred Stock, Series Y (incorporated by reference to Exhibit 3.1 to the Current Report on Form 8-K of JPMorgan Chase & Co. (File No. 1-5805) filed February 17, 2015).
3.6	Certificate of Designations for Fixed-to-Floating Rate Non-Cumulative Preferred Stock, Series Q (incorporated by reference to Exhibit 3.1 to the Current Report on Form 8-K of JPMorgan Chase & Co. (File No. 1-5805) filed April 23, 2013).	3.15	Certificate of Designations for Fixed-to-Floating Rate Non-Cumulative Preferred Stock, Series Z (incorporated by reference to Exhibit 3.1 to the Current Report on Form 8-K of JPMorgan Chase & Co. (File No. 1-5805) filed April 21, 2015).
3.7	Certificate of Designations for Fixed-to-Floating Rate Non-Cumulative Preferred Stock, Series R (incorporated by reference to Exhibit 3.1 to the Current Report on Form 8-K of JPMorgan Chase & Co. (File No. 1-5805) filed July 29, 2013).	3.16	Certificate of Designations for 6.10% Non-Cumulative Preferred Stock, Series AA (incorporated by reference to Exhibit 3.1 to the Current Report on Form 8-K of JPMorgan Chase & Co. (File No. 1-5805) filed June 4, 2015).
		3.17	Certificate of Designations for 6.15% Non-Cumulative Preferred Stock, Series BB (incorporated by reference to Exhibit 3.1 to the Current Report on Form 8-K of JPMorgan Chase & Co. (File No. 1-5805) filed July 29, 2015).

3.18	By-laws of JPMorgan Chase & Co., effective January 19, 2016 (incorporated by reference to Exhibit 3.1 to the Current Report on Form 8-K of JPMorgan Chase & Co. (File No. 1-5805) filed January 21, 2016).	4.5	Form of Deposit Agreement (incorporated by reference to Exhibit 4.3 to the Registration Statement on Form S-3 of JPMorgan Chase & Co. (File No. 333-191692) filed October 11, 2013).
4.1(a)	Indenture, dated as of October 21, 2010, between JPMorgan Chase & Co. and Deutsche Bank Trust Company Americas, as Trustee (incorporated by reference to Exhibit 4.1 to the Current Report on Form 8-K of JPMorgan Chase & Co. (File No.1-5805) filed October 21, 2010).	4.6	Form of Warrant to purchase common stock (incorporated by reference to Exhibit 4.2 to the Form 8-A of JPMorgan Chase & Co. (File No. 1-5805) filed December 11, 2009).
4.1(b)	First Supplemental Indenture, dated as of January 13, 2017, between JPMorgan Chase & Co. and Deutsche Bank Trust Company Americas, as Trustee, to the Indenture, dated as of October 21, 2010 (incorporated by reference to Exhibit 4.1 to the Current Report on Form 8-K of JPMorgan Chase & Co. (File No. 1-5805) filed January 13, 2017).	<p><i>Other instruments defining the rights of holders of long-term debt securities of JPMorgan Chase & Co. and its subsidiaries are omitted pursuant to Section (b)(4)(iii)(A) of Item 601 of Regulation S-K. JPMorgan Chase & Co. agrees to furnish copies of these instruments to the SEC upon request.</i></p>	
4.2(a)	Subordinated Indenture, dated as of March 14, 2014, between JPMorgan Chase & Co. and U.S. Bank Trust National Association, as Trustee (incorporated by reference to Exhibit 4.1 to the Current Report on Form 8-K of JPMorgan Chase & Co. (File No.1-5805) filed March 14, 2014).	10.1	Deferred Compensation Plan for Non-Employee Directors of JPMorgan Chase & Co., as amended and restated July 2001 and as of December 31, 2004 (incorporated by reference to Exhibit 10.1 to the Annual Report on Form 10-K of JPMorgan Chase & Co. (File No. 1-5805) for the year ended December 31, 2007).(a)
4.2(b)	First Supplemental Indenture, dated as of January 13, 2017, between JPMorgan Chase & Co. and U.S. Bank Trust National Association, as Trustee, to the Subordinated Indenture, dated as of March 14, 2014 (incorporated by reference to Exhibit 4.2 to the Current Report on Form 8-K of JPMorgan Chase & Co. (File No. 1-5805) filed January 13, 2017).	10.2	2005 Deferred Compensation Plan for Non-Employee Directors of JPMorgan Chase & Co., effective as of January 1, 2005 (incorporated by reference to Exhibit 10.2 to the Annual Report on Form 10-K of JPMorgan Chase & Co. (File No. 1-5805) for the year ended December 31, 2007).(a)
4.3(a)	Indenture, dated as of May 25, 2001, between JPMorgan Chase & Co. and Bankers Trust Company (succeeded by Deutsche Bank Trust Company Americas), as Trustee (incorporated by reference to Exhibit 4(a)(1) to the Registration Statement on Form S-3 of JPMorgan Chase & Co. (File No. 333-52826) filed June 13, 2001).	10.3	2005 Deferred Compensation Program of JPMorgan Chase & Co., restated effective as of December 31, 2008 (incorporated by reference to Exhibit 10.4 to the Annual Report on Form 10-K of JPMorgan Chase & Co. (File No. 1-5805) for the year ended December 31, 2008).(a)
4.3(b)	Sixth Supplemental Indenture, dated as of January 13, 2017, between JPMorgan Chase & Co. and Bankers Trust Company (succeeded by Deutsche Bank Trust Company Americas), as Trustee, to the Indenture, dated as of May 25, 2001 (incorporated by reference to Exhibit 4.3 to the Current Report on Form 8-K of JPMorgan Chase & Co. (File No. 1-5805) filed January 13, 2017).	10.4	JPMorgan Chase & Co. Long-Term Incentive Plan as amended and restated effective May 19, 2015 (incorporated by reference to Appendix C of the Schedule 14A of JPMorgan Chase & Co. (File No. 1-5805) filed April 8, 2015).(a)
4.4	Indenture, dated as of February 19, 2016, among JPMorgan Chase Financial Company LLC, JPMorgan Chase & Co. and Deutsche Bank Trust Company Americas, as Trustee (incorporated by reference to Exhibit 4(a)(7) to the Registration Statement on Form S-3 of JPMorgan Chase & Co. and JPMorgan Chase Financial Company LLC (File No. 333-209682) filed February 24, 2016).	10.5	Key Executive Performance Plan of JPMorgan Chase & Co., as amended and restated effective January 1, 2014 (incorporated by reference to Appendix G of the Schedule 14A of JPMorgan Chase & Co. (File No. 1-5805) filed April 10, 2013).(a)
		10.6	Excess Retirement Plan of JPMorgan Chase & Co., restated and amended as of December 31, 2008, as amended (incorporated by reference to Exhibit 10.7 to the Annual Report on Form 10-K of JPMorgan Chase & Co. (File No. 1-5805) for the year ended December 31, 2009).(a)

Part IV

10.7	1995 Stock Incentive Plan of J.P. Morgan & Co. Incorporated and Affiliated Companies, as amended, dated December 11, 1996 (incorporated by reference to Exhibit 10.8 to the Annual Report on Form 10-K of JPMorgan Chase & Co. (File No. 1-5805) for the year ended December 31, 2008).(a)	10.16	Form of JPMorgan Chase & Co. Long-Term Incentive Plan Terms and Conditions for Operating Committee member stock appreciation rights, dated as of February 3, 2010 (incorporated by reference to Exhibit 10.23 to the Annual Report on Form 10-K of JPMorgan Chase & Co. (File No. 1-5805) for the year ended December 31, 2009).(a)
10.8	Executive Retirement Plan of JPMorgan Chase & Co., as amended and restated December 31, 2008 (incorporated by reference to Exhibit 10.9 to the Annual Report on Form 10-K of JPMorgan Chase & Co. (File No. 1-5805) for the year ended December 31, 2008).(a)	10.17	Forms of JPMorgan Chase & Co. Long-Term Incentive Plan Terms and Conditions for stock appreciation rights and restricted stock units, dated as of January 18, 2012 (incorporated by reference to Exhibit 10.25 to the Annual Report on Form 10-K of JPMorgan Chase & Co. (File No. 1-5805) for the year ended December 31, 2011).(a)
10.9	Bank One Corporation Stock Performance Plan, as amended and restated effective February 20, 2001 (incorporated by reference to Exhibit 10.12 to the Annual Report on Form 10-K of JPMorgan Chase & Co. (File No. 1-5805) for the year ended December 31, 2008).(a)	10.18	Forms of JPMorgan Chase & Co. Long-Term Incentive Plan Terms and Conditions for stock appreciation rights and restricted stock units for Operating Committee members, dated as of January 17, 2013 (incorporated by reference to Exhibit 10.23 to the Annual Report on Form 10-K of JPMorgan Chase & Co. (File No. 1-5805) for the year ended December 31, 2012).(a)
10.10	Bank One Corporation Supplemental Savings and Investment Plan, as amended and restated effective December 31, 2008 (incorporated by reference to Exhibit 10.13 to the Annual Report on Form 10-K of JPMorgan Chase & Co. (File No. 1-5805) for the year ended December 31, 2008).(a)	10.19	Form of JPMorgan Chase & Co. Long-Term Incentive Plan Terms and Conditions for restricted stock units for Operating Committee members, dated as of January 22, 2014 (incorporated by reference to Exhibit 10.1 to the Quarterly Report on Form 10-Q of JPMorgan Chase & Co. (File No. 1-5805) for the quarter ended March 31, 2014).(a)
10.11	Banc One Corporation Revised and Restated 1995 Stock Incentive Plan, effective April 17, 1995 (incorporated by reference to Exhibit 10.15 to the Annual Report on Form 10-K of JPMorgan Chase & Co. (File No. 1-5805) for the year ended December 31, 2008).(a)	10.20	Forms of JPMorgan Chase & Co. Long-Term Incentive Plan Terms & Conditions for restricted stock units for Operating Committee members (U.S., E.U. and U.K.), dated as of January 20, 2015 (incorporated by reference to Exhibit 10.1 to the Quarterly Report on Form 10-Q of JPMorgan Chase & Co. (File No. 1-5805) for the quarter ended March 31, 2015).(a)
10.12	Form of JPMorgan Chase & Co. Long-Term Incentive Plan Award Agreement of January 22, 2008 stock appreciation rights (incorporated by reference to Exhibit 10.25 to the Annual Report on Form 10-K of JPMorgan Chase & Co. (File No. 1-5805) for the year ended December 31, 2007).(a)	10.21	Form of JPMorgan Chase & Co. Long-Term Incentive Plan Terms and Conditions for restricted stock units for Operating Committee members, dated as of January 19, 2016 (incorporated by reference to Exhibit 10.21 to the Annual Report on Form 10-K of JPMorgan Chase & Co. (File No. 1-5805) for the year ended December 31, 2015).(a)
10.13	Form of JPMorgan Chase & Co. Long-Term Incentive Plan Award Agreement of January 22, 2008 stock appreciation rights for James Dimon (incorporated by reference to Exhibit 10.27 to the Annual Report on Form 10-K of JPMorgan Chase & Co. (File No. 1-5805) for the year ended December 31, 2007).(a)	10.22	Form of JPMorgan Chase & Co. Long-Term Incentive Plan Terms and Conditions for performance share units for Operating Committee members, dated as of January 19, 2016 (incorporated by reference to Exhibit 10.22 to the Annual Report on Form 10-K of JPMorgan Chase & Co. (File No. 1-5805) for the year ended December 31, 2015).(a)
10.14	Form of JPMorgan Chase & Co. Long-Term Incentive Plan Terms and Conditions for stock appreciation rights, dated as of January 20, 2009 (incorporated by reference to Exhibit 10.20 to the Annual Report on Form 10-K of JPMorgan Chase & Co. (File No. 1-5805) for the year ended December 31, 2008).(a)		
10.15	Form of JPMorgan Chase & Co. Long-Term Incentive Plan Terms and Conditions for Operating Committee member stock appreciation rights, dated as of January 20, 2009 (incorporated by reference to Exhibit 10.21 to the Annual Report on Form 10-K of JPMorgan Chase & Co. (File No. 1-5805) for the year ended December 31, 2008).(a)		

10.23	Form of JPMorgan Chase & Co. Long-Term Incentive Plan Terms and Conditions for performance share units and restricted stock units for Operating Committee members (U.S. and U.K.), dated as of January 17, 2017.(a)(b)	101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document.(b)
10.24	Form of JPMorgan Chase & Co. Terms and Conditions of Fixed Allowance (UK) (incorporated by reference to Exhibit 10.1 to the Quarterly Report on Form 10-Q of JPMorgan Chase & Co. (File No. 1-5805) for the quarter ended June 30, 2014).(a)	<hr/> (a) This exhibit is a management contract or compensatory plan or arrangement. (b) Filed herewith. (c) Furnished herewith. This exhibit shall not be deemed “filed” for purposes of Section 18 of the Securities Exchange Act of 1934, or otherwise subject to the liability of that Section. Such exhibit shall not be deemed incorporated into any filing under the Securities Act of 1933 or the Securities Exchange Act of 1934. (d) Pursuant to Rule 405 of Regulation S-T, includes the following financial information included in the Firm’s Annual Report on Form 10-K for the year ended December 31, 2016, formatted in XBRL (eXtensible Business Reporting Language) interactive data files: (i) the Consolidated statements of income for the years ended December 31, 2016, 2015 and 2014, (ii) the Consolidated statements of comprehensive income for the years ended December 31, 2016, 2015 and 2014, (iii) the Consolidated balance sheets as of December 31, 2016 and 2015, (iv) the Consolidated statements of changes in stockholders’ equity for the years ended December 31, 2016, 2015 and 2014, (v) the Consolidated statements of cash flows for the years ended December 31, 2016, 2015 and 2014, and (vi) the Notes to Consolidated Financial Statements.	
10.25	Form of JPMorgan Chase & Co. Performance-Based Incentive Compensation Plan, effective as of January 1, 2006, as amended (incorporated by reference to Exhibit 10.27 to the Annual Report on Form 10-K of JPMorgan Chase & Co. (File No. 1-5805) for the year ended December 31, 2009).(a)		
10.26	Plea Agreement dated May 20, 2015 between JPMorgan Chase & Co. and the U.S. Department of Justice (incorporated by reference to Exhibit 99.3 to the Current Report on Form 8-K of JPMorgan Chase & Co. (File No. 1-5805) filed May 20, 2015).		
12.1	Computation of ratio of earnings to fixed charges.(b)		
12.2	Computation of ratio of earnings to fixed charges and preferred stock dividend requirements.(b)		
21	List of subsidiaries of JPMorgan Chase & Co.(b)		
22.1	Annual Report on Form 11-K of The JPMorgan Chase 401(k) Savings Plan for the year ended December 31, 2016 (to be filed pursuant to Rule 15d-21 under the Securities Exchange Act of 1934).		
23	Consent of independent registered public accounting firm. (b)		
31.1	Certification.(b)		
31.2	Certification.(b)		
32	Certification pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.(c)		
101.INS	XBRL Instance Document.(b)(d)		
101.SCH	XBRL Taxonomy Extension Schema Document.(b)		
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document.(b)		
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document.(b)		
101.LAB	XBRL Taxonomy Extension Label Linkbase Document.(b)		

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Financial

FIVE-YEAR SUMMARY OF CONSOLIDATED FINANCIAL HIGHLIGHTS

(unaudited) As of or for the year ended December 31, (in millions, except per share, ratio, headcount data and where otherwise noted)						
	2016	2015	2014	2013	2012	
Selected income statement data						
Total net revenue	\$ 95,668	\$ 93,543	\$ 95,112	\$ 97,367	\$ 97,680	
Total noninterest expense	55,771	59,014	61,274	70,467	64,729	
Pre-provision profit	39,897	34,529	33,838	26,900	32,951	
Provision for credit losses	5,361	3,827	3,139	225	3,385	
Income before income tax expense	34,536	30,702	30,699	26,675	29,566	
Income tax expense	9,803	6,260	8,954	8,789	8,307	
Net income	\$ 24,733	\$ 24,442	\$ 21,745	\$ 17,886	\$ 21,259	
Earnings per share data						
Net income: Basic	\$ 6.24	\$ 6.05	\$ 5.33	\$ 4.38	\$ 5.21	
Diluted	6.19	6.00	5.29	4.34	5.19	
Average shares: Basic	3,618.5	3,700.4	3,763.5	3,782.4	3,809.4	
Diluted	3,649.8	3,732.8	3,797.5	3,814.9	3,822.2	
Market and per common share data						
Market capitalization	\$ 307,295	\$ 241,899	\$ 232,472	\$ 219,657	\$ 167,260	
Common shares at period-end	3,561.2	3,663.5	3,714.8	3,756.1	3,804.0	
Share price:(a)						
High	\$ 87.39	\$ 70.61	\$ 63.49	\$ 58.55	\$ 46.49	
Low	52.50	50.07	52.97	44.20	30.83	
Close	86.29	66.03	62.58	58.48	43.97	
Book value per share	64.06	60.46	56.98	53.17	51.19	
Tangible book value per share (“TBVPS”)(b)	51.44	48.13	44.60	40.72	38.68	
Cash dividends declared per share	1.88	1.72	1.58	1.44	1.20	
Selected ratios and metrics						
Return on common equity (“ROE”)	10%	11%	10%	9%	11%	
Return on tangible common equity (“ROTCE”)(b)	13	13	13	11	15	
Return on assets (“ROA”)	1.00	0.99	0.89	0.75	0.94	
Overhead ratio	58	63	64	72	66	
Loans-to-deposits ratio	65	65	56	57	61	
High quality liquid assets (“HQLA”) (in billions)(c)	\$ 524	\$ 496	\$ 600	\$ 522	\$ 341	
Common equity tier 1 (“CET1”) capital ratio(d)	12.4%	11.8%	10.2%	10.7%	11.0%	
Tier 1 capital ratio(d)	14.1	13.5	11.6	11.9	12.6	
Total capital ratio(d)	15.5	15.1	13.1	14.3	15.2	
Tier 1 leverage ratio(d)	8.4	8.5	7.6	7.1	7.1	
Selected balance sheet data (period-end)						
Trading assets	\$ 372,130	\$ 343,839	\$ 398,988	\$ 374,664	\$ 450,028	
Securities	289,059	290,827	348,004	354,003	371,152	
Loans	894,765	837,299	757,336	738,418	733,796	
Core Loans	806,152	732,093	628,785	583,751	555,351	
Average core loans	769,385	670,757	596,823	563,809	534,615	
Total assets	2,490,972	2,351,698	2,572,274	2,414,879	2,358,323	
Deposits	1,375,179	1,279,715	1,363,427	1,287,765	1,193,593	
Long-term debt(e)	295,245	288,651	276,379	267,446	248,521	
Common stockholders’ equity	228,122	221,505	211,664	199,699	194,727	
Total stockholders’ equity	254,190	247,573	231,727	210,857	203,785	
Headcount	243,355	234,598	241,359	251,196	258,753	
Credit quality metrics						
Allowance for credit losses	\$ 14,854	\$ 14,341	\$ 14,807	\$ 16,969	\$ 22,604	
Allowance for loan losses to total retained loans	1.55%	1.63%	1.90%	2.25%	3.02%	
Allowance for loan losses to retained loans excluding purchased credit-impaired loans(f)	1.34	1.37	1.55	1.80	2.43	
Nonperforming assets	\$ 7,535	\$ 7,034	\$ 7,967	\$ 9,706	\$ 11,906	
Net charge-offs	4,692	4,086	4,759	5,802	9,063	
Net charge-off rate	0.54%	0.52%	0.65%	0.81%	1.26%	

Note: Effective January 1, 2016, the Firm adopted new accounting guidance related to (1) the recognition and measurement of debit valuation adjustments (“DVA”) on financial liabilities where the fair value option has been elected, and (2) the accounting for employee stock-based incentive payments. For additional information, see Accounting and Reporting Developments on pages 135–137 and Notes 3, 4 and 25.

- (a) Share prices are from the New York Stock Exchange.
- (b) TBVPS and ROTCE are non-GAAP financial measures. For further discussion of these measures, see Explanation and Reconciliation of the Firm’s Use of Non-GAAP Financial Measures and Key Financial Performance Measures on pages 48–50.

- (c) HQLA represents the amount of assets that qualify for inclusion in the liquidity coverage ratio under the final U.S. rule ("U.S. LCR") for December 31, 2016 and 2015, and the Firm's estimated amount for December 31, 2014 prior to the effective date of the final rule, and under the Basel III liquidity coverage ratio ("Basel III LCR") for prior periods. For additional information, see HQLA on page 111.
- (d) Ratios presented are calculated under the Basel III Transitional rules, which became effective on January 1, 2014, and for the capital ratios, represent the Collins Floor. Prior to 2014, the ratios were calculated under the Basel I rules. See Capital Risk Management on pages 76–85 for additional information on Basel III.
- (e) Included unsecured long-term debt of \$212.6 billion, \$211.8 billion, \$207.0 billion, \$198.9 billion and \$200.1 billion respectively, as of December 31, of each year presented.
- (f) Excluded the impact of residential real estate purchased credit-impaired ("PCTI") loans, a non-GAAP financial measure. For further discussion of these measures, see Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures and Key Performance Measures on pages 48–50. For further discussion, see Allowance for credit losses on pages 105–107.

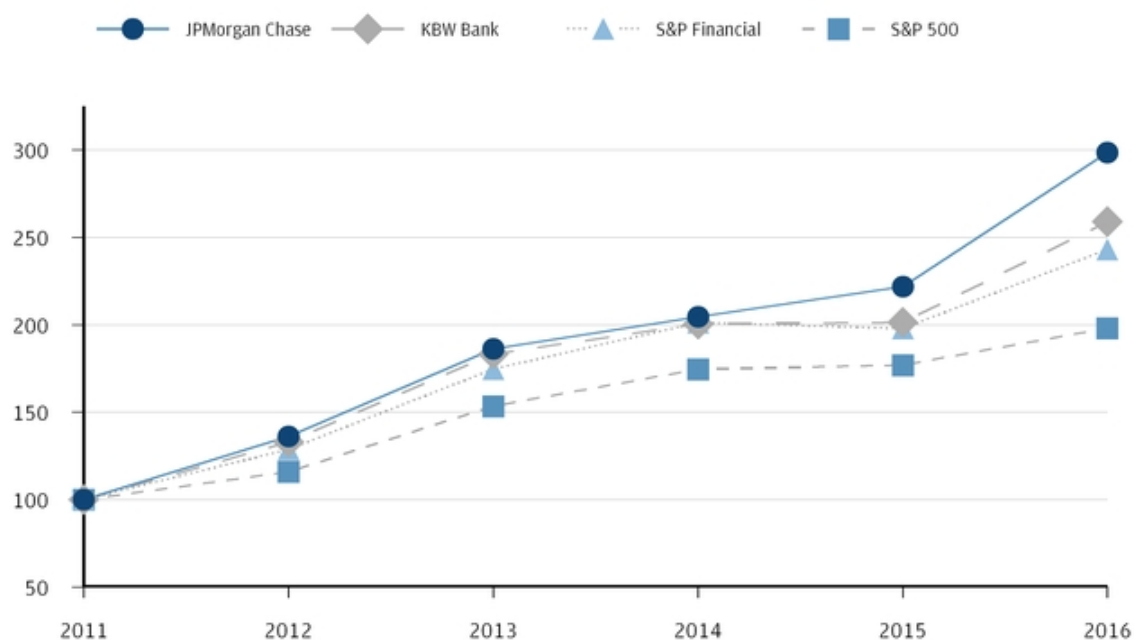
FIVE-YEAR STOCK PERFORMANCE

The following table and graph compare the five-year cumulative total return for JPMorgan Chase & Co. (“JPMorgan Chase” or the “Firm”) common stock with the cumulative return of the S&P 500 Index, the KBW Bank Index and the S&P Financial Index. The S&P 500 Index is a commonly referenced United States of America (“U.S.”) equity benchmark consisting of leading companies from different economic sectors. The KBW Bank Index seeks to reflect the performance of banks and thrifts that are publicly traded in the U.S. and is composed of leading national money center and regional banks and thrifts. The S&P Financial Index is an index of financial companies, all of which are components of the S&P 500. The Firm is a component of all three industry indices.

The following table and graph assume simultaneous investments of \$100 on December 31, 2011, in JPMorgan Chase common stock and in each of the above indices. The comparison assumes that all dividends are reinvested.

December 31, (in dollars)	2011	2012	2013	2014	2015	2016
JPMorgan Chase	\$ 100.00	\$ 136.18	\$ 186.17	\$ 204.57	\$ 221.68	\$ 298.31
KBW Bank Index	100.00	133.03	183.26	200.42	201.40	258.82
S&P Financial Index	100.00	128.75	174.57	201.06	197.92	242.94
S&P 500 Index	100.00	115.99	153.55	174.55	176.95	198.10

December 31,
(in dollars)



Management’s discussion and analysis

This section of JPMorgan Chase’s Annual Report for the year ended December 31, 2016 (“Annual Report”), provides Management’s discussion and analysis of the financial condition and results of operations (“MD&A”) of JPMorgan Chase. See the Glossary of Terms and Acronyms on pages 279-285 for definitions of terms used throughout this Annual Report. The MD&A included in this Annual Report contains statements that are forward-looking within the meaning of the Private Securities Litigation Reform Act of 1995. Such statements are based on the current beliefs and expectations of JPMorgan Chase’s management and are subject to significant risks and uncertainties. These risks and uncertainties could cause the Firm’s actual results to differ materially from those set forth in such forward-looking statements. Certain of such risks and uncertainties are described herein (see Forward-looking Statements on page 138) and in JPMorgan Chase’s Annual Report on Form 10-K for the year ended December 31, 2016 (“2016 Form 10-K”), in Part I, Item 1A: Risk factors; reference is hereby made to both.

INTRODUCTION

JPMorgan Chase & Co., a financial holding company incorporated under Delaware law in 1968, is a leading global financial services firm and one of the largest banking institutions in the United States of America (“U.S.”), with operations worldwide; the Firm had \$2.5 trillion in assets and \$254.2 billion in stockholders’ equity as of December 31, 2016. The Firm is a leader in investment banking, financial services for consumers and small businesses, commercial banking, financial transaction processing and asset management. Under the J.P. Morgan and Chase brands, the Firm serves millions of customers in the U.S. and many of the world’s most prominent corporate, institutional and government clients.

JPMorgan Chase’s principal bank subsidiaries are JPMorgan Chase Bank, National Association (“JPMorgan Chase Bank, N.A.”), a national banking association with U.S. branches in 23 states, and Chase Bank USA, National Association (“Chase Bank USA, N.A.”), a national banking association that is the Firm’s credit card-issuing bank. JPMorgan Chase’s principal nonbank subsidiary is J.P. Morgan Securities LLC (“JPMorgan Securities”), the Firm’s U.S. investment banking firm. The bank and nonbank subsidiaries of JPMorgan Chase operate nationally as well as through overseas branches and subsidiaries, representative offices and subsidiary foreign banks. One of the Firm’s principal operating subsidiaries in the U.K. is J.P. Morgan Securities plc, a subsidiary of JPMorgan Chase Bank, N.A.

For management reporting purposes, the Firm’s activities are organized into four major reportable business segments, as well as a Corporate segment. The Firm’s consumer business is the Consumer & Community Banking (“CCB”) segment. The Firm’s wholesale business segments are Corporate & Investment Bank (“CIB”), Commercial Banking (“CB”), and Asset & Wealth Management (“AWM”) (formerly Asset Management or “AM”). For a description of the Firm’s business segments, and the products and services they provide to their respective client bases, refer to Business Segment Results on pages 51–70, and Note 33.

EXECUTIVE OVERVIEW

This executive overview of the MD&A highlights selected information and may not contain all of the information that is important to readers of this Annual Report. For a complete description of the trends and uncertainties, as well as the risks and critical accounting estimates affecting the Firm and its various lines of business, this Annual Report should be read in its entirety.

Financial performance of JPMorgan Chase

Year ended December 31, (in millions, except per share data and ratios)	2016	2015	Change
Selected income statement data			
Total net revenue	\$ 95,668	\$ 93,543	2 %
Total noninterest expense	55,771	59,014	(5)
Pre-provision profit	39,897	34,529	16
Provision for credit losses	5,361	3,827	40
Net income	24,733	24,442	1
Diluted earnings per share	6.19	6.00	3
Selected ratios and metrics			
Return on common equity	10%	11%	
Return on tangible common equity	13	13	
Book value per share	\$ 64.06	\$ 60.46	6
Tangible book value per share	51.44	48.13	7
Capital ratios(a)			
CET1	12.4%	11.8%	
Tier 1 capital	14.1	13.5	
Total capital	15.5	15.1	

(a) Ratios presented are calculated under the Basel III Transitional rules and represent the Collins Floor. See Capital Risk Management on pages 76–85 for additional information on Basel III.

Summary of 2016 results

JPMorgan Chase reported strong results for full year 2016 with net income of \$24.7 billion, or \$6.19 per share, on net revenue of \$95.7 billion. The Firm reported ROE of 10% and ROTCE of 13%.

Net income increased 1% compared with the prior year driven by lower noninterest expense and higher net revenue, predominantly offset by higher income tax expense and provision for credit losses.

Total net revenue increased by 2% primarily reflecting higher net interest income across all the Firm's business segments and higher Markets noninterest revenue in CIB, partially offset by lower card income in CCB and lower asset management fees in AWM.

Noninterest expense was \$55.8 billion, down 5% compared with the prior year, driven by lower legal expense.

The provision for credit losses was \$5.4 billion, an increase of \$1.5 billion, reflecting an increase in the total consumer provision related to additions in the allowance for loan losses and higher net charge-offs in the credit card portfolio, and a lower benefit in the residential real estate portfolio driven by a lower reduction in the allowance for

loan losses compared with the prior year. The wholesale provision had a modest increase, largely driven by the impact of downgrades in the Oil & Gas and Natural Gas Pipelines portfolios.

The total allowance for credit losses was \$14.9 billion at December 31, 2016, and the Firm had a loan loss coverage ratio, excluding the PCI portfolio, of 1.34%, compared with 1.37% in the prior year. The Firm's nonperforming assets totaled \$7.5 billion, an increase from the prior-year level of \$7.0 billion.

Firmwide average core loans increased 15% compared with the prior year.

Within CCB, average core loans increased 20% from the prior year. CCB had record growth in average deposits, with a 10% increase from the prior year. Credit card sales volume increased 10%, and merchant processing volume increased 12%, from the prior year. CCB had nearly 27 million active mobile customers at year-end 2016, an increase of 16% from the prior year.

CIB maintained its #1 ranking for Global Investment Banking fees with a 8.1% wallet share for the full-year ended December 31, 2016. Within CB, record average loans increased 14% from the prior year as loans in the commercial and industrial client segment increased 9% and loans in the wholesale commercial real estate client segment increased 18%. AWM had record average loans, an increase of 5% over the prior year, and 79% of AWM's mutual fund assets under management ranked in the 1st or 2nd quartiles over the past 5 years.

For a detailed discussion of results by line of business ("LOB"), refer to the Business Segment Results on pages 51–52.

The Firm added to its capital, ending the full-year of 2016 with a TBVPS of \$51.44, up 7% over the prior year. The Firm's estimated Basel III Advanced Fully Phased-In CET1 capital and ratio were \$182 billion and 12.2%, respectively. The Fully Phased-In supplementary leverage ratio ("SLR") for the Firm and for JPMorgan Chase Bank, N.A. was 6.5% and 6.6%, respectively, at December 31, 2016. The Firm also was compliant with the Fully Phased-In U.S. LCR and had \$524 billion of HQLA as of December 31, 2016. For further discussion of the LCR and HQLA, see Liquidity Risk Management on pages 110–115.

ROTCE and TBVPS are non-GAAP financial measures. Core loans are considered a key performance measure. Each of the Fully Phased-In capital and leverage measures is considered a key regulatory capital measure. For a further discussion of these measures, see Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures and Key Performance Measures on pages 48–50, and Capital Risk Management on pages 76–85.

Management's discussion and analysis

JPMorgan Chase continues to support consumers, businesses and communities around the globe. The Firm provided credit and raised capital of \$2.4 trillion for commercial and consumer clients during the full-year of 2016:

- \$265 billion of credit for consumers
- \$24 billion of credit for U.S. small businesses
- \$772 billion of credit for corporations
- \$1.2 trillion of capital raised for corporate clients and non-U.S. government entities
- \$90 billion of credit and capital raised for nonprofit and U.S. government entities, including states, municipalities, hospitals and universities

On October 1, 2016, the Firm filed with the Federal Reserve and the FDIC its submission (the "2016 Resolution Submission") describing how the Firm remediated certain deficiencies, and providing a status report on its actions to address certain shortcomings, that had been identified by the Federal Reserve and the FDIC in April 2016 when those agencies provided feedback to the Firm as well as to seven other systemically important domestic banking institutions on their respective 2015 Resolution Plans.

Among the steps taken by the Firm to address the identified deficiencies and shortcomings were: (i) establishing a new subsidiary that has become an "intermediate holding company" and to which JPMorgan Chase & Co. has contributed the stock of substantially all of its direct subsidiaries (other than JPMorgan Chase Bank, N.A.), as well as other assets and intercompany indebtedness owing to JPMorgan Chase & Co.; (ii) increasing the Firm's liquidity reserves and pre-positioning significant amounts of capital and liquidity at the Firm's "material legal entities" (as defined in the 2016 Resolution Submission); (iii) refining the Firm's liquidity and capital governance frameworks, including establishing a Firmwide "trigger framework" that identifies key actions and escalations that would need to be taken, as well as decisions that would need to be made, at critical points in time if certain defined liquidity and/or capital metrics were to fall below defined thresholds; (iv) establishing clear, actionable legal entity rationalization criteria and related governance procedures; and (v) improving divestiture readiness, including determining and analyzing divestiture options in a crisis. On December 13, 2016, the Federal Reserve and the FDIC informed the Firm that they had determined that the Firm's 2016 Resolution Submission adequately remediated the identified deficiencies in the Firm's 2015 Resolution Plan. For more information, see the Federal Reserve and FDIC websites, and the Firm's website for the public portion of the 2016 Resolution Submission.

Business outlook

These current expectations are forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. Such forward-looking statements are based on the current beliefs and expectations of JPMorgan Chase's management and are subject to significant risks and uncertainties. These risks and uncertainties could cause the Firm's actual results to differ materially from those set forth in such forward-looking statements. See Forward-Looking Statements on page 138 and the Risk Factors section on pages 8–21.

Business outlook

JPMorgan Chase's outlook for the full-year 2017 should be viewed against the backdrop of the global and U.S. economies, financial markets activity, the geopolitical environment, the competitive environment, client activity levels, and regulatory and legislative developments in the U.S. and other countries where the Firm does business. Each of these inter-related factors will affect the performance of the Firm and its lines of business. The Firm expects it will continue to make appropriate adjustments to its businesses and operations in response to ongoing developments in the legal and regulatory, as well as business and economic, environment in which it operates.

In the first quarter of 2017, management expects net interest income to increase modestly compared with the fourth quarter of 2016. During 2017, assuming no change in interest rates since December 31, 2016, management expects net interest income could be approximately \$3 billion higher than in 2016, reflecting the Federal Reserve's rate increase in December 2016 and expected loan growth. Management expects average core loan growth of approximately 10% in 2017.

The Firm continues to experience charge-off rates at or near historically low levels, reflecting favorable credit trends across the consumer and wholesale portfolios. Management expects total net charge-offs of approximately \$5 billion in 2017. In Card, management expects the portfolio average net charge-off rate to increase in 2017, but remain below 3.00%, reflecting continued loan growth and the seasoning of newer vintages, with quarterly net-charge offs reflecting normal seasonal trends.

Management believes that the consumer allowance for credit losses could increase by approximately \$300 million in 2017, reflecting growth across businesses, offset by reductions in the allowance for the residential real estate portfolio. Excluding the allowance related to the Oil & Gas and Natural Gas Pipelines and Metals & Mining portfolios, management expects that the wholesale allowance for credit losses could increase modestly in 2017 reflecting growth across businesses. Continued stability in the energy sector could result in a reduction in the allowance for credit losses in future periods. As management continually looks to enhance its credit loss estimation methodologies, the outlook for the allowance for credit losses does not take into consideration any such potential refinements.

The Firm continues to take a disciplined approach to managing its expenses, while investing in growth and innovation. As a result, Firmwide adjusted expense in 2017 is expected to be approximately \$58 billion (excluding Firmwide legal expense).

In CCB, management expects Mortgage noninterest revenue to decrease approximately \$700 million in 2017, driven by margin compression in a smaller mortgage market and continued run-off of the Servicing portfolio, as well as approximately \$200 million of MSR gains in 2016 which are not expected to recur in 2017. Management expects Card Services noninterest revenue to decrease approximately \$600 million in 2017, reflecting the amortization of premiums on strong new product originations and the absence in 2017 of a gain on the sale of Visa Europe interests in 2016, although total Card Services revenue is expected to increase due to strong growth in net interest income.

In the first quarter of 2017, management expects CCB expense to increase by approximately \$150 million, compared to the prior quarter.

In CIB, Investment Banking revenue in the first quarter of 2017 is expected to be approximately in line with the fourth quarter of 2016, dependent on the timing of the closing of a number of transactions. Treasury Services revenue is expected to be approximately \$950 million in the first quarter of 2017. In addition, management currently expects Markets revenue in the first quarter of 2017 to increase modestly compared to the prior year quarter, with results sensitive to market conditions in March in light of particularly strong revenue in March 2016. In Securities Services, management expects revenue of approximately \$900 million in the first quarter of 2017.

In CB, management expects expense of approximately \$775 million in the first quarter of 2017.

In AWM, management expects revenue to be approximately \$3 billion in the first quarter of 2017.

CONSOLIDATED RESULTS OF OPERATIONS

This section provides a comparative discussion of JPMorgan Chase's Consolidated Results of Operations on a reported basis for the three-year period ended December 31, 2016, unless otherwise specified. Factors that relate primarily to a single business segment are discussed in more detail within that business segment. For a discussion of the Critical Accounting Estimates Used by the Firm that affect the Consolidated Results of Operations, see pages 132–134.

Revenue

Year ended December 31, (in millions)	2016	2015	2014
Investment banking fees	\$ 6,448	\$ 6,751	\$ 6,542
Principal transactions(a)	11,566	10,408	10,531
Lending- and deposit-related fees	5,774	5,694	5,801
Asset management, administration and commissions	14,591	15,509	15,931
Securities gains	141	202	77
Mortgage fees and related income	2,491	2,513	3,563
Card income	4,779	5,924	6,020
Other income(b)	3,795	3,032	3,013
Noninterest revenue	49,585	50,033	51,478
Net interest income	46,083	43,510	43,634
Total net revenue	\$ 95,668	\$ 93,543	\$ 95,112

(a) Effective January 1, 2016, changes in DVA on fair value option elected liabilities previously recorded in principal transactions revenue are recorded in other comprehensive income ("OCI"). For additional information, see the segment results of CIB and Accounting and Reporting Developments on pages 58–62 and page 135, respectively.

(b) Included operating lease income of \$2.7 billion, \$2.1 billion and \$1.7 billion for the years ended December 31, 2016, 2015 and 2014, respectively.

2016 compared with 2015

Total net revenue increased by 2% primarily reflecting higher net interest income across all the Firm's business segments and higher Markets noninterest revenue in CIB, partially offset by lower card income in CCB and lower asset management fees in AWM.

Investment banking fees decreased predominantly due to lower equity underwriting fees driven by declines in industry-wide fee levels. For additional information on investment banking fees, see CIB segment results on pages 58–62 and Note 7.

Principal transactions revenue increased reflecting broad-based strength across products in CIB's Fixed Income Markets business. Rates performance was strong, with increased client activity driven by high issuance-based flows, global political developments, and central bank actions. Credit revenue improved driven by higher market-making revenue from the secondary market as clients' appetite for risk recovered. For additional information, see CIB and Corporate segment results on pages 58–62 and pages 69–70, respectively, and Note 7.

Asset management, administration and commissions revenue decreased reflecting lower asset management fees in AWM driven by a reduction in revenue related to the disposal of assets at the beginning of 2016, the impact of lower average equity market levels and lower performance

fees, as well as due to lower brokerage commissions and other fees in CIB and AWM. For additional information, see the segment discussions of CIB and AWM on pages 58–62 and pages 66–68, respectively, and Note 7.

For information on lending- and deposit-related fees, see the segment results for CCB on pages 53–57, CIB on pages 58–62, and CB on pages 63–65 and Note 7; on securities gains, see the Corporate segment discussion on pages 69–70.

Mortgage fees and related income were relatively flat, as lower mortgage servicing revenue related to lower average third-party loans serviced was predominantly offset by higher MSR risk management results. For further information on mortgage fees and related income, see the segment discussion of CCB on pages 53–57 and Notes 7 and 17.

Card income decreased predominantly driven by higher new account origination costs and the impact of renegotiated co-brand partnership agreements, partially offset by higher card sales volume and other card-related fees. For further information, see CCB segment results on pages 53–57 and Note 7.

Other income increased primarily reflecting:

- higher operating lease income from growth in auto operating lease assets in CCB
- a gain on the sale of Visa Europe interests in CCB
- a gain related to the redemption of guaranteed capital debt securities ("trust preferred securities")
- the absence of losses recognized in 2015 related to the accelerated amortization of cash flow hedges associated with the exit of certain non-operating deposits
- a gain on disposal of an asset in AWM at the beginning of 2016

partially offset by

- a \$514 million benefit recorded in the prior year from a legal settlement in Corporate.

For further information on other income, see Note 7.

Net interest income increased primarily driven by loan growth across the businesses and the net impact of higher rates, partially offset by lower investment securities balances and higher interest expense on long-term debt. The Firm's average interest-earning assets were \$2.1 trillion in 2016, and the net interest yield on these assets, on a fully taxable equivalent ("FTE") basis, was 2.25%, an increase of 11 basis points from the prior year.

2015 compared with 2014

Total net revenue for 2015 was down by 2%, predominantly driven by lower Corporate private equity gains, lower CIB revenue reflecting the impact of business simplification initiatives, and lower CCB Mortgage Banking revenue. These decreases were partially offset by a benefit from a legal settlement in Corporate, and higher operating lease income, predominantly in CCB.

Investment banking fees increased reflecting higher advisory fees, partially offset by lower equity and debt underwriting fees. The increase in advisory fees was driven by a greater share of fees for completed transactions as well as growth in industry-wide fee levels. The decrease in equity underwriting fees resulted from lower industry-wide issuance, and the decrease in debt underwriting fees resulted primarily from lower loan syndication and bond underwriting fees on lower industry-wide fee levels.

Principal transactions revenue decreased reflecting lower private equity gains in Corporate driven by lower valuation gains and lower net gains on sales as the Firm exits this non-core business. The decrease was partially offset by higher client-driven market-making revenue, particularly in foreign exchange, interest rate and equity-related products in CIB, as well as a gain of approximately \$160 million on CCB's investment in Square, Inc. upon its initial public offering.

Asset management, administration and commissions revenue decreased largely as a result of lower fees in CIB and lower performance fees in AWM. The decrease was partially offset by higher asset management fees as a result of net client inflows into assets under management and the impact of higher average market levels in AWM and CCB.

Mortgage fees and related income decreased reflecting lower servicing revenue, largely as a result of lower average third-party loans serviced, and lower net production revenue reflecting a lower repurchase benefit.

For information on lending- and deposit-related fees, see the segment results for CCB on pages 53–57, CIB on pages 58–62, and CB on pages 63–65 and Note 7; on securities gains, see the Corporate segment discussion on pages 69–70; and card income, see CCB segment results on pages 53–57.

Other income was relatively flat reflecting a \$514 million benefit from a legal settlement in Corporate, higher operating lease income as a result of growth in auto operating lease assets in CCB, and the absence of losses related to the exit of non-core portfolios in Card. These increases were offset by the impact of business simplification in CIB; the absence of a benefit recognized in 2014 from a franchise tax settlement; and losses related to the accelerated amortization of cash flow hedges associated with the exit of certain non-operating deposits.

Net interest income was relatively flat as lower loan yields, lower investment securities net interest income, and lower trading asset balance and yields were offset by higher average loan balances and lower interest expense on deposits. The Firm's average interest-earning assets were \$2.1 trillion in 2015, and the net interest yield on these assets, on a FTE basis, was 2.14%, a decrease of 4 basis points from the prior year.

Provision for credit losses

Year ended December 31, (in millions)	2016	2015	2014
Consumer, excluding credit card	\$ 467	\$ (81)	\$ 419
Credit card	4,042	3,122	3,079
Total consumer	4,509	3,041	3,498
Wholesale	852	786	(359)
Total provision for credit losses	\$ 5,361	\$ 3,827	\$ 3,139

2016 compared with 2015

The provision for credit losses reflected an increase in the total consumer provision and, to a lesser extent, the wholesale provision. The increase in the total consumer provision was predominantly driven by:

- a \$920 million increase related to the credit card portfolio, due to a \$600 million addition in the allowance for loan losses, as well as \$320 million of higher net charge-offs, driven by loan growth (including growth in newer vintages which, as anticipated, have higher loss rates compared to the overall portfolio), and
- a \$470 million lower benefit related to the residential real estate portfolio, as the current year reduction in the allowance for loan losses was lower than the prior year. The reduction in both periods reflected continued improvements in home prices and lower delinquencies.

The increase in the wholesale provision was largely driven by the impact of downgrades in the Oil & Gas and Natural Gas Pipelines portfolios. For a more detailed discussion of the credit portfolio and the allowance for credit losses, see the segment discussions of CCB on pages 53–57, CIB on pages 58–62, CB on pages 63–65, the Allowance For Credit Losses on pages 105–107 and Note 15.

2015 compared with 2014

The provision for credit losses increased as a result of an increase in the wholesale provision, largely reflecting the impact of downgrades in the Oil & Gas portfolio. The increase was partially offset by a decrease in the consumer provision, reflecting lower net charge-offs due to continued discipline in credit underwriting, as well as improvement in the economy driven by increasing home prices and lower unemployment levels. The decrease in the consumer provision was partially offset by a lower reduction in the allowance for loan losses.

Management's discussion and analysis

Noninterest expense

Year ended December 31, (in millions)	2016	2015	2014
Compensation expense	\$ 29,979	\$ 29,750	\$ 30,160
Noncompensation expense:			
Occupancy	3,638	3,768	3,909
Technology, communications and equipment	6,846	6,193	5,804
Professional and outside services	6,655	7,002	7,705
Marketing	2,897	2,708	2,550
Other(a)(b)	5,756	9,593	11,146
Total noncompensation expense	25,792	29,264	31,114
Total noninterest expense	\$ 55,771	\$ 59,014	\$ 61,274

(a) Included legal (benefit)/expense of \$(317) million, \$3.0 billion and \$2.9 billion for the years ended December 31, 2016, 2015 and 2014, respectively.

(b) Included FDIC-related expense of \$1.3 billion, \$1.2 billion and \$1.0 billion for the years ended December 31, 2016, 2015 and 2014, respectively.

2016 compared with 2015

Total noninterest expense decreased by 5% driven by lower legal expense.

Compensation expense was relatively flat predominantly driven by higher performance-based compensation expense and investments in several businesses, offset by the impact of continued expense reduction initiatives, including lower headcount in certain businesses.

Noncompensation expense decreased as a result of lower legal expense (including lower legal professional services expense), the impact of efficiencies, and reduced non-U.S. tax surcharges. These factors were partially offset by higher depreciation expense from growth in auto operating lease assets and higher investments in marketing. For a further discussion of legal expense, see Note 31.

2015 compared with 2014

Total noninterest expense decreased by 4% as a result of lower CIB expense, predominantly reflecting the impact of business simplification; and lower CCB expense resulting from efficiencies related to declines in headcount-related expense and lower professional fees. These decreases were partially offset by investment in the businesses, including for infrastructure and controls.

Compensation expense decreased predominantly driven by lower performance-based incentives and reduced headcount, partially offset by higher postretirement benefit costs and investment in the businesses, including for infrastructure and controls.

Noncompensation expense decreased reflecting benefits from business simplification in CIB; lower professional and outside services expense, reflecting lower legal services expense and a reduced number of contractors in the businesses; lower amortization of intangibles; and the absence of a goodwill impairment in Corporate. These factors were partially offset by higher depreciation expense, largely associated with higher auto operating lease assets in CCB; higher marketing expense in CCB; and higher FDIC-related assessments. Legal expense was relatively flat compared with the prior year.

Income tax expense

Year ended December 31, (in millions, except rate)	2016	2015	2014
Income before income tax expense	\$ 34,536	\$ 30,702	\$ 30,699
Income tax expense	9,803	6,260	8,954
Effective tax rate	28.4%	20.4%	29.2%

2016 compared with 2015

The effective tax rate in 2016 was affected by changes in the mix of income and expense subject to U.S. federal and state and local taxes, tax benefits related to the utilization of certain deferred tax assets, as well as the adoption of new accounting guidance related to employee stock-based incentive payments. These tax benefits were partially offset by higher income tax expense from tax audits. The lower effective tax rate in 2015 was predominantly driven by \$2.9 billion of tax benefits, which reduced the Firm's effective tax rate by 9.4 percentage points. The recognition of tax benefits in 2015 resulted from the resolution of various tax audits, as well as the release of U.S. deferred taxes associated with the restructuring of certain non-U.S. entities. For additional details on the impact of the new accounting guidance, see Accounting and Reporting Developments on page 135 and for further information see Note 26.

2015 compared with 2014

The effective tax rate decreased predominantly due to the recognition in 2015 of tax benefits of \$2.9 billion and other changes in the mix of income and expense subject to U.S. federal, state and local income taxes, partially offset by prior-year tax adjustments. See above for details on the \$2.9 billion of tax benefits.

CONSOLIDATED BALANCE SHEETS ANALYSIS

The following is a discussion of the significant changes between December 31, 2016 and 2015.

Selected Consolidated balance sheets data

December 31, (in millions)	2016	2015	Change
Assets			
Cash and due from banks	\$ 23,873	\$ 20,490	17 %
Deposits with banks	365,762	340,015	8
Federal funds sold and securities purchased under resale agreements	229,967	212,575	8
Securities borrowed	96,409	98,721	(2)
Trading assets:			
Debt and equity instruments	308,052	284,162	8
Derivative receivables	64,078	59,677	7
Securities	289,059	290,827	(1)
Loans	894,765	837,299	7
Allowance for loan losses	(13,776)	(13,555)	2
Loans, net of allowance for loan losses	880,989	823,744	7
Accrued interest and accounts receivable	52,330	46,605	12
Premises and equipment	14,131	14,362	(2)
Goodwill	47,288	47,325	—
Mortgage servicing rights	6,096	6,608	(8)
Other intangible assets	862	1,015	(15)
Other assets	112,076	105,572	6
Total assets	\$ 2,490,972	\$ 2,351,698	6 %

Cash and due from banks and deposits with banks

The increase was primarily driven by deposit growth in excess of loan growth. The Firm's excess cash is placed with various central banks, predominantly Federal Reserve Banks.

Federal funds sold and securities purchased under resale agreements

The increase was due to higher demand for securities to cover short positions related to client-driven market-making activities in CIB, and the deployment of excess cash by Treasury and Chief Investment Office ("CIO"). For additional information on the Firm's Liquidity Risk Management, see pages 110–115.

Trading assets and liabilities—debt and equity instruments

The increase in trading assets and liabilities was predominantly related to client-driven market-making activities in CIB. The increase in trading assets reflected higher debt and, to a lesser extent, equity instrument inventory levels to facilitate client demand. The increase in trading liabilities reflected higher levels of client-driven short positions in both debt and equity instruments. For additional information, refer to Note 3.

Trading assets and liabilities—derivative receivables and payables

The change in derivative receivables and payables was predominantly related to client-driven market-making activities in CIB. The increase in derivative receivables reflected the impact of market movements, which increased foreign exchange receivables, partially offset by reduced commodity derivative receivables. The decrease in derivative payables reflected the impact of market

movements, which reduced commodity payables. For additional information, refer to Derivative contracts on pages 102–103, and Notes 3 and 6.

Securities

The decrease was predominantly due to net sales, maturities and paydowns during the year of non-agency mortgage-backed securities ("MBS"), corporate debt securities and asset-backed securities ("ABS"), offset by purchases of U.S. Treasuries. For additional information, see Notes 3 and 12.

Loans and allowance for loan losses

The increase in loans was driven by higher consumer and wholesale loans. The increase in consumer loans was due to retention of originated high-quality prime mortgages in CCB and AWM, and growth in credit card and auto loans in CCB. The increase in wholesale loans was predominantly driven by originations of commercial real estate loans in CB and commercial and industrial loans across multiple industries in CB and CIB.

The increase in the allowance for loan losses was attributable to additions to the wholesale allowance driven by downgrades in the Oil & Gas and Natural Gas Pipelines portfolios. The consumer allowance was flat from the prior year and reflected reductions in the allowance for loan losses in the residential real estate portfolio reflecting continued improvement in home prices and delinquencies, and due to runoff in the student loan portfolio; these factors were offset by additions to the allowance reflecting the impact of loan growth in the credit card portfolio (including newer vintages which, as anticipated, have higher loss rates compared to the overall portfolio), as well as due

Management's discussion and analysis

to loan growth in the auto and business banking loan portfolios. For a more detailed discussion of loans and the allowance for loan losses, refer to Credit Risk Management on pages 86–107, and Notes 3, 4, 14 and 15.

Accrued interest and accounts receivable

The increase reflected higher receivables from merchants in CCB and higher client receivables related to client-driven activity in CIB.

Selected Consolidated balance sheets data

December 31, (in millions)	2016	2015	Change
Liabilities			
Deposits	\$ 1,375,179	\$ 1,279,715	7
Federal funds purchased and securities loaned or sold under repurchase agreements	165,666	152,678	9
Commercial paper	11,738	15,562	(25)
Other borrowed funds	22,705	21,105	8
Trading liabilities:			
Debt and equity instruments	87,428	74,107	18
Derivative payables	49,231	52,790	(7)
Accounts payable and other liabilities	190,543	177,638	7
Beneficial interests issued by consolidated variable interest entities ("VIEs")	39,047	41,879	(7)
Long-term debt	295,245	288,651	2
Total liabilities	2,236,782	2,104,125	6
Stockholders' equity	254,190	247,573	3
Total liabilities and stockholders' equity	\$ 2,490,972	\$ 2,351,698	6 %

Deposits

The increase was attributable to higher consumer and wholesale deposits. The consumer increase reflected continuing strong growth from existing and new customers, and the impact of low attrition rates. The wholesale increase was driven by growth in operating deposits related to client activity in CIB's Treasury Services business, and inflows in AWM primarily from business growth and the impact of new rules governing money market funds. For more information on deposits, refer to the Liquidity Risk Management discussion on pages 110–115; and Notes 3 and 19.

Federal funds purchased and securities loaned or sold under repurchase agreements

The increase was predominantly due to higher client-driven market-making activities in CIB. For additional information on the Firm's Liquidity Risk Management, see pages 110–115.

Commercial paper

The decrease reflected lower issuance in the wholesale markets consistent with Treasury and CIO's short-term funding plans. For additional information, see Liquidity Risk Management on pages 110–115.

Mortgage servicing rights

For additional information on MSRs, see Note 17.

Other assets

The increase reflected higher auto operating lease assets from growth in business volume in CCB and higher cash collateral pledged in CIB.

Accounts payable and other liabilities

The increase was largely driven by higher client-driven activity in CIB.

Beneficial interests issued by consolidated VIEs

The decrease was predominantly due to a reduction in commercial paper issued by conduits to third parties, partially offset by net new credit card securitizations. For further information on Firm-sponsored VIEs and loan securitization trusts, see Off-Balance Sheet Arrangements on pages 45–46 and Note 16.

Long-term debt

The increase was due to net issuance of structured notes driven by client demand in CIB, and other net issuance consistent with Treasury and CIO's long-term funding plans, including liquidity actions related to the 2016 Resolution Submission. For additional information on the Firm's long-term debt activities, see Liquidity Risk Management on pages 110–115 and Note 21.

Stockholders' equity

The increase was due to net income offset partially by cash dividends on common and preferred stock, and repurchases of common stock. For additional information on changes in stockholders' equity, see page 144, and on the Firm's capital actions, see Capital actions on page 84.

OFF-BALANCE SHEET ARRANGEMENTS AND CONTRACTUAL CASH OBLIGATIONS

In the normal course of business, the Firm enters into various contractual obligations that may require future cash payments. Certain obligations are recognized on-balance sheet, while others are off-balance sheet under accounting principles generally accepted in the U.S. ("U.S. GAAP"). The Firm is involved with several types of off-balance sheet arrangements, including through nonconsolidated SPEs, which are a type of VIE, and through lending-related financial instruments (e.g., commitments and guarantees).

Special-purpose entities

The most common type of VIE is an SPE. SPEs are commonly used in securitization transactions in order to isolate certain assets and distribute the cash flows from those assets to investors. SPEs are an important part of the financial markets, including the mortgage- and asset-backed securities and commercial paper markets, as they provide market liquidity by facilitating investors' access to specific portfolios of assets and risks. SPEs may be organized as trusts, partnerships or corporations and are typically established for a single, discrete purpose. SPEs are not typically operating entities and usually have a limited life and no employees. The basic SPE structure involves a company selling assets to the SPE; the SPE funds the purchase of those assets by issuing securities to investors.

JPMorgan Chase uses SPEs as a source of liquidity for itself and its clients by securitizing financial assets, and by creating investment products for clients. The Firm is involved with SPEs through multi-seller conduits, investor intermediation activities, and loan securitizations. See Note 16 for further information on these types of SPEs.

The Firm holds capital, as deemed appropriate, against all SPE-related transactions and related exposures, such as derivative transactions and lending-related commitments and guarantees.

The Firm has no commitments to issue its own stock to support any SPE transaction, and its policies require that transactions with SPEs be conducted at arm's length and reflect market pricing. Consistent with this policy, no JPMorgan Chase employee is permitted to invest in SPEs with which the Firm is involved where such investment would violate the Firm's Code of Conduct. These rules prohibit employees from self-dealing and acting on behalf of the Firm in transactions with which they or their family have any significant financial interest.

Implications of a credit rating downgrade to JPMorgan Chase Bank, N.A. For certain liquidity commitments to SPEs, JPMorgan Chase Bank, N.A. could be required to provide funding if its short-term credit rating were downgraded below specific levels, primarily "P-1", "A-1" and "F1" for Moody's Investors Service ("Moody's"), Standard & Poor's and Fitch,

respectively. These liquidity commitments support the issuance of asset-backed commercial paper by Firm-administered consolidated SPEs. In the event of a short-term credit rating downgrade, JPMorgan Chase Bank, N.A., absent other solutions, would be required to provide funding to the SPE if the commercial paper could not be reissued as it matured. The aggregate amounts of commercial paper outstanding held by third parties as of December 31, 2016 and 2015, was \$2.7 billion and \$8.7 billion, respectively. The aggregate amounts of commercial paper issued by these SPEs could increase in future periods should clients of the Firm-administered consolidated SPEs draw down on certain unfunded lending-related commitments. These unfunded lending-related commitments were \$7.4 billion and \$5.6 billion at December 31, 2016 and 2015, respectively. The Firm could facilitate the refinancing of some of the clients' assets in order to reduce the funding obligation. For further information, see the discussion of Firm-administered multi-seller conduits in Note 16.

The Firm also acts as liquidity provider for certain municipal bond vehicles. The Firm's obligation to perform as liquidity provider is conditional and is limited by certain termination events, which include bankruptcy or failure to pay by the municipal bond issuer and any credit enhancement provider, an event of taxability on the municipal bonds or the immediate downgrade of the municipal bond to below investment grade. See Note 16 for additional information.

Off-balance sheet lending-related financial instruments, guarantees, and other commitments

JPMorgan Chase provides lending-related financial instruments (e.g., commitments and guarantees) to meet the financing needs of its customers. The contractual amount of these financial instruments represents the maximum possible credit risk to the Firm should the counterparty draw upon the commitment or the Firm be required to fulfill its obligation under the guarantee, and should the counterparty subsequently fail to perform according to the terms of the contract. Most of these commitments and guarantees are refinanced, extended, cancelled, or expire without being drawn or a default occurring. As a result, the total contractual amount of these instruments is not, in the Firm's view, representative of its actual future credit exposure or funding requirements. For further discussion of lending-related financial instruments, guarantees and other commitments, and the Firm's accounting for them, see Lending-related commitments on page 101 and Note 29. For a discussion of liabilities associated with loan sales and securitization-related indemnifications, see Note 29.

Management's discussion and analysis

Contractual cash obligations

The accompanying table summarizes, by remaining maturity, JPMorgan Chase's significant contractual cash obligations at December 31, 2016. The contractual cash obligations included in the table below reflect the minimum contractual obligation under legally enforceable contracts with terms that are both fixed and determinable. Excluded from the below table are certain liabilities with variable cash flows and/or no obligation to return a stated amount of principal at maturity.

The carrying amount of on-balance sheet obligations on the Consolidated balance sheets may differ from the minimum contractual amount of the obligations reported below. For a discussion of mortgage repurchase liabilities and other obligations, see Note 29.

Contractual cash obligations

By remaining maturity at December 31, (in millions)	2016					2015
	2017	2018-2019	2020-2021	After 2021	Total	Total
On-balance sheet obligations						
Deposits(a)	\$ 1,356,641	\$ 5,512	\$ 3,542	\$ 3,171	\$ 1,368,866	\$ 1,276,139
Federal funds purchased and securities loaned or sold under repurchase agreements	163,978	1,307	2	379	165,666	152,738
Commercial paper	11,738	—	—	—	11,738	15,562
Other borrowed funds(a)	14,759	—	—	—	14,759	11,331
Beneficial interests issued by consolidated VIEs	17,290	16,240	2,767	2,630	38,927	41,092
Long-term debt(a)	44,380	78,676	61,772	103,487	288,315	280,206
Other(b)	4,172	1,328	984	2,496	8,980	8,372
Total on-balance sheet obligations	1,612,958	103,063	69,067	112,163	1,897,251	1,785,440
Off-balance sheet obligations						
Unsettled reverse repurchase and securities borrowing agreements(c)	50,722	—	—	—	50,722	42,482
Contractual interest payments(d)	9,640	10,317	7,638	21,267	48,862	46,149
Operating leases(e)	1,598	2,780	2,036	3,701	10,115	11,829
Equity investment commitments(f)	356	103	30	579	1,068	921
Contractual purchases and capital expenditures	1,382	723	236	225	2,566	2,598
Obligations under co-brand programs	187	233	201	247	868	496
Total off-balance sheet obligations	63,885	14,156	10,141	26,019	114,201	104,475
Total contractual cash obligations	\$ 1,676,843	\$ 117,219	\$ 79,208	\$ 138,182	\$ 2,011,452	\$ 1,889,915

- (a) Excludes structured notes on which the Firm is not obligated to return a stated amount of principal at the maturity of the notes, but is obligated to return an amount based on the performance of the structured notes.
- (b) Primarily includes dividends declared on preferred and common stock, deferred annuity contracts, pension and other postretirement employee benefit obligations and insurance liabilities.
- (c) For further information, refer to unsettled reverse repurchase and securities borrowing agreements in Note 29.
- (d) Includes accrued interest and future contractual interest obligations. Excludes interest related to structured notes for which the Firm's payment obligation is based on the performance of certain benchmarks.
- (e) Includes noncancelable operating leases for premises and equipment used primarily for banking purposes and for energy-related tolling service agreements. Excludes the benefit of noncancelable sublease rentals of \$1.4 billion and \$1.9 billion at December 31, 2016 and 2015, respectively. See Note 30 for more information on lease commitments.
- (f) At December 31, 2016 and 2015, included unfunded commitments of \$48 million and \$50 million, respectively, to third-party private equity funds, and \$1.0 billion and \$871 million of unfunded commitments, respectively, to other equity investments.

CONSOLIDATED CASH FLOWS ANALYSIS

(in millions)	Year ended December 31,		
	2016	2015	2014
Net cash provided by/(used in)			
Operating activities	\$ 20,196	\$ 73,466	\$ 36,593
Investing activities	(114,949)	106,980	(165,636)
Financing activities	98,271	(187,511)	118,228
Effect of exchange rate changes on cash	(135)	(276)	(1,125)
Net increase/(decrease) in cash and due from banks	\$ 3,383	\$ (7,341)	\$ (11,940)

Operating activities

JPMorgan Chase's operating assets and liabilities support the Firm's lending and capital markets activities, including the origination or purchase of loans initially designated as held-for-sale. Operating assets and liabilities can vary significantly in the normal course of business due to the amount and timing of cash flows, which are affected by client-driven and risk management activities and market conditions. The Firm believes cash flows from operations, available cash balances and its capacity to generate cash through secured and unsecured sources are sufficient to meet the Firm's operating liquidity needs.

Cash provided by operating activities in 2016, 2015 and 2014 reflected net income after noncash operating adjustments. Additionally, in 2016 cash provided reflected increases in accounts payable and trading liabilities related to client-driven market-making activities in CIB. The increase in trading liabilities reflected higher levels of client-driven short positions in both debt and equity instruments. Cash used in 2016 reflected an increase in trading assets, an increase in accounts receivable from merchants in CCB and higher client receivables related to client-driven activities in CIB; and higher net originations and purchases from loan held-for-sale activities. The increase in trading assets reflected higher debt and, to a lesser extent, equity instrument inventory levels to facilitate client demand. Cash provided in 2015 resulted from a decrease in trading assets, predominantly due to client-driven market-making activities in CIB, resulting in lower levels of debt and equity securities. Additionally, cash provided reflected a decrease in accounts receivable due to lower client receivables and higher net proceeds from loan sales activities. This was partially offset by cash used due to a decrease in accounts payable and other liabilities, resulting from lower brokerage customer payables related to client activity in CIB. In 2014, cash provided reflected higher net proceeds from loan securitizations and sales activities.

Investing activities

The Firm's investing activities predominantly include originating loans for investment, depositing cash at banks, and investing in the securities portfolio and other short-term interest-earning assets. Cash used in investing activities in 2016 resulted from net originations of consumer and wholesale loans. The increase in consumer loans was due to retention of originated high-quality prime

mortgages in CCB and AWM, and growth of credit card and auto loans in CCB. The increase in wholesale loans was predominantly driven by originations of commercial real estate loans in CB and commercial and industrial loans across multiple industries in CB and CIB. Additionally, in 2016, cash outflows reflected an increase in deposits with banks primarily due to growth in deposits in excess of growth in loans; an increase in securities purchased under resale agreements due to higher demand for securities to cover short positions related to client-driven market-making activities in CIB and the deployment of excess cash by Treasury and CIO. Cash provided by investing activities during 2015 predominantly resulted from lower deposits with banks due to the Firm's actions to reduce wholesale non-operating deposits; and net proceeds from paydowns, maturities, sales and purchases of investment securities. Partially offsetting these net inflows was cash used for net originations of consumer and wholesale loans, a portion of which reflected a shift from investment securities. Cash used in investing activities during 2014 resulted from increases in deposits with banks attributable to higher levels of excess funds; cash was also used for growth in wholesale and consumer loans in 2014. Partially offsetting these cash outflows in 2014 was a net decline in securities purchased under resale agreements due to a shift in the deployment of the Firm's excess cash by Treasury and CIO. Investing activities in 2014 also reflected net proceeds from paydowns, maturities, sales and purchases of investment securities.

Financing activities

The Firm's financing activities includes acquiring customer deposits, issuing long-term debt, as well as preferred and common stock. Cash provided by financing activities in 2016 resulted from higher consumer and wholesale deposits, and an increase in securities loaned or sold under repurchase agreements, predominantly due to higher client-driven market-making activities in CIB. Cash used in financing activities in 2015 resulted from lower wholesale deposits partially offset by higher consumer deposits. Additionally, in 2015 cash outflows were attributable to lower levels of commercial paper due to the discontinuation of a cash management product that offered customers the option of sweeping their deposits into commercial paper; lower commercial paper issuances in the wholesale markets; and a decrease in securities loaned or sold under repurchase agreements due to a decline in secured financings. Cash provided by financing activities in 2014 predominantly resulted from higher consumer and wholesale deposits. For all periods, cash was provided by net proceeds from long-term borrowings; and cash was used for repurchases of common stock and cash dividends on common and preferred stock.

* * *

For a further discussion of the activities affecting the Firm's cash flows, see Consolidated Balance Sheets Analysis on pages 43–44, Capital Risk Management on pages 76–85, and Liquidity Risk Management on pages 110–115.

EXPLANATION AND RECONCILIATION OF THE FIRM’S USE OF NON-GAAP FINANCIAL MEASURES AND KEY PERFORMANCE MEASURES
Non-GAAP financial measures

The Firm prepares its Consolidated Financial Statements using U.S. GAAP; these financial statements appear on pages 141–145. That presentation, which is referred to as “reported” basis, provides the reader with an understanding of the Firm’s results that can be tracked consistently from year to year and enables a comparison of the Firm’s performance with other companies’ U.S. GAAP financial statements.

In addition to analyzing the Firm’s results on a reported basis, management reviews the Firm’s results, including the overhead ratio, and the results of the lines of business, on a “managed” basis, which are non-GAAP financial measures. The Firm’s definition of managed basis starts with the reported U.S. GAAP results and includes certain reclassifications to present total net revenue for the Firm (and each of the reportable business segments) on an FTE basis. Accordingly, revenue from investments that receive tax credits and tax-exempt securities is presented in the managed results on a basis comparable to taxable investments and securities. These non-GAAP financial measures allow management to assess the comparability of revenue from year-to-year arising from both taxable and tax-exempt sources. The corresponding income tax impact

related to tax-exempt items is recorded within income tax expense. These adjustments have no impact on net income as reported by the Firm as a whole or by the lines of business.

Management also uses certain non-GAAP financial measures at the Firm and business-segment level, because these other non-GAAP financial measures provide information to investors about the underlying operational performance and trends of the Firm or of the particular business segment, as the case may be, and, therefore, facilitate a comparison of the Firm or the business segment with the performance of its relevant competitors. For additional information on these non-GAAP measures, see Business Segment Results on pages 51–70.

Additionally, certain credit metrics and ratios disclosed by the Firm exclude PCI loans, and are therefore non-GAAP measures. For additional information on these non-GAAP measures, see Credit Risk Management on pages 86–107.

Non-GAAP financial measures used by the Firm may not be comparable to similarly named non-GAAP financial measures used by other companies.

The following summary table provides a reconciliation from the Firm’s reported U.S. GAAP results to managed basis.

Year ended December 31, (in millions, except ratios)	2016			2015			2014		
	Reported Results	Fully taxable- equivalent adjustments(a)	Managed basis	Reported Results	Fully taxable- equivalent adjustments(a)	Managed basis	Reported Results	Fully taxable- equivalent adjustments(a)	Managed basis
Other income	\$ 3,795	\$ 2,265	\$ 6,060	\$ 3,032	\$ 1,980	\$ 5,012	\$ 3,013	\$ 1,788	\$ 4,801
Total noninterest revenue	49,585	2,265	51,850	50,033	1,980	52,013	51,478	1,788	53,266
Net interest income	46,083	1,209	47,292	43,510	1,110	44,620	43,634	985	44,619
Total net revenue	95,668	3,474	99,142	93,543	3,090	96,633	95,112	2,773	97,885
Pre-provision profit	39,897	3,474	43,371	34,529	3,090	37,619	33,838	2,773	36,611
Income before income tax expense	34,536	3,474	38,010	30,702	3,090	33,792	30,699	2,773	33,472
Income tax expense	9,803	3,474	13,277	6,260	3,090	9,350	8,954	2,773	11,727
Overhead ratio	58%	NM	56%	63%	NM	61%	64%	NM	63%

(a) Predominantly recognized in CIB and CB business segments and Corporate.

Net interest income excluding CIB's Markets businesses

In addition to reviewing net interest income on a managed basis, management also reviews net interest income excluding net interest income arising from CIB's Markets businesses to assess the performance of the Firm's lending, investing (including asset-liability management) and deposit-raising activities. CIB's Markets businesses represent both Fixed Income Markets and Equity Markets. The data presented below are non-GAAP financial measures due to the exclusion of net interest income from CIB's Markets businesses ("CIB Markets").

Management believes this exclusion provides investors and analysts with another measure by which to analyze the non-markets-related business trends of the Firm and provides a comparable measure to other financial institutions that are primarily focused on lending, investing and deposit-raising activities.

Year ended December 31, (in millions, except rates)	2016	2015	2014
Net interest income – managed basis(a)(b)	\$ 47,292	\$ 44,620	\$ 44,619
Less: CIB Markets net interest income(c)	6,334	5,298	6,032
Net interest income excluding CIB Markets(a)	\$ 40,958	\$ 39,322	\$ 38,587
Average interest-earning assets	\$ 2,101,604	\$ 2,088,242	\$ 2,049,093
Less: Average CIB Markets interest-earning assets(c)	520,307	510,292	522,989
Average interest-earning assets excluding CIB Markets	\$ 1,581,297	\$ 1,577,950	\$ 1,526,104
Net interest yield on average interest-earning assets – managed basis	2.25%	2.14%	2.18%
Net interest yield on average CIB Markets interest-earning assets(c)	1.22	1.04	1.15
Net interest yield on average interest-earning assets excluding CIB Markets	2.59%	2.49%	2.53%

- (a) Interest includes the effect of related hedges. Taxable-equivalent amounts are used where applicable.
(b) For a reconciliation of net interest income on a reported and managed basis, see reconciliation from the Firm's reported U.S. GAAP results to managed basis on page 48.
(c) Prior period amounts were revised to align with CIB's Markets businesses. For further information on CIB's Markets businesses, see page 61.

Calculation of certain U.S. GAAP and non-GAAP financial measures

Certain U.S. GAAP and non-GAAP financial measures are calculated as follows:

Book value per share ("BVPS")

Common stockholders' equity at period-end /
Common shares at period-end

Overhead ratio

Total noninterest expense / Total net revenue

Return on assets ("ROA")

Reported net income / Total average assets

Return on common equity ("ROE")

Net income* / Average common stockholders' equity

Return on tangible common equity ("ROTCE")

Net income* / Average tangible common equity

Tangible book value per share ("TBVPS")

Tangible common equity at period-end / Common shares at period-end

* Represents net income applicable to common equity

Management’s discussion and analysis

Tangible common equity, ROTCE and TBVPS

Tangible common equity (“TCE”), ROTCE and TBVPS are each non-GAAP financial measures. TCE represents the Firm’s common stockholders’ equity (i.e., total stockholders’ equity less preferred stock) less goodwill and identifiable intangible assets (other than MSRs), net of related deferred tax liabilities. ROTCE measures the Firm’s net income applicable to common equity as a percentage of average TCE. TBVPS represents the Firm’s TCE at period-end divided by common shares at period-end. TCE, ROTCE, and TBVPS are utilized by the Firm, as well as investors and analysts, in assessing the Firm’s use of equity. The following summary table provides a reconciliation from the Firm’s common stockholders’ equity to TCE.

(in millions, except per share and ratio data)	Period-end		Average		
	Dec 31, 2016	Dec 31, 2015	Year ended December 31,		
			2016	2015	2014
Common stockholders’ equity	\$ 228,122	\$ 221,505	\$ 224,631	\$ 215,690	\$ 207,400
Less: Goodwill	47,288	47,325	47,310	47,445	48,029
Less: Certain identifiable intangible assets	862	1,015	922	1,092	1,378
Add: Deferred tax liabilities ^(a)	3,230	3,148	3,212	2,964	2,950
Tangible common equity	\$ 183,202	\$ 176,313	\$ 179,611	\$ 170,117	\$ 160,943
Return on tangible common equity	NA	NA	13%	13%	13%
Tangible book value per share	\$ 51.44	\$ 48.13	NA	NA	NA

(a) Represents deferred tax liabilities related to tax-deductible goodwill and to identifiable intangibles created in nontaxable transactions, which are netted against goodwill and other intangibles when calculating TCE.

Key performance measures

The Firm’s capital, RWA, and capital and leverage ratios that are presented under Basel III Standardized and Advanced Fully Phased-In rules and the Firm’s, JPMorgan Chase Bank, N.A.’s and Chase Bank USA, N.A.’s SLRs calculated under the Basel III Advanced Fully Phased-In rules are considered key regulatory capital measures. Such measures are used by banking regulators, investors and analysts to assess the Firm’s regulatory capital position and to compare the Firm’s regulatory capital to that of other financial services companies.

For additional information on these measures, see Capital Risk Management on pages 76–85.

Core loans are also considered a key performance measure. Core loans represent loans considered central to the Firm’s ongoing businesses; and exclude loans classified as trading assets, runoff portfolios, discontinued portfolios and portfolios the Firm has an intent to exit. Core loans are utilized by the Firm and its investors and analysts in assessing actual growth in the loan portfolio.

BUSINESS SEGMENT RESULTS

The Firm is managed on a line of business basis. There are four major reportable business segments – Consumer & Community Banking, Corporate & Investment Bank, Commercial Banking and Asset & Wealth Management (formerly Asset Management). In addition, there is a Corporate segment.

The business segments are determined based on the products and services provided, or the type of customer

served, and they reflect the manner in which financial information is currently evaluated by management. Results of these lines of business are presented on a managed basis. For a definition of managed basis, see Explanation and Reconciliation of the Firm's use of Non-GAAP Financial Measures, on pages 48–50.

JPMorgan Chase						
Consumer Businesses			Wholesale Businesses			
Consumer & Community Banking			Corporate & Investment Bank		Commercial Banking	Asset & Wealth Management
Consumer & Business Banking <ul style="list-style-type: none"> • Consumer Banking/Chase Wealth Management • Business Banking 	Mortgage Banking <ul style="list-style-type: none"> • Mortgage Production • Mortgage Servicing • Real Estate Portfolios 	Card, Commerce Solutions & Auto <ul style="list-style-type: none"> • Card Services <ul style="list-style-type: none"> – Credit Card – Commerce Solutions • Auto & Student 	Banking <ul style="list-style-type: none"> • Investment Banking • Treasury Services • Lending 	Markets & Investor Services <ul style="list-style-type: none"> • Fixed Income Markets • Equity Markets • Securities Services • Credit Adjustments & Other 	<ul style="list-style-type: none"> • Middle Market Banking • Corporate Client Banking • Commercial Term Lending • Real Estate Banking 	<ul style="list-style-type: none"> • Asset Management^(a) • Wealth Management^(b)

(a) Formerly Global Investment Management

(b) Formerly Global Wealth Management

Description of business segment reporting methodology

Results of the business segments are intended to reflect each segment as if it were essentially a stand-alone business. The management reporting process that derives business segment results includes the allocation of certain income and expense items described in more detail below. The Firm also assesses the level of capital required for each line of business on at least an annual basis. For further information about line of business capital, see Line of business equity on page 83.

The Firm periodically assesses the assumptions, methodologies and reporting classifications used for segment reporting, and further refinements may be implemented in future periods.

Revenue sharing

When business segments join efforts to sell products and services to the Firm's clients, the participating business segments agree to share revenue from those transactions. The segment results reflect these revenue-sharing agreements.

Funds transfer pricing

Funds transfer pricing is used to allocate interest income and expense to each business segment and to transfer the primary interest rate risk and liquidity risk exposures to Treasury and CIO within Corporate. The funds transfer pricing process considers the interest rate risk, liquidity risk and regulatory requirements of a business segment as if it were operating independently. This process is overseen by

senior management and reviewed by the Firm's Asset-Liability Committee ("ALCO").

Debt expense and preferred stock dividend allocation

As part of the funds transfer pricing process, largely all of the cost of the credit spread component of outstanding unsecured long-term debt and preferred stock dividends is allocated to the reportable business segments, while the balance of the cost is retained in Corporate. The methodology to allocate the cost of unsecured long-term debt and preferred stock dividend to the business segments is aligned with the Firm's process to allocate capital. The allocated cost of unsecured long-term debt is included in a business segment's net interest income, and net income is reduced by preferred stock dividends to arrive at a business segment's net income applicable to common equity.

Business segment capital allocation changes

The amount of capital assigned to each business is referred to as common equity. On at least an annual basis, the Firm assesses the level of capital required for each line of business as well as the assumptions and methodologies used to allocate capital. Through the end of 2016, capital was allocated to the lines of business based on a single measure, Basel III Advanced Fully Phased-In RWA. Effective January 1, 2017, the Firm's methodology used to allocate capital to the Firm's business segments was updated. The new methodology incorporates Basel III Standardized Fully Phased-In RWA (as well as Basel III Advanced Fully Phased-In RWA), leverage, the GSIB surcharge, and a simulation of

Management's discussion and analysis

capital in a severe stress environment. The methodology will continue to be weighted towards Basel III Advanced Fully Phased-In RWA because the Firm believes it to be the best proxy for economic risk. The Firm will consider further changes to its capital allocation methodology as the regulatory framework evolves. In addition, under the new methodology, capital is no longer allocated to each line of business for goodwill and other intangibles associated with acquisitions effected by the line of business.

Expense allocation

Where business segments use services provided by corporate support units, or another business segment, the costs of those services are allocated to the respective business segments. The expense is generally

allocated based on actual cost and use of services provided. In contrast, certain other costs related to corporate support units, or to certain technology and operations, are not allocated to the business segments and are retained in Corporate. Expense retained in Corporate generally includes parent company costs that would not be incurred if the segments were stand-alone businesses; adjustments to align corporate support units; and other items not aligned with a particular business segment.

The following provides a comparative discussion of business segment results as of or for the years ended December 31, 2016, 2015 and 2014.

Segment Results – Managed Basis

The following tables summarize the business segment results for the periods indicated.

Year ended December 31, (in millions)	Total net revenue			Total noninterest expense			Pre-provision profit/(loss)		
	2016	2015	2014	2016	2015	2014	2016	2015	2014
Consumer & Community Banking	\$ 44,915	\$ 43,820	\$ 44,368	\$ 24,905	\$ 24,909	\$ 25,609	\$ 20,010	\$ 18,911	\$ 18,759
Corporate & Investment Bank	35,216	33,542	34,595	18,992	21,361	23,273	16,224	12,181	11,322
Commercial Banking	7,453	6,885	6,882	2,934	2,881	2,695	4,519	4,004	4,187
Asset & Wealth Management	12,045	12,119	12,028	8,478	8,886	8,538	3,567	3,233	3,490
Corporate	(487)	267	12	462	977	1,159	(949)	(710)	(1,147)
Total	\$ 99,142	\$ 96,633	\$ 97,885	\$ 55,771	\$ 59,014	\$ 61,274	\$ 43,371	\$ 37,619	\$ 36,611

Year ended December 31, (in millions, except ratios)	Provision for credit losses			Net income/(loss)			Return on common equity		
	2016	2015	2014	2016	2015	2014	2016	2015	2014
Consumer & Community Banking	\$ 4,494	\$ 3,059	\$ 3,520	\$ 9,714	\$ 9,789	\$ 9,185	18%	18%	18%
Corporate & Investment Bank	563	332	(161)	10,815	8,090	6,908	16	12	10
Commercial Banking	282	442	(189)	2,657	2,191	2,635	16	15	18
Asset & Wealth Management	26	4	4	2,251	1,935	2,153	24	21	23
Corporate	(4)	(10)	(35)	(704)	2,437	864	NM	NM	NM
Total	\$ 5,361	\$ 3,827	\$ 3,139	\$ 24,733	\$ 24,442	\$ 21,745	10%	11%	10%

Consumer & Community Banking offers services to consumers and businesses through bank branches, ATMs, online, mobile and telephone banking. CCB is organized into Consumer & Business Banking (including Consumer Banking/Chase Wealth Management and Business Banking), Mortgage Banking (including Mortgage Production, Mortgage Servicing and Real Estate Portfolios) and Card, Commerce Solutions & Auto. Consumer & Business Banking offers deposit and investment products and services to consumers, and lending, deposit, and cash management and payment solutions to small businesses. Mortgage Banking includes mortgage origination and servicing activities, as well as portfolios consisting of residential mortgages and home equity loans. Card, Commerce Solutions & Auto issues credit cards to consumers and small businesses, offers payment processing services to merchants, originates and services auto loans and leases, and services student loans.

Selected income statement data

Year ended December 31, (in millions, except ratios)	2016	2015	2014
Revenue			
Lending- and deposit-related fees	\$ 3,231	\$ 3,137	\$ 3,039
Asset management, administration and commissions	2,093	2,172	2,096
Mortgage fees and related income	2,490	2,511	3,560
Card income	4,364	5,491	5,779
All other income	3,077	2,281	1,463
Noninterest revenue	15,255	15,592	15,937
Net interest income	29,660	28,228	28,431
Total net revenue	44,915	43,820	44,368
Provision for credit losses	4,494	3,059	3,520
Noninterest expense			
Compensation expense	9,723	9,770	10,538
Noncompensation expense(a)	15,182	15,139	15,071
Total noninterest expense	24,905	24,909	25,609
Income before income tax expense	15,516	15,852	15,239
Income tax expense	5,802	6,063	6,054
Net income	\$ 9,714	\$ 9,789	\$ 9,185
Revenue by line of business			
Consumer & Business Banking	\$ 18,659	\$ 17,983	\$ 18,226
Mortgage Banking	7,361	6,817	7,826
Card, Commerce Solutions & Auto	18,895	19,020	18,316
Mortgage fees and related income details:			
Net production revenue	853	769	1,190
Net mortgage servicing revenue(b)	1,637	1,742	2,370
Mortgage fees and related income	\$ 2,490	\$ 2,511	\$ 3,560
Financial ratios			
Return on common equity	18%	18%	18%
Overhead ratio	55	57	58

Note: In the discussion and the tables which follow, CCB presents certain financial measures which exclude the impact of PCI loans; these are non-GAAP financial measures.

(a) Included operating lease depreciation expense of \$1.9 billion, \$1.4 billion and \$1.2 billion for the years ended December 31, 2016, 2015 and 2014, respectively.

(b) Included MSR risk management of \$217 million, \$(117) million and \$(28) million for the years ended December 31, 2016, 2015 and 2014, respectively.

2016 compared with 2015

Consumer & Community Banking net income was \$9.7 billion, a decrease of 1% compared with the prior year, driven by higher provision for credit losses predominantly offset by higher net revenue.

Net revenue was \$44.9 billion, an increase of 2% compared with the prior year. Net interest income was \$29.7 billion, up 5%, driven by higher deposit balances and higher loan balances, partially offset by deposit spread compression and an increase in the reserve for uncollectible interest and fees in Credit Card. Noninterest revenue was \$15.3 billion, down 2%, driven by higher new account origination costs and the impact of renegotiated co-brand partnership agreements in Credit Card and lower mortgage servicing revenue predominantly as a result of a lower level of third-party loans serviced; these factors were predominantly offset by higher auto lease and card sales volume, higher card- and deposit-related fees, higher MSR risk management results and a gain on the sale of Visa Europe interests. See Note 17 for further information regarding changes in value of the MSR asset and related hedges, and mortgage fees and related income.

The provision for credit losses was \$4.5 billion, an increase of 47% from the prior year. The increase in the provision was driven by:

- a \$920 million increase related to the credit card portfolio, due to a \$600 million addition in the allowance for loan losses, as well as \$320 million of higher net charge-offs, driven by loan growth, including growth in newer vintages which, as anticipated, have higher loss rates compared to the overall portfolio,
- a \$450 million lower benefit related to the residential real estate portfolio, as the current year reduction in the allowance for loan losses was lower than the prior year. The reduction in both periods reflected continued improvements in home prices and lower delinquencies and
- a \$150 million increase related to the auto and business banking portfolio, due to additions to the allowance for loan losses and higher net charge-offs, reflecting loan growth in the portfolios.

Noninterest expense of \$24.9 billion was flat compared with the prior year, driven by lower legal expense and branch efficiencies offset by higher auto lease depreciation and higher investment in marketing.

2015 compared with 2014

Consumer & Community Banking net income was \$9.8 billion, an increase of 7% compared with the prior year, driven by lower noninterest expense and lower provision for credit losses, partially offset by lower net revenue.

Net revenue was \$43.8 billion, a decrease of 1% compared with the prior year. Net interest income was \$28.2 billion, down 1%, driven by spread compression, predominantly offset by higher deposit balances, higher loan balances largely resulting from originations of high-quality mortgage loans that have been retained, and improved credit quality including lower reversals of interest and fees due to lower net charge-offs in Credit Card. Noninterest revenue was \$15.6 billion, down 2%, driven by lower mortgage servicing revenue largely as a result of lower average third-party loans serviced, lower net mortgage production revenue reflecting a lower repurchase benefit and the impact of renegotiated co-brand partnership agreements in Credit Card, largely offset by higher auto lease and card sales volume, the impact of non-core portfolio exits in Credit Card in the prior year, and a gain on the investment in Square, Inc. upon its initial public offering.

The provision for credit losses was \$3.1 billion, a decrease of 13% from the prior year, reflecting lower net charge-offs, partially offset by a lower reduction in the allowance for loan losses. The current-year provision reflected a \$1.0 billion reduction in the allowance for loan losses due to continued improvement in home prices and lower delinquencies as well as increased granularity in the impairment estimates in the residential real estate portfolio and runoff in the student loan portfolio. The prior-year provision reflected a \$1.3 billion reduction in the allowance for loan losses due to continued improvement in home prices and lower delinquencies in the residential real estate portfolio, a decrease in the Credit Card asset-specific allowance resulting from increased granularity of the impairment estimates and lower balances related to credit card loans modified in troubled debt restructurings ("TDRs"), runoff in the student loan portfolio and lower estimated losses in auto loans.

Noninterest expense was \$24.9 billion, a decrease of 3% from the prior year, driven by lower headcount-related expense and lower professional fees, partially offset by higher auto lease depreciation.

Selected metrics

As of or for the year ended December 31, (in millions, except headcount)			
	2016	2015	2014
Selected balance sheet data (period-end)			
Total assets	\$ 535,310	\$ 502,652	\$ 455,634
Loans:			
Consumer & Business Banking	24,307	22,730	21,200
Home equity	50,296	58,734	67,994
Residential mortgage and other	181,196	164,500	115,575
Mortgage Banking	231,492	223,234	183,569
Credit Card	141,816	131,463	131,048
Auto	65,814	60,255	54,536
Student	7,057	8,176	9,351
Total loans	470,486	445,858	399,704
Core loans	382,608	341,881	273,494
Deposits	618,337	557,645	502,520
Common equity	51,000	51,000	51,000
Selected balance sheet data (average)			
Total assets	\$ 516,354	\$ 472,972	\$ 447,750
Loans:			
Consumer & Business Banking	23,431	21,894	20,152
Home equity	54,545	63,261	72,440
Residential mortgage and other	177,010	140,294	110,231
Mortgage Banking	231,555	203,555	182,671
Credit Card	131,165	125,881	125,113
Auto	63,573	56,487	52,961
Student	7,623	8,763	9,987
Total loans	457,347	416,580	390,884
Core loans	361,316	301,700	253,803
Deposits	586,637	530,938	486,919
Common equity	51,000	51,000	51,000
Headcount	132,802	127,094	137,186

Selected metrics

As of or for the year ended December 31, (in millions, except ratio data)			
	2016	2015	2014
Credit data and quality statistics			
Nonaccrual loans(a)(b)	\$ 4,708	\$ 5,313	\$ 6,401
Net charge-offs(c)			
Consumer & Business Banking	257	253	305
Home equity	184	283	473
Residential mortgage and other	14	2	10
Mortgage Banking	198	285	483
Credit Card	3,442	3,122	3,429
Auto	285	214	181
Student	162	210	375
Total net charge-offs	\$ 4,344	\$ 4,084	\$ 4,773
Net charge-off rate(c)			
Consumer & Business Banking	1.10%	1.16%	1.51%
Home equity(d)	0.45	0.60	0.87
Residential mortgage and other(d)	0.01	—	0.01
Mortgage Banking(d)	0.10	0.18	0.37
Credit Card(e)	2.63	2.51	2.75
Auto	0.45	0.38	0.34
Student	2.13	2.40	3.75
Total net charge-offs rate(d)	1.04	1.10	1.40
30+ day delinquency rate			
Mortgage Banking(f)(g)	1.23%	1.57%	2.61%
Credit Card(h)	1.61	1.43	1.44
Auto	1.19	1.35	1.23
Student(i)	1.60	1.81	2.35
90+ day delinquency rate - Credit Card(h)	0.81	0.72	0.70
Allowance for loan losses			
Consumer & Business Banking	\$ 753	\$ 703	\$ 703
Mortgage Banking, excluding PCI loans	1,328	1,588	2,188
Mortgage Banking — PCI loans(c)	2,311	2,742	3,325
Credit Card	4,034	3,434	3,439
Auto	474	399	350
Student	249	299	399
Total allowance for loan losses(c)	\$ 9,149	\$ 9,165	\$ 10,404

- (a) Excludes PCI loans. The Firm is recognizing interest income on each pool of PCI loans as they are all performing.
- (b) At December 31, 2016, 2015 and 2014, nonaccrual loans excluded loans 90 or more days past due as follows: (1) mortgage loans insured by U.S. government agencies of \$5.0 billion, \$6.3 billion and \$7.8 billion respectively; and (2) student loans insured by U.S. government agencies under the Federal Family Education Loan Program ("FFELP") of \$263 million, \$290 million and \$367 million, respectively. These amounts have been excluded based upon the government guarantee.
- (c) Net charge-offs and the net charge-off rates for the years ended December 31, 2016, 2015 and 2014, excluded \$156 million, \$208 million, and \$533 million, respectively, of write-offs in the PCI portfolio. These write-offs decreased the allowance for loan losses for PCI loans. For further information on PCI write-offs, see summary of changes in the allowance on page 106.

Management's discussion and analysis

- (d) Excludes the impact of PCI loans. For the years ended December 31, 2016, 2015 and 2014, the net charge-off rates including the impact of PCI loans were as follows: (1) home equity of 0.34%, 0.45% and 0.65%, respectively; (2) residential mortgage and other of 0.01%, –% and 0.01%, respectively; (3) Mortgage Banking of 0.09%, 0.14% and 0.27%, respectively; and (4) total CCB of 0.95%, 0.99% and 1.22%, respectively.
- (e) Average credit card loans included loans held-for-sale of \$84 million, \$1.6 billion and \$509 million for the years ended December 31, 2016, 2015 and 2014, respectively. These amounts are excluded when calculating the net charge-off rate.
- (f) At December 31, 2016, 2015 and 2014, excluded mortgage loans insured by U.S. government agencies of \$7.0 billion, \$8.4 billion and \$9.7 billion, respectively, that are 30 or more days past due. These amounts have been excluded based upon the government guarantee.
- (g) Excludes PCI loans. The 30+ day delinquency rate for PCI loans was 9.82%, 11.21% and 13.33% at December 31, 2016, 2015 and 2014, respectively.
- (h) Period-end credit card loans included loans held-for-sale of \$105 million, \$76 million and \$3.0 billion at December 31, 2016, 2015 and 2014, respectively. These amounts are excluded when calculating delinquency rates.
- (i) Excluded student loans insured by U.S. government agencies under FFELP of \$468 million, \$526 million and \$654 million at December 31, 2016, 2015 and 2014, respectively, that are 30 or more days past due. These amounts have been excluded based upon the government guarantee.

Selected metrics

As of or for the year ended December 31, (in billions, except ratios and where otherwise noted)				
	2016	2015	2014	
Business Metrics				
CCB households (in millions)	60.0	57.8	57.2	
Number of branches	5,258	5,413	5,602	
Active digital customers (in thousands)(a)	43,836	39,242	36,396	
Active mobile customers (in thousands)(b)	26,536	22,810	19,084	
Debit and credit card sales volume	\$ 817.9	\$ 753.8	\$ 707.0	
Consumer & Business Banking				
Average deposits	\$ 570.8	\$ 515.2	\$ 472.3	
Deposit margin	1.81%	1.90%	2.21%	
Business banking origination volume	\$ 7.3	\$ 6.8	\$ 6.6	
Client investment assets	234.5	218.6	213.5	
Mortgage Banking				
Mortgage origination volume by channel				
Retail	\$ 44.3	\$ 36.1	\$ 29.5	
Correspondent	59.3	70.3	48.5	
Total mortgage origination volume(c)	\$ 103.6	\$ 106.4	\$ 78.0	
Total loans serviced (period-end)	\$ 846.6	\$ 910.1	\$ 948.8	
Third-party mortgage loans serviced (period-end)	591.5	674.0	751.5	
MSR carrying value (period-end)	6.1	6.6	7.4	
Ratio of MSR carrying value (period-end) to third-party mortgage loans serviced (period-end)	1.03%	0.98%	0.98%	
MSR revenue multiple(d)	2.94x	2.80x	2.72x	
Credit Card, excluding Commercial Card				
Credit card sales volume	\$ 545.4	\$ 495.9	\$ 465.6	
New accounts opened (in millions)	10.4	8.7	8.8	
Card Services				
Net revenue rate	11.29%	12.33%	12.03%	
Commerce Solutions				
Merchant processing volume	\$ 1,063.4	\$ 949.3	\$ 847.9	
Auto				
Loan and lease origination volume	\$ 35.4	\$ 32.4	\$ 27.5	
Average Auto operating lease assets	11.0	7.8	6.1	

(a) Users of all web and/or mobile platforms who have logged in within the past 90 days.

(b) Users of all mobile platforms who have logged in within the past 90 days.

(c) Firmwide mortgage origination volume was \$117.4 billion, \$115.2 billion and \$83.3 billion for the years ended December 31, 2016, 2015 and 2014, respectively.

(d) Represents the ratio of MSR carrying value (period-end) to third-party mortgage loans serviced (period-end) divided by the ratio of loan servicing-related revenue to third-party mortgage loans serviced (average).

Mortgage servicing-related matters

The Firm has resolved the majority of the consent orders and settlements into which it entered with federal and state governmental agencies and private parties related to mortgage servicing, origination, and residential mortgage-backed securities activities. However, among those obligations, the mortgage servicing-related Consent Order entered into with the Federal Reserve on April 13, 2011, as amended on February 28, 2013, and certain other settlements remain outstanding. The Audit Committee of the Board of Directors provides governance and oversight of the Federal Reserve Consent Order.

The Federal Reserve Consent Order and other obligations under certain mortgage-related settlements are the subject of ongoing reporting to various regulators and independent overseers. The Firm's compliance with certain of these settlements is detailed in periodic reports published by the independent overseers. The Firm is committed to fulfilling its commitments with appropriate diligence.

Management's discussion and analysis

CORPORATE & INVESTMENT BANK

The Corporate & Investment Bank, which consists of Banking and Markets & Investor Services, offers a broad suite of investment banking, market-making, prime brokerage, and treasury and securities products and services to a global client base of corporations, investors, financial institutions, government and municipal entities. Banking offers a full range of investment banking products and services in all major capital markets, including advising on corporate strategy and structure, capital-raising in equity and debt markets, as well as loan origination and syndication. Banking also includes Treasury Services, which provides transaction services, consisting of cash management and liquidity solutions. Markets & Investor Services is a global market-maker in cash securities and derivative instruments, and also offers sophisticated risk management solutions, prime brokerage, and research. Markets & Investor Services also includes Securities Services, a leading global custodian which provides custody, fund accounting and administration, and securities lending products principally for asset managers, insurance companies and public and private investment funds.

Selected income statement data

Year ended December 31, (in millions)	2016	2015	2014
Revenue			
Investment banking fees	\$ 6,424	\$ 6,736	\$ 6,570
Principal transactions	11,089	9,905	8,947
Lending- and deposit-related fees	1,581	1,573	1,742
Asset management, administration and commissions	4,062	4,467	4,687
All other income(a)	1,169	1,012	1,474
Noninterest revenue	24,325	23,693	23,420
Net interest income(a)	10,891	9,849	11,175
Total net revenue	35,216	33,542	34,595
Provision for credit losses	563	332	(161)
Noninterest expense			
Compensation expense	9,546	9,973	10,449
Noncompensation expense	9,446	11,388	12,824
Total noninterest expense	18,992	21,361	23,273
Income before income tax expense	15,661	11,849	11,483
Income tax expense	4,846	3,759	4,575
Net income	\$ 10,815	\$ 8,090	\$ 6,908

(a) Included tax-equivalent adjustments, predominantly due to income tax credits related to alternative energy investments; income tax credits and amortization of the cost of investments in affordable housing projects; and tax-exempt income from municipal bonds of \$2.0 billion, \$1.7 billion and \$1.6 billion for the years ended December 31, 2016, 2015 and 2014, respectively.

Selected income statement data

Year ended December 31, (in millions, except ratios)	2016	2015	2014
Financial ratios			
Return on common equity	16%	12%	10%
Overhead ratio	54	64	67
Compensation expense as percentage of total net revenue	27	30	30
Revenue by business			
Investment Banking	\$ 5,950	\$ 6,376	\$ 6,122
Treasury Services	3,643	3,631	3,728
Lending	1,208	1,461	1,547
Total Banking	10,801	11,468	11,397
Fixed Income Markets	15,259	12,592	14,075
Equity Markets	5,740	5,694	5,044
Securities Services	3,591	3,777	4,351
Credit Adjustments & Other(a)	(175)	11	(272)
Total Markets & Investor Service	24,415	22,074	23,198
Total net revenue	\$ 35,216	\$ 33,542	\$ 34,595

(a) Effective January 1, 2016, consists primarily of credit valuation adjustments ("CVA") managed by the Credit Portfolio Group, Funding valuation adjustment ("FVA") and DVA on derivatives. Results are primarily reported in Principal transactions. Prior periods also include DVA on fair value option elected liabilities. Results are presented net of associated hedging activities and net of CVA and FVA amounts allocated to Fixed Income Markets and Equity Markets. Effective January 1, 2016, changes in DVA on fair value option elected liabilities is recognized in OCI. For additional information, see Accounting and Reporting Developments on page 135 and Notes 3, 4 and 25.

2016 compared with 2015

Net income was \$10.8 billion, up 34% compared with the prior year, driven by lower noninterest expense and higher net revenue, partially offset by a higher provision for credit losses.

Banking revenue was \$10.8 billion, down 6% compared with the prior year. Investment banking revenue was \$6.0 billion, down 7% from the prior year, largely driven by lower equity underwriting fees. The Firm maintained its #1 ranking for Global Investment Banking fees, according to Dealogic. Equity underwriting fees were \$1.2 billion, down 19% driven by lower industry-wide fee levels; however, the Firm improved its market share and maintained its #1 ranking in equity underwriting fees globally as well as in both North America and Europe and its #1 ranking by volumes across all products, according to Dealogic. Advisory fees were \$2.1 billion, down 1%; the Firm maintained its #2 ranking for M&A, according to Dealogic. Debt underwriting fees were \$3.2 billion; the Firm maintained its #1 ranking globally in fees across high grade, high yield, and loan products, according to Dealogic. Treasury Services revenue was \$3.6 billion. Lending revenue was \$1.2 billion, down 17% from the prior year, reflecting fair value losses on hedges of accrual loans.

Markets & Investor Services revenue was \$24.4 billion, up 11% from the prior year. Fixed Income Markets revenue was \$15.3 billion, up 21% from the prior year, driven by broad strength across products. Rates performance was strong, with increased client activity driven by high issuance-based flows, global political developments, and central bank actions. Credit and Securitized Products revenue improved driven by higher market-making revenue from the secondary market as clients' risk appetite recovered, and due to increased financing activity. Equity Markets revenue was \$5.7 billion, up 1%, compared to a strong prior-year. Securities Services revenue was \$3.6 billion, down 5% from the prior year, largely driven by lower fees and commissions. Credit Adjustments and Other was a loss of \$175 million driven by valuation adjustments, compared with an \$11 million gain in prior-year, which included funding spread gains on fair value option elected liabilities.

The provision for credit losses was \$563 million, compared to \$332 million in the prior year, reflecting a higher allowance for credit losses, including the impact of select downgrades within the Oil & Gas portfolio.

Noninterest expense was \$19.0 billion, down 11% compared with the prior year, driven by lower legal and compensation expenses.

2015 compared with 2014

Net income was \$8.1 billion, up 17% compared with \$6.9 billion in the prior year. The increase primarily reflected lower income tax expenses largely reflecting the release in 2015 of U.S. deferred taxes associated with the restructuring of certain non-U.S. entities and lower noninterest expense partially offset by lower net revenue, both driven by business simplification, as well as higher provisions for credit losses.

Banking revenue was \$11.5 billion, up 1% versus the prior year. Investment banking revenue was \$6.4 billion, up 4% from the prior year, driven by higher advisory fees, partially offset by lower debt and equity underwriting fees. Advisory fees were \$2.1 billion, up 31% on a greater share of fees for completed transactions as well as growth in the industry-wide fee levels. The Firm maintained its #2 ranking for M&A, according to Dealogic. Debt underwriting fees were \$3.2 billion, down 6%, primarily related to lower bond underwriting and loan syndication fees on lower industry-wide fee levels. The Firm ranked #1 globally in fee share across high grade, high yield and loan products. Equity underwriting fees were \$1.4 billion, down 9%, driven by lower industry-wide fee levels. The Firm was #1 in equity underwriting fees in 2015, up from #3 in 2014. Treasury Services revenue was \$3.6 billion, down 3% compared with the prior year, primarily driven by lower net interest income. Lending revenue was \$1.5 billion, down 6% from the prior year, driven by lower trade finance revenue on lower loan balances.

Markets & Investor Services revenue was \$22.1 billion, down 5% from the prior year. Fixed Income Markets revenue was \$12.6 billion, down 11% from the prior year, primarily driven by the impact of business simplification as well as lower revenue in credit-related products on an industry-wide slowdown, partially offset by increased revenue in Rates and Currencies & Emerging Markets on higher client activity. The lower Fixed Income revenue also reflected higher interest costs on higher long-term debt. Equity Markets revenue was \$5.7 billion, up 13%, primarily driven by higher equity derivatives revenue across all regions. Securities Services revenue was \$3.8 billion, down 13% from the prior year, driven by lower fees as well as lower net interest income.

The provision for credit losses was \$332 million, compared to a benefit of \$161 million in the prior year, reflecting a higher allowance for credit losses, including the impact of select downgrades within the Oil & Gas portfolio.

Noninterest expense was \$21.4 billion, down 8% compared with the prior year, driven by the impact of business simplification as well as lower legal and compensation expenses.

Management's discussion and analysis

Selected metrics

As of or for the year ended December 31, (in millions, except headcount)	2016	2015	2014
Selected balance sheet data (period-end)			
Assets	\$ 803,511	\$ 748,691	\$ 861,466
Loans:			
Loans retained(a)	111,872	106,908	96,409
Loans held-for-sale and loans at fair value	3,781	3,698	5,567
Total loans	115,653	110,606	101,976
Core Loans	115,243	110,084	100,772
Common equity	64,000	62,000	61,000
Selected balance sheet data (average)			
Assets	\$ 815,321	\$ 824,208	\$ 854,712
Trading assets-debt and equity instruments	300,606	302,514	317,535
Trading assets-derivative receivables	63,387	67,263	64,833
Loans:			
Loans retained(a)	111,082	98,331	95,764
Loans held-for-sale and loans at fair value	3,812	4,572	7,599
Total loans	114,894	102,903	103,363
Core Loans(b)	114,455	102,142	99,500
Common equity	64,000	62,000	61,000
Headcount	48,748	49,067	50,965

(a) Loans retained includes credit portfolio loans, loans held by consolidated Firm-administered multi-seller conduits, trade finance loans, other held-for-investment loans and overdrafts.

(b) Prior period amounts were revised to conform with current period presentation.

Selected metrics

As of or for the year ended December 31, (in millions, except ratios)	2016	2015	2014
Credit data and quality statistics			
Net charge-offs/(recoveries)	\$ 168	\$ (19)	\$ (12)
Nonperforming assets:			
Nonaccrual loans:			
Nonaccrual loans retained(a)	467	428	110
Nonaccrual loans held-for-sale and loans at fair value	109	10	11
Total nonaccrual loans	576	438	121
Derivative receivables	223	204	275
Assets acquired in loan satisfactions	79	62	67
Total nonperforming assets	878	704	463
Allowance for credit losses:			
Allowance for loan losses	1,420	1,258	1,034
Allowance for lending-related commitments	801	569	439
Total allowance for credit losses	2,221	1,827	1,473
Net charge-off/(recovery) rate	0.15%	(0.02)%	(0.01)%
Allowance for loan losses to period-end loans retained	1.27	1.18	1.07
Allowance for loan losses to period-end loans retained, excluding trade finance and conduits(b)	1.86	1.88	1.82
Allowance for loan losses to nonaccrual loans retained(a)	304	294	940
Nonaccrual loans to total period-end loans	0.50	0.40	0.12

(a) Allowance for loan losses of \$113 million, \$177 million and \$18 million were held against these nonaccrual loans at December 31, 2016, 2015 and 2014, respectively.

(b) Management uses allowance for loan losses to period-end loans retained, excluding trade finance and conduits, a non-GAAP financial measure, to provide a more meaningful assessment of CIB's allowance coverage ratio.

Investment banking fees

(in millions)	Year ended December 31,		
	2016	2015	2014
Advisory	\$ 2,110	\$ 2,133	\$ 1,627
Equity underwriting	1,159	1,434	1,571
Debt underwriting(a)	3,155	3,169	3,372
Total investment banking fees	\$ 6,424	\$ 6,736	\$ 6,570

(a) Includes loans syndication

League table results – wallet share

Year ended December 31,	2016		2015		2014	
	Share	Rank	Share	Rank	Share	Rank
<i>Based on fees(a)</i>						
Debt, equity and equity-related						
Global	7.2%	#1	7.7%	#1	7.6%	#1
U.S.	11.9	1	11.7	1	10.7	1
Long-term debt(b)						
Global	6.9	1	8.3	1	7.9	1
U.S.	11.1	2	11.9	1	11.7	1
Equity and equity-related						
Global(c)	7.6	1	7.0	1	7.2	3
U.S.	13.4	1	11.4	1	9.6	3
M&A(d)						
Global	8.6	2	8.4	2	8.0	2
U.S.	10.1	2	9.9	2	9.7	2
Loan syndications						
Global	9.4	1	7.5	1	9.3	1
U.S.	11.9	2	10.8	2	13.0	1
Global investment banking fees (e)	8.1%	#1	7.9%	#1	8.0%	#1

(a) Source: Dealogic as of January 3, 2017. Reflects the ranking of revenue wallet and market share.

(b) Long-term debt rankings include investment-grade, high-yield, supranationals, sovereigns, agencies, covered bonds, ABS and MBS; and exclude money market, short-term debt, and U.S. municipal securities.

(c) Global equity and equity-related ranking includes rights offerings and Chinese A-Shares.

(d) Global M&A reflect the removal of any withdrawn transactions. U.S. M&A revenue wallet represents wallet from client parents based in the U.S.

(e) Global investment banking fees exclude money market, short-term debt and shelf deals.

Markets Revenue

The following table summarizes select income statement data for the Markets businesses. Markets includes both Fixed Income Markets and Equity Markets. Markets revenue comprises principal transactions, fees, commissions and other income, as well as net interest income. For a description of the composition of these income statement line items, see Notes 7 and 8.

Principal transactions reflects revenue on financial instruments and commodities transactions that arise from client-driven market making activity. Principal transactions revenue includes amounts recognized upon executing new transactions with market participants, as well as “inventory-related revenue”, which is revenue recognized from gains and losses on derivatives and other instruments that the Firm has been holding in anticipation of, or in response to, client demand, and changes in the fair value of instruments used by the Firm to actively manage the risk exposure arising from such inventory. Principal transactions revenue recognized upon executing new transactions with market participants is driven by many factors including the level of client activity, the bid-offer spread (which is the difference between the price at which a market participant is willing to sell an instrument to the Firm and the price at which another market participant is willing to buy it from the Firm, and vice versa), market liquidity and volatility. These factors are interrelated and sensitive to the same factors that drive inventory-related revenue, which include general market conditions, such as interest rates, foreign exchange rates, credit spreads, and equity and commodity prices, as well as other macroeconomic conditions.

For the periods presented below, the predominant source of principal transactions revenue was the amounts recognized upon executing new transactions.

Year ended December 31, (in millions, except where otherwise noted)	2016			2015			2014		
	Fixed Income Markets	Equity Markets	Total Markets	Fixed Income Markets	Equity Markets	Total Markets	Fixed Income Markets	Equity Markets	Total Markets
Principal transactions	\$ 8,347	\$ 3,130	\$ 11,477	\$ 6,899	\$ 3,038	\$ 9,937	\$ 7,014	\$ 2,362	\$ 9,376
Lending- and deposit-related fees	220	2	222	194	—	194	222	2	224
Asset management, administration and commissions	388	1,551	1,939	383	1,704	2,087	345	1,684	2,029
All other income	1,014	13	1,027	854	(84)	770	1,399	59	1,458
Noninterest revenue	9,969	4,696	14,665	8,330	4,658	12,988	8,980	4,107	13,087
Net interest income	5,290	1,044	6,334	4,262	1,036	5,298	5,095	937	6,032
Total net revenue	\$ 15,259	\$ 5,740	\$ 20,999	\$ 12,592	\$ 5,694	\$ 18,286	\$ 14,075	\$ 5,044	\$ 19,119
Loss days(a)	0			2			0		

(a) Loss days represent the number of days for which Markets posted losses. The loss days determined under this measure differ from the loss days that are determined based on the disclosure of market risk-related gains and losses for the Firm in the value-at-risk (“VaR”) back-testing discussion on pages 118-120.

Management's discussion and analysis

Selected metrics

As of or for the year ended December 31, (in millions, except where otherwise noted)					
	2016		2015		2014
Assets under custody (“AUC”) by asset class (period-end) (in billions):					
Fixed Income	\$	12,166	\$	12,042	\$ 12,328
Equity		6,428		6,194	6,524
Other(a)		1,926		1,707	1,697
Total AUC	\$	20,520	\$	19,943	\$ 20,549
Client deposits and other third party liabilities (average)(b)	\$	376,287	\$	395,297	\$ 417,369
Trade finance loans (period-end)		15,923		19,255	25,713
(a) Consists of mutual funds, unit investment trusts, currencies, annuities, insurance contracts, options and other contracts.					
(b) Client deposits and other third party liabilities pertain to the Treasury Services and Securities Services businesses.					

International metrics

Year ended December 31, (in millions, except where otherwise noted)					
	2016		2015		2014
Total net revenue(a)					
Europe/Middle East/Africa	\$	10,786	\$	10,894	\$ 11,598
Asia/Pacific		4,915		4,901	4,698
Latin America/Caribbean		1,225		1,096	1,179
Total international net revenue		16,926		16,891	17,475
North America		18,290		16,651	17,120
Total net revenue	\$	35,216	\$	33,542	\$ 34,595
Loans retained (period-end)(a)					
Europe/Middle East/Africa	\$	26,696	\$	24,622	\$ 27,155
Asia/Pacific		14,508		17,108	19,992
Latin America/Caribbean		7,607		8,609	8,950
Total international loans		48,811		50,339	56,097
North America		63,061		56,569	40,312
Total loans retained	\$	111,872	\$	106,908	\$ 96,409
Client deposits and other third-party liabilities (average)(a)(b)					
Europe/Middle East/Africa	\$	135,979	\$	141,062	\$ 152,712
Asia/Pacific		68,110		67,111	66,933
Latin America/Caribbean		22,914		23,070	22,360
Total international	\$	227,003	\$	231,243	\$ 242,005
North America		149,284		164,054	175,364
Total client deposits and other third-party liabilities	\$	376,287	\$	395,297	\$ 417,369
AUC (period-end) (in billions)(a)					
North America	\$	12,290	\$	12,034	\$ 11,987
All other regions		8,230		7,909	8,562
Total AUC	\$	20,520	\$	19,943	\$ 20,549

(a) Total net revenue is based predominantly on the domicile of the client or location of the trading desk, as applicable. Loans outstanding (excluding loans held-for-sale and loans at fair value), client deposits and other third-party liabilities, and AUC are based predominantly on the domicile of the client.

(b) Client deposits and other third party liabilities pertain to the Treasury Services and Securities Services businesses.

Commercial Banking delivers extensive industry knowledge, local expertise and dedicated service to U.S. and U.S. multinational clients, including corporations, municipalities, financial institutions and nonprofit entities with annual revenue generally ranging from \$20 million to \$2 billion. In addition, CB provides financing to real estate investors and owners. Partnering with the Firm's other businesses, CB provides comprehensive financial solutions, including lending, treasury services, investment banking and asset management to meet its clients' domestic and international financial needs.

Selected income statement data

Year ended December 31, (in millions)	2016	2015	2014
Revenue			
Lending- and deposit-related fees	\$ 917	\$ 944	\$ 978
Asset management, administration and commissions	69	88	92
All other income(a)	1,334	1,333	1,279
Noninterest revenue	2,320	2,365	2,349
Net interest income	5,133	4,520	4,533
Total net revenue(b)	7,453	6,885	6,882
Provision for credit losses	282	442	(189)
Noninterest expense			
Compensation expense	1,332	1,238	1,203
Noncompensation expense	1,602	1,643	1,492
Total noninterest expense	2,934	2,881	2,695
Income before income tax expense	4,237	3,562	4,376
Income tax expense	1,580	1,371	1,741
Net income	\$ 2,657	\$ 2,191	\$ 2,635

(a) Includes revenue from investment banking products and commercial card transactions.

(b) Total net revenue included tax-equivalent adjustments from income tax credits related to equity investments in designated community development entities that provide loans to qualified businesses in low-income communities, as well as tax-exempt income related to municipal financing activities of \$505 million, \$493 million and \$462 million for the years ended December 31, 2016, 2015 and 2014, respectively.

2016 compared with 2015

Net income was \$2.7 billion, an increase of 21% compared with the prior year, driven by higher net revenue and a lower provision for credit losses, partially offset by higher noninterest expense.

Net revenue was \$7.5 billion, an increase of 8% compared with the prior year. Net interest income was \$5.1 billion, an increase of 14% compared with the prior year, driven by higher loan balances and deposit spreads. Noninterest revenue was \$2.3 billion, a decrease of 2% compared with the prior year, largely driven by lower lending-and-deposit-related fees and other revenue, partially offset by higher investment banking revenue.

Noninterest expense was \$2.9 billion, an increase of 2% compared with the prior year, reflecting increased hiring of bankers and business-related support staff and investments in technology.

The provision for credit losses was \$282 million and \$442 million for 2016 and 2015, respectively, with both periods driven by downgrades in the Oil & Gas portfolio and select client downgrades in other industries.

2015 compared with 2014

Net income was \$2.2 billion, a decrease of 17% compared with the prior year, driven by a higher provision for credit losses and higher noninterest expense.

Net revenue was \$6.9 billion, flat compared with the prior year. Net interest income was \$4.5 billion, flat compared with the prior year, with interest income from higher loan balances offset by spread compression. Noninterest revenue was \$2.4 billion, flat compared with the prior year, with higher investment banking revenue offset by lower lending-related fees.

Noninterest expense was \$2.9 billion, an increase of 7% compared with the prior year, reflecting investment in controls.

The provision for credit losses was \$442 million, reflecting an increase in the allowance for credit losses for Oil & Gas exposure and select client downgrades in other industries. The prior year was a benefit of \$189 million.

Management's discussion and analysis

CB product revenue consists of the following:

Lending includes a variety of financing alternatives, which are primarily provided on a secured basis; collateral includes receivables, inventory, equipment, real estate or other assets. Products include term loans, revolving lines of credit, bridge financing, asset-based structures, leases, and standby letters of credit.

Treasury services includes revenue from a broad range of products and services that enable CB clients to manage payments and receipts, as well as invest and manage funds.

Investment banking includes revenue from a range of products providing CB clients with sophisticated capital-raising alternatives, as well as balance sheet and risk management tools through advisory, equity underwriting, and loan syndications. Revenue from Fixed Income and Equity Markets products used by CB clients is also included. Investment banking revenue, gross, represents total revenue related to investment banking products sold to CB clients.

Other product revenue primarily includes tax-equivalent adjustments generated from Community Development Banking activities and certain income derived from principal transactions.

CB is divided into four primary client segments: Middle Market Banking, Corporate Client Banking, Commercial Term Lending, and Real Estate Banking.

Middle Market Banking covers corporate, municipal and nonprofit clients, with annual revenue generally ranging between \$20 million and \$500 million.

Corporate Client Banking covers clients with annual revenue generally ranging between \$500 million and \$2 billion and focuses on clients that have broader investment banking needs.

Commercial Term Lending primarily provides term financing to real estate investors/owners for multifamily properties as well as office, retail and industrial properties.

Real Estate Banking provides full-service banking to investors and developers of institutional-grade real estate investment properties.

Other primarily includes lending and investment-related activities within the Community Development Banking business.

Selected income statement data (continued)

Year ended December 31, (in millions, except ratios)	2016	2015	2014
Revenue by product			
Lending	\$ 3,795	\$ 3,429	\$ 3,358
Treasury services	2,797	2,581	2,681
Investment banking(a)	785	730	684
Other	76	145	159
Total Commercial Banking net revenue	\$ 7,453	\$ 6,885	\$ 6,882
Revenue by client segment(c)			
Middle Market Banking	\$ 2,885	\$ 2,706	\$ 2,765
Corporate Client Banking	2,392	2,184	2,134
Commercial Term Lending	1,408	1,275	1,252
Real Estate Banking	456	358	369
Other	312	362	362
Total Commercial Banking net revenue	\$ 7,453	\$ 6,885	\$ 6,882
Financial ratios			
Return on common equity	16%	15%	18%
Overhead ratio	39	42	39

(a) Includes total Firm revenue from investment banking products sold to CB clients, net of revenue sharing with the CIB.

(b) Represents total Firm revenue from investment banking products sold to CB clients.

(c) Certain clients were transferred from Middle Market Banking to Corporate Client Banking and from Real Estate Banking to Corporate Client Banking during 2016. Prior period client segment amounts were revised to conform with the current period presentation.

Selected metrics (continued)

As of or for the year ended December 31, (in millions, except headcount)	2016	2015	2014
Selected balance sheet data (period-end)			
Total assets	\$ 214,341	\$ 200,700	\$ 195,267
Loans:			
Loans retained	188,261	167,374	147,661
Loans held-for-sale and loans at fair value	734	267	845
Total loans	\$ 188,995	\$ 167,641	\$ 148,506
Core loans	188,673	166,939	147,392
Common equity	16,000	14,000	14,000
Period-end loans by client segment(a)			
Middle Market Banking	\$ 53,931	\$ 50,502	\$ 50,040
Corporate Client Banking	43,025	37,708	30,564
Commercial Term Lending	71,249	62,860	54,038
Real Estate Banking	14,722	11,234	9,024
Other	6,068	5,337	4,840
Total Commercial Banking loans	\$ 188,995	\$ 167,641	\$ 148,506
Selected balance sheet data (average)			
Total assets	\$ 207,532	\$ 198,076	\$ 191,857
Loans:			
Loans retained	178,670	157,389	140,982
Loans held-for-sale and loans at fair value	723	492	782
Total loans	\$ 179,393	\$ 157,881	\$ 141,764
Core loans	178,875	156,975	140,390
Client deposits and other third-party liabilities	174,396	191,529	204,017
Common equity	16,000	14,000	14,000
Average loans by client segment(a)			
Middle Market Banking	\$ 52,244	\$ 50,336	\$ 50,076
Corporate Client Banking	41,754	34,495	27,732
Commercial Term Lending	66,700	58,138	51,120
Real Estate Banking	13,063	9,917	8,324
Other	5,632	4,995	4,512
Total Commercial Banking loans	\$ 179,393	\$ 157,881	\$ 141,764
Headcount	8,365	7,845	7,426

(a) Certain clients were transferred from Middle Market Banking to Corporate Client Banking and from Real Estate Banking to Corporate Client Banking during 2016. Prior period client segment amounts were revised to conform with the current period presentation.

Selected metrics (continued)

As of or for the year ended December 31, (in millions, except ratios)	2016	2015	2014
Credit data and quality statistics			
Net charge-offs/(recoveries)	\$ 163	\$ 21	\$ (7)
Nonperforming assets			
Nonaccrual loans:			
Nonaccrual loans retained(a)	1,149	375	317
Nonaccrual loans held-for-sale and loans at fair value	—	18	14
Total nonaccrual loans	1,149	393	331
Assets acquired in loan satisfactions	1	8	10
Total nonperforming assets	1,150	401	341
Allowance for credit losses:			
Allowance for loan losses	2,925	2,855	2,466
Allowance for lending-related commitments	248	198	165
Total allowance for credit losses	3,173	3,053	2,631
Net charge-off/(recovery) rate(b)	0.09%	0.01%	—
Allowance for loan losses to period-end loans retained	1.55	1.71	1.67
Allowance for loan losses to nonaccrual loans retained(a)	255	761	778
Nonaccrual loans to period-end total loans	0.61	0.23	0.22

(a) An allowance for loan losses of \$155 million, \$64 million and \$45 million was held against nonaccrual loans retained at December 31, 2016, 2015 and 2014, respectively.

(b) Loans held-for-sale and loans at fair value were excluded when calculating the net charge-off/(recovery) rate.

ASSET & WEALTH MANAGEMENT

Asset & Wealth Management, with client assets of \$2.5 trillion, is a global leader in investment and wealth management. AWM clients include institutions, high-net-worth individuals and retail investors in many major markets throughout the world. AWM offers investment management across most major asset classes including equities, fixed income, alternatives and money market funds. AWM also offers multi-asset investment management, providing solutions for a broad range of clients' investment needs. For Wealth Management clients, AWM also provides retirement products and services, brokerage and banking services including trusts and estates, loans, mortgages and deposits. The majority of AWM's client assets are in actively managed portfolios.

Selected income statement data

Year ended December 31, (in millions, except ratios and headcount)	2016	2015	2014
Revenue			
Asset management, administration and commissions	\$ 8,414	\$ 9,175	\$ 9,024
All other income	598	388	564
Noninterest revenue	9,012	9,563	9,588
Net interest income	3,033	2,556	2,440
Total net revenue	12,045	12,119	12,028
Provision for credit losses	26	4	4
Noninterest expense			
Compensation expense	5,065	5,113	5,082
Noncompensation expense	3,413	3,773	3,456
Total noninterest expense	8,478	8,886	8,538
Income before income tax expense	3,541	3,229	3,486
Income tax expense	1,290	1,294	1,333
Net income	\$ 2,251	\$ 1,935	\$ 2,153
Revenue by line of business			
Asset Management	\$ 5,970	\$ 6,301	\$ 6,327
Wealth Management	6,075	5,818	5,701
Total net revenue	\$ 12,045	\$ 12,119	\$ 12,028
Financial ratios			
Return on common equity	24%	21%	23%
Overhead ratio	70	73	71
Pre-tax margin ratio:			
Asset Management	31	31	31
Wealth Management	28	22	27
Asset & Wealth Management	29	27	29
Headcount	21,082	20,975	19,735
Number of client advisors	2,504	2,778	2,836

2016 compared with 2015

Net income was \$2.3 billion, an increase of 16% compared with the prior year, reflecting lower noninterest expense, partially offset by lower net revenue.

Net revenue was \$12.0 billion, a decrease of 1%. Net interest income was \$3.0 billion, up 19%, driven by higher deposit and loan spreads and loan growth. Noninterest revenue was \$9.0 billion, a decrease of 6%, reflecting the impact of lower average equity market levels, a reduction in revenue related to the disposal of assets at the beginning of 2016, and lower performance fees and placement fees.

Revenue from Asset Management was \$6.0 billion, down 5% from the prior year, driven by a reduction in revenue related to the disposal of assets at the beginning of 2016, the impact of lower average equity market levels and lower performance fees. Revenue from Wealth Management was \$6.1 billion, up 4% from the prior year, reflecting higher net interest income from higher deposit and loan spreads and continued loan growth, partially offset by the impact of lower average equity market levels and lower placement fees.

Noninterest expense was \$8.5 billion, a decrease of 5%, predominantly due to a reduction in expense related to the disposal of assets at the beginning of 2016 and lower legal expense.

2015 compared with 2014

Net income was \$1.9 billion, a decrease of 10% compared with the prior year, reflecting higher noninterest expense, predominantly offset by higher net revenue.

Net revenue was \$12.1 billion, an increase of 1%. Net interest income was \$2.6 billion, up 5%, driven by higher loan balances and spreads.

Noninterest revenue was \$9.6 billion, flat from last year, as net client inflows into assets under management and the impact of higher average market levels were predominantly offset by lower performance fees and the sale of Retirement Plan Services ("RPS") in 2014.

Revenue from Asset Management was \$6.3 billion, flat from the prior year as the sale of RPS in 2014 and lower performance fees were largely offset by net client inflows. Revenue from Wealth Management was \$5.8 billion, up 2% from the prior year due to higher net interest income from higher loan balances and spreads and net client inflows, partially offset by lower brokerage revenue.

Noninterest expense was \$8.9 billion, an increase of 4%, predominantly due to higher legal expense and investment in both infrastructure and controls.

AWM's lines of business consist of the following:

Asset Management provides comprehensive global investment services, including asset management, pension analytics, asset-liability management and active risk-budgeting strategies.

Wealth Management offers investment advice and wealth management, including investment management, capital markets and risk management, tax and estate planning, banking, lending and specialty-wealth advisory services.

AWM's client segments consist of the following:

Private Banking clients include high- and ultra-high-net-worth individuals, families, money managers, business owners and small corporations worldwide.

Institutional clients include both corporate and public institutions, endowments, foundations, nonprofit organizations and governments worldwide.

Retail clients include financial intermediaries and individual investors.

Asset Management has two high-level measures of its overall fund performance.

• **Percentage of mutual fund assets under management in funds rated 4- or 5-star:** Mutual fund rating services rank funds based on their risk-adjusted performance over various periods. A 5-star rating is the best rating and represents the top 10% of industry-wide ranked funds. A 4-star rating represents the next 22.5% of industry-wide ranked funds. A 3-star rating represents the next 35% of industry-wide ranked funds. A 2-star rating represents the next 22.5% of industry-wide ranked funds. A 1-star rating is the worst rating and represents the bottom 10% of industry-wide ranked funds. The “overall Morningstar rating” is derived from a weighted average of the performance associated with a fund’s three-, five- and ten-year (if applicable) Morningstar Rating metrics. For U.S. domiciled funds, separate star ratings are given at the individual share class level. The Nomura “star rating” is based on three-year risk-adjusted performance only. Funds with fewer than three years of history are not rated and hence excluded from this analysis. All ratings, the assigned peer categories and the asset values used to derive this analysis are sourced from these fund rating providers mentioned in footnote (a). The data providers re-denominate the asset values into U.S. dollars. This % of AUM is based on star ratings at the share class level for U.S. domiciled funds, and at a “primary share class” level to represent the star rating of all other funds except for Japan where Nomura provides ratings at the fund level. The “primary share class”, as defined by Morningstar, denotes the share class recommended as being the best proxy for the portfolio and in most cases will be the most retail version (based upon annual management charge, minimum investment, currency and other factors). The performance data could have been different if all funds/accounts would have been included. Past performance is not indicative of future results.

• **Percentage of mutual fund assets under management in funds ranked in the 1st or 2nd quartile (one, three and five years):** All quartile rankings, the assigned peer categories and the asset values used to derive this analysis are sourced from the fund ranking providers mentioned in footnote (b). Quartile rankings are done on the net-of-fee absolute return of each fund. The data providers re-denominate the asset values into U.S. dollars. This % of AUM is based on fund performance and associated peer rankings at the share class level for U.S. domiciled funds, at a “primary share class” level to represent the quartile ranking of the U.K., Luxembourg and Hong Kong funds and at the fund level for all other funds. The “primary share class”, as defined by Morningstar, denotes the share class recommended as being the best proxy for the portfolio and in most cases will be the most retail version (based upon annual management charge, minimum investment, currency and other factors). Where peer group rankings given for a fund are in more than one “primary share class” territory both rankings are included to reflect local market competitiveness (applies to “Offshore Territories” and “HK SFC Authorized” funds only). The performance data could have been different if all funds/accounts would have been included. Past performance is not indicative of future results.

Selected metrics

As of or for the year ended December 31, (in millions, except ranking data and ratios)	2016	2015	2014
% of JPM mutual fund assets rated as 4- or 5-star(a)(b)	63%	52%	51%
% of JPM mutual fund assets ranked in 1st or 2nd quartile:(c)			
1 year	54	62	72
3 years	72	78	72
5 years(b)	79	79	76

Selected balance sheet data (period-end)

Total assets	\$ 138,384	\$ 131,451	\$ 128,701
Loans(d)	118,039	111,007	104,279
Core loans	118,039	111,007	104,279
Deposits	161,577	146,766	155,247
Common equity	9,000	9,000	9,000

Selected balance sheet data (average)

Total assets	\$ 132,875	\$ 129,743	\$ 126,440
Loans	112,876	107,418	99,805
Core loans	112,876	107,418	99,805
Deposits	153,334	149,525	150,121
Common equity	9,000	9,000	9,000

Credit data and quality statistics

Net charge-offs	\$ 16	\$ 12	\$ 6
Nonaccrual loans	390	218	218
Allowance for credit losses:			
Allowance for loan losses	274	266	271
Allowance for lending-related commitments	4	5	5
Total allowance for credit losses	278	271	276
Net charge-off rate	0.01%	0.01%	0.01%
Allowance for loan losses to period-end loans	0.23	0.24	0.26
Allowance for loan losses to nonaccrual loans	70	122	124
Nonaccrual loans to period-end loans	0.33	0.20	0.21

- (a) Represents the “overall star rating” derived from Morningstar for the U.S., the U.K., Luxembourg, Hong Kong and Taiwan domiciled funds; and Nomura “star rating” for Japan domiciled funds. Includes only Asset Management retail open-ended mutual funds that have a rating. Excludes money market funds, Undiscovered Managers Fund, and Brazil and India domiciled funds.
- (b) Prior period amounts were revised to conform with current period presentation.
- (c) Quartile ranking sourced from: Lipper for the U.S. and Taiwan domiciled funds; Morningstar for the U.K., Luxembourg and Hong Kong domiciled funds; Nomura for Japan domiciled funds and FundDoctor for South Korea domiciled funds. Includes only Asset Management retail open-ended mutual funds that are ranked by the aforementioned sources. Excludes money market funds, Undiscovered Managers Fund, and Brazil and India domiciled funds.
- (d) Included \$32.8 billion, \$26.6 billion and \$22.1 billion of prime mortgage loans reported in the Consumer, excluding credit card, loan portfolio at December 31, 2016, 2015 and 2014, respectively.

Management's discussion and analysis

Client assets

2016 compared with 2015

Client assets were \$2.5 trillion, an increase of 4% compared with the prior year. Assets under management were \$1.8 trillion, an increase of 3% from the prior year reflecting inflows into both liquidity and long-term products and the effect of higher market levels, partially offset by asset sales at the beginning of 2016.

2015 compared with 2014

Client assets were \$2.4 trillion, a decrease of 2% compared with the prior year. Assets under management were \$1.7 trillion, a decrease of 1% from the prior year reflecting the effect of lower market levels, partially offset by net inflows to long-term products.

Client assets

December 31, (in billions)	2016	2015	2014
Assets by asset class			
Liquidity(a)	\$ 436	\$ 430	\$ 425
Fixed income(a)	420	376	395
Equity	351	353	375
Multi-asset and alternatives	564	564	549
Total assets under management	1,771	1,723	1,744
Custody/brokerage/ administration/deposits	682	627	643
Total client assets	\$ 2,453	\$ 2,350	\$ 2,387

Memo:

Alternatives client assets(b)	\$ 154	\$ 172	\$ 166
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Assets by client segment

Private Banking	\$ 435	\$ 437	\$ 428
Institutional	869	816	827
Retail	467	470	489
Total assets under management	\$ 1,771	\$ 1,723	\$ 1,744
Private Banking	\$ 1,098	\$ 1,050	\$ 1,057
Institutional	886	824	835
Retail	469	476	495
Total client assets	\$ 2,453	\$ 2,350	\$ 2,387

(a) Prior period amounts were revised to conform with current period presentation.

(b) Represents assets under management, as well as client balances in brokerage accounts.

Client assets (continued)

Year ended December 31, (in billions)	2016	2015	2014
Assets under management rollforward			
Beginning balance	\$ 1,723	\$ 1,744	\$ 1,598
Net asset flows:			
Liquidity(a)	24	—	14
Fixed income(a)	30	(8)	37
Equity	(29)	1	5
Multi-asset and alternatives	22	22	42
Market/performance/other impacts	1	(36)	48
Ending balance, December 31	\$ 1,771	\$ 1,723	\$ 1,744

Client assets rollforward

Beginning balance	\$ 2,350	\$ 2,387	\$ 2,343
Net asset flows	63	27	118
Market/performance/other impacts	40	(64)	(74)
Ending balance, December 31	\$ 2,453	\$ 2,350	\$ 2,387

(a) Prior period amounts were revised to conform with current period presentation.

International metrics

Year ended December 31, (in billions, except where otherwise noted)	2016	2015	2014
Total net revenue (in millions)(a)			
Europe/Middle East/Africa	\$ 1,849	\$ 1,946	\$ 2,080
Asia/Pacific	1,077	1,130	1,199
Latin America/Caribbean	726	795	841
Total international net revenue	3,652	3,871	4,120
North America	8,393	8,248	7,908
Total net revenue	\$ 12,045	\$ 12,119	\$ 12,028

Assets under management

Europe/Middle East/Africa	\$ 309	\$ 302	\$ 329
Asia/Pacific	123	123	126
Latin America/Caribbean	45	45	46
Total international assets under management	477	470	501
North America	1,294	1,253	1,243
Total assets under management	\$ 1,771	\$ 1,723	\$ 1,744

Client assets

Europe/Middle East/Africa	\$ 359	\$ 351	\$ 391
Asia/Pacific	177	173	174
Latin America/Caribbean	114	110	115
Total international client assets	650	634	680
North America	1,803	1,716	1,707
Total client assets	\$ 2,453	\$ 2,350	\$ 2,387

(a) Regional revenue is based on the domicile of the client.

The Corporate segment consists of Treasury and Chief Investment Office and Other Corporate, which includes corporate staff units and expense that is centrally managed. Treasury and CIO are predominantly responsible for measuring, monitoring, reporting and managing the Firm's liquidity, funding and structural interest rate and foreign exchange risks, as well as executing the Firm's capital plan. The major Other Corporate units include Real Estate, Enterprise Technology, Legal, Compliance, Finance, Human Resources, Internal Audit, Risk Management, Oversight & Control, Corporate Responsibility and various Other Corporate groups.

Selected income statement data

Year ended December 31, (in millions, except headcount)	2016	2015	2014
Revenue			
Principal transactions	\$ 210	\$ 41	\$ 1,197
Securities gains	140	190	71
All other income	588	569	704
Noninterest revenue	938	800	1,972
Net interest income	(1,425)	(533)	(1,960)
Total net revenue(a)	(487)	267	12
Provision for credit losses	(4)	(10)	(35)
Noninterest expense(b)	462	977	1,159
Loss before income tax benefit	(945)	(700)	(1,112)
Income tax benefit	(241)	(3,137)	(1,976)
Net income/(loss)	\$ (704)	\$ 2,437	\$ 864
Total net revenue			
Treasury and CIO	(787)	(493)	(1,317)
Other Corporate	300	760	1,329
Total net revenue	\$ (487)	\$ 267	\$ 12
Net income/(loss)			
Treasury and CIO	(715)	(235)	(1,165)
Other Corporate	11	2,672	2,029
Total net income/(loss)	\$ (704)	\$ 2,437	\$ 864

Selected balance sheet data (period-end)

Total assets (period-end)	\$ 799,426	\$ 768,204	\$ 931,206
Loans	1,592	2,187	2,871
Core loans(c)	1,589	2,182	2,848
Headcount	32,358	29,617	26,047

(a) Included tax-equivalent adjustments, predominantly due to tax-exempt income from municipal bond investments of \$885 million, \$839 million and \$730 million for the years ended December 31, 2016, 2015 and 2014, respectively.

(b) Included legal expense/(benefit) of \$(385) million, \$832 million and \$821 million for the years ended December 31, 2016, 2015 and 2014, respectively.

(c) Average core loans were \$1.9 billion, \$2.5 billion and \$3.3 billion for the years ended December 31, 2016, 2015 and 2014, respectively.

2016 compared with 2015

Net loss was \$704 million, compared with net income of \$2.4 billion in the prior year.

Net revenue was a loss of \$487 million, compared with a gain of \$267 million in the prior year. The prior year included a \$514 million benefit from a legal settlement.

Net interest income was a loss of \$1.4 billion, compared with a loss of \$533 million in the prior year. The loss in the current year was primarily driven by higher interest expense on long-term debt and lower investment securities balances during the year, partially offset by higher interest income on deposits with banks and securities purchased under resale agreements as a result of higher rates.

Noninterest expense was \$462 million, a decrease of \$515 million from the prior year driven by lower legal expense, partially offset by higher compensation expense.

The prior year reflected tax benefits of \$2.6 billion predominantly from the resolution of various tax audits.

2015 compared with 2014

Net income was \$2.4 billion, compared with net income of \$864 million in the prior year.

Net revenue was \$267 million, compared with \$12 million in the prior year. The current year included a \$514 million benefit from a legal settlement. Treasury and CIO included a benefit of approximately \$178 million associated with recognizing the unamortized discount on certain debt securities which were called at par and a \$173 million pretax loss primarily related to accelerated amortization of cash flow hedges associated with the exit of certain non-operating deposits. Private Equity gains were \$1.2 billion lower compared with the prior year, reflecting lower valuation gains and lower net gains on sales as the Firm exits this non-core business.

Noninterest expense was \$977 million, a decrease of \$182 million from the prior year which had included a \$276 million goodwill impairment related to the sale of a portion of the Private Equity business.

The current year reflected tax benefits of \$2.6 billion predominantly from the resolution of various tax audits compared with tax benefits of \$1.1 billion in the prior year.

Management's discussion and analysis

Treasury and CIO overview

Treasury and CIO are predominantly responsible for measuring, monitoring, reporting and managing the Firm's liquidity, funding and structural interest rate and foreign exchange risks, as well as executing the Firm's capital plan. The risks managed by Treasury and CIO arise from the activities undertaken by the Firm's four major reportable business segments to serve their respective client bases, which generate both on- and off-balance sheet assets and liabilities.

Treasury and CIO achieve the Firm's asset-liability management objectives generally by investing in high-quality securities that are managed for the longer-term as part of the Firm's investment securities portfolio. Treasury and CIO also use derivatives to meet the Firm's asset-liability management objectives. For further information on derivatives, see Note 6. The investment securities portfolio primarily consists of U.S. and non-U.S. government securities, agency and nonagency mortgage-backed securities, other ABS, corporate debt securities and obligations of U.S. states and municipalities. At December 31, 2016, the investment securities portfolio was \$286.8 billion, and the average credit rating of the securities comprising the portfolio was AA+ (based upon external ratings where available and where not available, based primarily upon internal ratings that correspond to ratings as defined by S&P and Moody's). During 2016, the Firm transferred commercial mortgage-backed securities and obligations of U.S. states and municipalities with a fair value of \$7.5 billion from available-for-sale ("AFS") to held-to maturity ("HTM"). These securities were transferred at fair value. The transfers reflect the Firm's intent to hold the securities to maturity in order to reduce the impact of price volatility on accumulated other comprehensive income ("AOCI"). See Note 12 for further information on the details of the Firm's investment securities portfolio.

For further information on liquidity and funding risk, see Liquidity Risk Management on pages 110–115. For information on interest rate, foreign exchange and other risks, Treasury and CIO VaR and the Firm's earnings-at-risk, see Market Risk Management on pages 116–123.

Selected income statement and balance sheet data

As of or for the year ended December 31, (in millions)	2016	2015	2014
Securities gains	\$ 132	\$ 190	\$ 71
Investment securities portfolio (average) (a)	278,250	314,802	349,285
Investment securities portfolio (period-end)(b)	286,838	287,777	343,146
Mortgage loans (average)	1,790	2,501	3,308
Mortgage loans (period-end)	1,513	2,136	2,834

(a) Average investment securities included HTM balances of \$51.4 billion, \$50.0 billion and \$47.2 billion for the years ended December 31, 2016, 2015 and 2014, respectively.

(b) Period-end investment securities included HTM securities of \$50.2 billion, \$49.1 billion, \$49.3 billion at December 31, 2016, 2015 and 2014, respectively.

Private equity portfolio information(a)

December 31, (in millions)	2016	2015	2014
Carrying value	\$ 1,797	\$ 2,103	\$ 5,866
Cost	2,649	3,798	6,281

(a) For more information on the Firm's methodologies regarding the valuation of the Private Equity portfolio, see Note 3.

2016 compared with 2015

The carrying value of the private equity portfolio at December 31, 2016 was \$1.8 billion, down from \$2.1 billion at December 31, 2015, driven by portfolio sales.

2015 compared with 2014

The carrying value of the private equity portfolio at December 31, 2015 was \$2.1 billion, down from \$5.9 billion at December 31, 2014, driven by the sale of a portion of the Private Equity business and portfolio sales.

ENTERPRISE-WIDE RISK MANAGEMENT

Risk is an inherent part of JPMorgan Chase's business activities. When the Firm extends a consumer or wholesale loan, advises customers on their investment decisions, makes markets in securities, or offers other products or services, the Firm takes on some degree of risk. The Firm's overall objective is to manage its businesses, and the associated risks, in a manner that balances serving the interests of its clients, customers and investors and protects the safety and soundness of the Firm.

Firmwide Risk Management is overseen and managed on an enterprise-wide basis. The Firm's approach to risk management covers a broad spectrum of economic and other core risk areas, such as credit, market, liquidity, model, principal, country, operational, compliance, conduct, legal, capital and reputation risk, with controls and governance established for each area, as appropriate.

The Firm believes that effective risk management requires:

- Acceptance of responsibility, including identification and escalation of risk issues, by all individuals within the Firm;
- Ownership of risk identification, assessment, data and management within each of the lines of business and corporate functions; and
- Firmwide structures for risk governance.

The Firm's Operating Committee, which consists of the Firm's Chief Executive Officer ("CEO"), Chief Risk Officer ("CRO"), Chief Operating Officer ("COO"), Chief Financial Officer ("CFO") and other senior executives, is the ultimate management escalation point in the Firm, and may refer matters to the Firm's Board of Directors. The Operating Committee is responsible and accountable to the Firm's Board of Directors.

The Firm strives for continual improvement through efforts to enhance controls, ongoing employee training and development, talent retention, and other measures. The Firm follows a disciplined and balanced compensation framework with strong internal governance and independent Board oversight. The impact of risk and control issues are carefully considered in the Firm's performance evaluation and incentive compensation processes.

Management's discussion and analysis

The following sections outline the key risks that are inherent in the Firm's business activities:

Risk	Definition	Select risk management metrics	Page references
I. Economic risks			
(i) Capital risk	The risk that the Firm has an insufficient level and composition of capital to support its business activities and associated risks during both normal economic environments and under stressed conditions.	Risk-based capital ratios and leverage ratios; stress	76–85
(ii) Consumer Credit risk	The risk of loss arising from the default of a customer.	Total exposure; geographic and customer concentrations; delinquencies; loss experience; stressed credit performance	89–95
(iii) Wholesale Credit risk	The risk of loss arising from the default of a client or counterparty.	Total exposure; industry, geographic and client concentrations; risk ratings; loss experience; stressed credit performance	96–104
(iv) Country risk	The risk that a sovereign event or action alters the value or terms of contractual obligations of obligors, counterparties and issuers, or adversely affects markets related to a particular country.	Default exposure at 0% recovery; stress; risk ratings; ratings based capital limits	108–109
(v) Liquidity risk	The risk that the Firm will be unable to meet its contractual and contingent obligations or that it does not have the appropriate amount, composition and tenor of funding and liquidity to support its assets and liabilities.	LCR; stress by material legal entity	110–115
(vi) Market risk	The risk of loss arising from potential adverse changes in the value of the Firm's assets and liabilities or future results, resulting from changes in market variables such as interest rates, foreign exchange rates, equity prices, commodity prices, implied volatilities or credit spreads; this includes the structural interest rate and foreign exchange risks managed on a firmwide basis in Treasury and CIO.	VaR; P&L drawdown; economic stress testing; sensitivities; earnings-at-risk; and foreign exchange ("FX") net open position	116–123
(vii) Principal risk	The risk of an adverse change in the value of privately-held financial assets and instruments, typically representing an ownership or junior capital positions that have unique risks due to their illiquidity or for which there is less observable market or valuation data.	Carrying value, stress	124
II. Other core risks			
(i) Compliance risk	The risk of failure to comply with applicable laws, rules, and regulations.	Risk based monitoring and testing for timely compliance with financial obligations	125
(ii) Conduct risk	The risk that an employee's action or inaction causes undue harm to the Firm's clients, damages market integrity, undermines the Firm's reputation, or negatively impacts the Firm's culture.	Relevant risk and control self-assessment results, employee compliance information, code of conduct case information	126
(iii) Legal risk	The risk of loss or imposition of damages, fines, penalties or other liability arising from the failure to comply with a contractual obligation or to comply with laws, rules or regulations to which the Firm is subject.	Not applicable	127
(iv) Model risk	The risk of the potential for adverse consequences from decisions based on incorrect or misused model outputs.	Model status, model tier	128
(v) Operational risk	The risk of loss resulting from inadequate or failed processes or systems, human factors, or due to external events that are neither market- nor credit-related such as cyber and technology related events.	Risk and control self-assessment results, firm-specific loss experience; industry loss experience; business environment and internal control factors; key risk indicators; key control indicators; operating metrics	129–130
(vi) Reputation risk	The risk that an action, transaction, investment or event will reduce trust in the Firm's integrity or competence by its various constituents, including clients, counterparties, investors, regulators, employees and the broader public.	Not applicable	131

Governance and oversight

The Firm's overall appetite for risk is governed by a "Risk Appetite" framework. The framework and the Firm's risk appetite are set and approved by the Firm's CEO, CFO, CRO and COO. LOB-level risk appetite is set by the respective LOB CEO, CFO and CRO and is approved by the Firm's CEO, CFO, CRO and COO. Quantitative parameters and qualitative factors are used to monitor and measure the Firm's capacity to take risk against stated risk appetite. Quantitative parameters have been established to assess stressed net income, capital, credit risk, market risk, structural interest rate risk and liquidity risk. Qualitative factors have been established for select risks. Risk Appetite results are reported quarterly to the Board of Directors' Risk Policy Committee ("DRPC").

The Firm's CRO is the head of the Independent Risk Management ("IRM") function and reports to the CEO and the DRPC. The CEO appoints the CRO to create the Risk Management Framework subject to approval by the DRPC in the form of the Primary Risk Policies. The Chief Compliance Officer ("CCO"), who reports to the CRO, is also responsible for reporting to the Audit Committee for the Global Compliance Program. The Firm's Global Compliance Program focuses on overseeing compliance with laws, rules and regulations applicable to the Firm's products and services to clients and counterparties.

The IRM function, comprised of Risk Management and Compliance Organizations, is independent of the businesses. The IRM function sets various standards for the risk management governance framework, including risk policy, identification, measurement, assessment, testing, limit setting (e.g., risk appetite, thresholds, etc.), monitoring and reporting. Various groups within the IRM function are aligned to the LOBs and to corporate functions, regions and core areas of risk such as credit, market, country and liquidity risks, as well as operational, model and reputational risk governance.

The Firm places key reliance on each of its LOBs and other functional areas giving rise to risk. Each LOB or other functional area giving rise to risk is expected to operate its activities within the parameters identified by the IRM function, and within their own management-identified risk and control standards. Because these LOBs and functional areas are accountable for identifying and addressing the risks in their respective businesses and for operating within a sound control environment, they are considered the "first line of defense" within the Firm's risk governance framework.

The Firmwide Oversight and Control Group consists of dedicated control officers within each of the lines of business and corporate functions, as well as having a central oversight function. The group is charged with enhancing the Firm's control environment by looking within and across the lines of business and corporate functions to help identify and remediate control issues. The group enables the Firm to detect control problems more quickly, escalate issues promptly and engage other stakeholders to understand common themes and interdependencies among the various parts of the Firm.

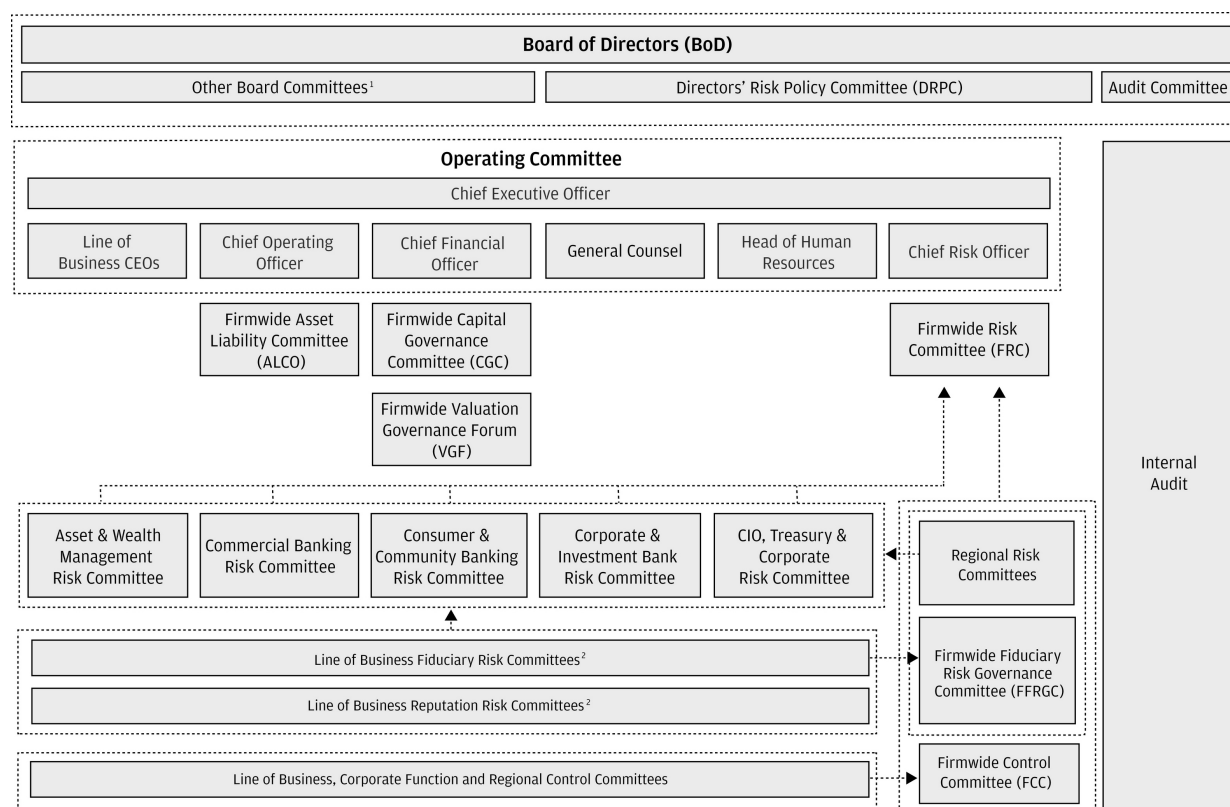
As the "second line of defense", the IRM function provides oversight and independent challenge, consistent with its policies and framework, to the risk-creating LOBs and functional areas.

Internal Audit, a function independent of the businesses and the IRM function, tests and evaluates the Firm's risk governance and management, as well as its internal control processes. This function, the "third line of defense" in the risk governance framework, brings a systematic and disciplined approach to evaluating and improving the effectiveness of the Firm's governance, risk management and internal control processes. The Internal Audit Function is headed by the General Auditor, who reports to the Audit Committee.

The independent status of the IRM function is supported by a governance structure that provides for escalation of risk issues to senior management, the Firmwide Risk Committee, or the Board of Directors.

Management’s discussion and analysis

The chart below illustrates the key senior management level committees in the Firm’s risk governance structure. Other committees, forums and paths of escalation are in place that are responsible for management and oversight of risk, although they are not shown in the chart below.



¹ Other Board Committees include the Compensation & Management Development Committee, Corporate Governance & Nominating Committee and Public Responsibility Committee.

² As applicable.

The Board of Directors provides oversight of risk principally through the DRPC, Audit Committee and, with respect to compensation and other management-related matters, the Compensation & Management Development Committee. Each committee of the Board oversees reputation risk issues within its scope of responsibility.

The Directors’ Risk Policy Committee of the Board oversees the Firm’s global risk management framework and approves the primary risk management policies of the Firm. The Committee’s responsibilities include oversight of management’s exercise of its responsibility to assess and manage the Firm’s risks, and its capital and liquidity planning and analysis. Breaches in risk appetite, liquidity issues that may have a material adverse impact on the Firm and other significant risk-related matters are escalated to the Committee.

The Audit Committee of the Board assists the Board in its oversight of management’s responsibilities to assure that there is an effective system of controls reasonably designed to safeguard the assets and income of the Firm, assure the integrity of the Firm’s financial statements and maintain compliance with the Firm’s ethical standards, policies, plans and procedures, and with laws and regulations. In addition, the Audit Committee assists the Board in its oversight of the Firm’s independent registered public accounting firm’s qualifications, independence and performance, and of the performance of the Firm’s Internal Audit function.

The Compensation & Management Development Committee (“CMDC”) assists the Board in its oversight of the Firm’s compensation programs and reviews and approves the Firm’s overall compensation philosophy, incentive compensation pools, and compensation practices consistent with key business objectives and safety and soundness. The Committee reviews Operating Committee members’ performance against their goals, and approves their compensation awards. The Committee also periodically reviews the Firm’s diversity programs and management development and succession planning, and provides oversight of the Firm’s culture and conduct programs.

Among the Firm’s senior management-level committees that are primarily responsible for key risk-related functions are:

The Firmwide Risk Committee (“FRC”) is the Firm’s highest management-level risk committee. It provides oversight of the risks inherent in the Firm’s businesses. The Committee is co-chaired by the Firm’s CEO and CRO. This Committee serves as an escalation point for risk topics and issues raised by its members, the Line of Business Risk

Committees, Firmwide Control Committee, Firmwide Fiduciary Risk Governance Committee, and regional Risk Committees, as appropriate. The Committee escalates significant issues to the DRPC, as appropriate.

The Firmwide Control Committee (“FCC”) provides a forum for senior management to review and discuss firmwide operational risks including existing and emerging issues, and operational risk metrics, and to review operational risk management execution in the context of the Operational Risk Management Framework (“ORMF”) which provides the framework for the governance, assessment, measurement, and monitoring and reporting of operational risk. The FCC is co-chaired by the Chief Control Officer and the Firmwide Risk Executive for Operational Risk Governance. The committee relies upon the prompt escalation of issues from businesses and functions as the primary owners of the operational risk. Operational risk issues may be escalated by business or function control committees to the FCC, which may, in turn, escalate to the FRC, as appropriate.

The Firmwide Fiduciary Risk Governance Committee is a forum for risk matters related to the Firm’s fiduciary activities. The Committee oversees the firmwide fiduciary risk governance framework, which supports the consistent identification and escalation of fiduciary risk issues by the relevant lines of business; establishes policies and best practices to effectuate the Committee’s oversight responsibility; and creates metrics reporting to track fiduciary activity and issue resolution Firmwide. The Committee escalates significant fiduciary issues to the FRC, the DRPC and the Audit Committee, as appropriate.

Line of Business and Regional Risk Committees review the ways in which the particular line of business or the business operating in a particular region could be exposed to adverse outcomes with a focus on identifying, accepting, escalating and/or requiring remediation of matters brought to these committees. These committees may escalate to the FRC, as appropriate. LOB risk committees are co-chaired by the LOB CEO and the LOB CRO. Each LOB risk committee may create sub-committees with requirements for escalation. The regional committees are established similarly, as appropriate, for the region.

In addition, each line of business and function is required to have a Control Committee. These control committees oversee the control environment of their respective business or function. As part of that mandate, they are responsible for reviewing data which indicates the quality and stability of the processes in a business or function, reviewing key operational risk issues and focusing on processes with shortcomings and overseeing process remediation. These committees escalate to the FCC, as appropriate.

The Firmwide Asset Liability Committee (“ALCO”), chaired by the Firm’s Treasurer and Chief Investment Officer under the direction of the COO, monitors the Firm’s balance sheet, liquidity risk and structural interest rate risk. ALCO reviews the Firm’s overall structural interest rate risk position,

funding requirements and strategy, and securitization programs (and any required liquidity support by the Firm of such programs). ALCO is responsible for reviewing and approving the Firm’s Funds Transfer Pricing Policy (through which lines of business “transfer” interest rate risk to Treasury and CIO) and the Firm’s Intercompany Funding and Liquidity Policy. ALCO is also responsible for reviewing the Firm’s Contingency Funding Plan.

The Firmwide Capital Governance Committee, chaired by the Head of the Regulatory Capital Management Office is responsible for reviewing the Firm’s Capital Management Policy and the principles underlying capital issuance and distribution alternatives and decisions. The Committee oversees the capital adequacy assessment process, including the overall design, scenario development and macro assumptions and ensures that capital stress test programs are designed to adequately capture the risks specific to the Firm’s businesses.

The Firmwide Valuation Governance Forum (“VGF”) is composed of senior finance and risk executives and is responsible for overseeing the management of risks arising from valuation activities conducted across the Firm. The VGF is chaired by the firmwide head of the Valuation Control Group (“VCG”) (under the direction of the Firm’s Controller), and includes sub-forums covering the Corporate & Investment Bank, Consumer & Community Banking, Commercial Banking, Asset & Wealth Management and certain corporate functions, including Treasury and CIO.

In addition, the JPMorgan Chase Bank, N.A. Board of Directors is responsible for the oversight of management of the Bank. The JPMorgan Chase Bank, N.A. Board accomplishes this function acting directly and through the principal standing committees of the Firm’s Board of Directors. Risk oversight on behalf of JPMorgan Chase Bank N.A. is primarily the responsibility of the DRPC and Audit Committee of the Firm’s Board of Directors and, with respect to compensation and other management-related matters, the Compensation & Management Development Committee of the Firm’s Board of Directors.

Risk measurement

The Firm has a broad spectrum of risk management metrics, as appropriate for each risk category. For further information on risk management metrics, see table on key risks on page 72. Additionally, the Firm is exposed to certain potential low-probability, but plausible and material, idiosyncratic risks that are not well-captured by its other existing risk analysis and reporting metrics. These idiosyncratic risks may arise in a number of ways, such as changes in legislation, an unusual combination of market events, or specific counterparty events. The Firm has a process intended to identify these risks in order to allow the Firm to monitor vulnerabilities that are not adequately covered by its other standard risk measurements.

CAPITAL RISK MANAGEMENT

Capital risk is the risk the Firm has an insufficient level and composition of capital to support its business activities and associated risks during both normal economic environments and under stressed conditions.

A strong capital position is essential to the Firm's business strategy and competitive position. Maintaining a strong balance sheet to manage through economic volatility is considered a strategic imperative of the Firm's Board of Directors, CEO and Operating Committee. The Firm's balance sheet philosophy focuses on risk-adjusted returns, strong capital and robust liquidity. The Firm's capital management strategy focuses on maintaining long-term stability to enable it to build and invest in market-leading businesses, even in a highly stressed environment. Prior to making any decisions on future business activities, senior management considers the implications on the Firm's capital. In addition to considering the Firm's earnings outlook, senior management evaluates all sources and uses of capital with a view to preserving the Firm's capital strength.

The Firm's capital management objectives are to hold capital sufficient to:

- Maintain "well-capitalized" status for the Firm and its principal bank subsidiaries;
- Support risks underlying business activities;
- Maintain sufficient capital in order to continue to build and invest in its businesses through the cycle and in stressed environments;
- Retain flexibility to take advantage of future investment opportunities;
- Serve as a source of strength to its subsidiaries;
- Meet capital distribution objectives; and
- Maintain sufficient capital resources to operate throughout a resolution period in accordance with the Firm's preferred resolution strategy.

These objectives are achieved through the establishment of minimum capital targets and a strong capital governance framework. Capital management is intended to be flexible in order to react to a range of potential events. The Firm's minimum capital targets are based on the most binding of three pillars: an internal assessment of the Firm's capital needs; an estimate of required capital under the CCAR and Dodd-Frank Act stress testing requirements; and Basel III Fully Phased-In regulatory minimums. Where necessary, each pillar may include a management-established buffer. The capital governance framework requires regular monitoring of the Firm's capital positions, stress testing and defining escalation protocols, both at the Firm and material legal entity levels.

The following tables present the Firm's Transitional and Fully Phased-In risk-based and leverage-based capital metrics under both the Basel III Standardized and Advanced Approaches. The Firm's Basel III ratios exceed both the current and Fully Phased-In regulatory minimums as of December 31, 2016 and 2015. For further discussion of these capital metrics and the Standardized and Advanced approaches, refer to Monitoring and management of capital on pages 78–82.

December 31, 2016 (in millions, except ratios)	Transitional			Fully Phased-In		
	Standardized	Advanced	Minimum capital ratios (c)	Standardized	Advanced	Minimum capital ratios (d)
Risk-based capital metrics:						
CET1 capital	\$ 182,967	\$ 182,967		\$ 181,734	\$ 181,734	
Tier 1 capital	208,112	208,112		207,474	207,474	
Total capital	239,553	228,592		237,487	226,526	
Risk-weighted assets	1,464,981	1,476,915		1,474,665	1,487,180	
CET1 capital ratio	12.5%	12.4%	6.25%	12.3%	12.2%	10.5%
Tier 1 capital ratio	14.2	14.1	7.75	14.1	14.0	12.0
Total capital ratio	16.4	15.5	9.75	16.1	15.2	14.0
Leverage-based capital metrics:						
Adjusted average assets	2,484,631	2,484,631		2,485,480	2,485,480	
Tier 1 leverage ratio(a)	8.4%	8.4%	4.0	8.3%	8.3%	4.0
SLR leverage exposure	NA	\$ 3,191,990		NA	\$ 3,192,839	
SLR(b)	NA	6.5%	NA	NA	6.5%	5.0 (e)

December 31, 2015 (in millions, except ratios)	Transitional			Fully Phased-In		
	Standardized	Advanced	Minimum capital ratios (c)	Standardized	Advanced	Minimum capital ratios (d)
Risk-based capital metrics:						
CET1 capital	\$ 175,398	\$ 175,398		\$ 173,189	\$ 173,189	
Tier 1 capital	200,482	200,482		199,047	199,047	
Total capital	234,413	224,616		229,976	220,179	
Risk-weighted assets	1,465,262	1,485,336		1,474,870	1,495,520	
CET1 capital ratio	12.0%	11.8%	4.5%	11.7%	11.6%	10.5%
Tier 1 capital ratio	13.7	13.5	6.0	13.5	13.3	12.0
Total capital ratio	16.0	15.1	8.0	15.6	14.7	14.0
Leverage based capital metrics:						
Adjusted average assets	2,358,471	2,358,471		2,360,499	2,360,499	
Tier 1 leverage ratio(a)	8.5%	8.5%	4.0	8.4%	8.4%	4.0
SLR leverage exposure	NA	3,079,797		NA	\$ 3,079,119	
SLR(b)	NA	6.5%	NA	NA	6.5%	5.0 (e)

Note: As of December 31, 2016 and 2015, the lower of the Standardized or Advanced capital ratios under each of the Transitional and Fully Phased-In approaches in the table above represents the Firm's Collins Floor, as discussed in Monitoring and management of Capital on page 78.

(a) The Tier 1 leverage ratio is calculated by dividing Tier 1 capital by adjusted average assets.

(b) The SLR leverage ratio is calculated by dividing Tier 1 capital by SLR leverage exposure.

(c) Represents the Transitional minimum capital ratios applicable to the Firm under Basel III as of December 31, 2016 and 2015. At December 31, 2016, the CET1 minimum capital ratio includes 0.625% resulting from the phase-in of the Firm's 2.5% capital conservation buffer and 1.125%, resulting from the phase-in of the Firm's 4.5% global systemically important banks ("GSIB") surcharge.

(d) Represents the minimum capital ratios applicable to the Firm on a Fully Phased-In Basel III basis. At December 31, 2016, the ratios include the Firm's estimate of its Fully Phased-In U.S. GSIB surcharge of 3.5%. The minimum capital ratios will be fully phased-in effective January 1, 2019. For additional information on the GSIB surcharge, see page 79.

(e) In the case of the SLR, the Fully Phased-In minimum ratio is effective beginning January 1, 2018.

Management's discussion and analysis

Strategy and governance

The Firm's CEO, in conjunction with the Board of Directors, establishes principles and guidelines for capital planning, issuance, usage and distributions, and minimum capital targets for the level and composition of capital in both business-as-usual and highly stressed environments. The DRPC assesses and approves the capital management and governance processes of the Firm. The Firm's Audit Committee is responsible for reviewing and approving the capital stress testing end-to-end control framework.

The Capital Governance Committee and the Regulatory Capital Management Office ("RCMO") support the Firm's strategic capital decision-making. The Capital Governance Committee oversees the capital adequacy assessment process, including the overall design, scenario development and macro assumptions and ensures that capital stress test programs are designed to adequately capture the risks specific to the Firm's businesses. RCMO, which reports to the Firm's CFO, is responsible for designing and monitoring the Firm's execution of its capital policies and strategies once approved by the Board, as well as reviewing and monitoring the execution of its capital adequacy assessment process. The Basel Independent Review function ("BIR"), which reports to the RCMO and has direct access to both the DRPC and Capital Governance Committee, conducts independent assessments of the Firm's regulatory capital framework to ensure compliance with the applicable U.S. Basel rules in support of senior management's responsibility for assessing and managing capital and for the DRPC's oversight of management in executing that responsibility. For additional discussion on the DRPC, see Enterprise-wide Risk Management on pages 71–75.

Monitoring and management of capital

In its monitoring and management of capital, the Firm takes into consideration an assessment of economic risk and all regulatory capital requirements to determine the level of capital needed to meet and maintain the objectives discussed above, as well as to support the framework for allocating capital to its business segments. While economic risk is considered prior to making decisions on future business activities, in most cases, the Firm considers risk-based regulatory capital to be a proxy for economic risk capital.

Regulatory capital

The Federal Reserve establishes capital requirements, including well-capitalized standards, for the consolidated financial holding company. The OCC establishes similar minimum capital requirements for the Firm's national banks, including JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A. The U.S. capital requirements generally follow the Capital Accord of the Basel Committee, as amended from time to time.

Basel III overview

Capital rules under Basel III establish minimum capital ratios and overall capital adequacy standards for large and internationally active U.S. bank holding companies and banks, including the Firm and its insured depository institution ("IDI") subsidiaries. Basel III presents two comprehensive methodologies for calculating RWA: a general (standardized) approach ("Basel III Standardized"), and an advanced approach ("Basel III Advanced"). Certain of the requirements of Basel III are subject to phase-in periods that began on January 1, 2014 and continue through the end of 2018 ("transitional period").

Basel III establishes capital requirements for calculating credit risk and market risk RWA, and in the case of Basel III Advanced, operational risk RWA. Key differences in the calculation of credit risk RWA between the Standardized and Advanced approaches are that for Basel III Advanced, credit risk RWA is based on risk-sensitive approaches which largely rely on the use of internal credit models and parameters, whereas for Basel III Standardized, credit risk RWA is generally based on supervisory risk-weightings which vary primarily by counterparty type and asset class. Market risk RWA is calculated on a generally consistent basis between Basel III Standardized and Basel III Advanced. In addition to the RWA calculated under these methodologies, the Firm may supplement such amounts to incorporate management judgment and feedback from its bank regulators.

Basel III also includes a requirement for Advanced Approach banking organizations, including the Firm, to calculate SLR. For additional information on SLR, see page 82.

Basel III Fully Phased-In

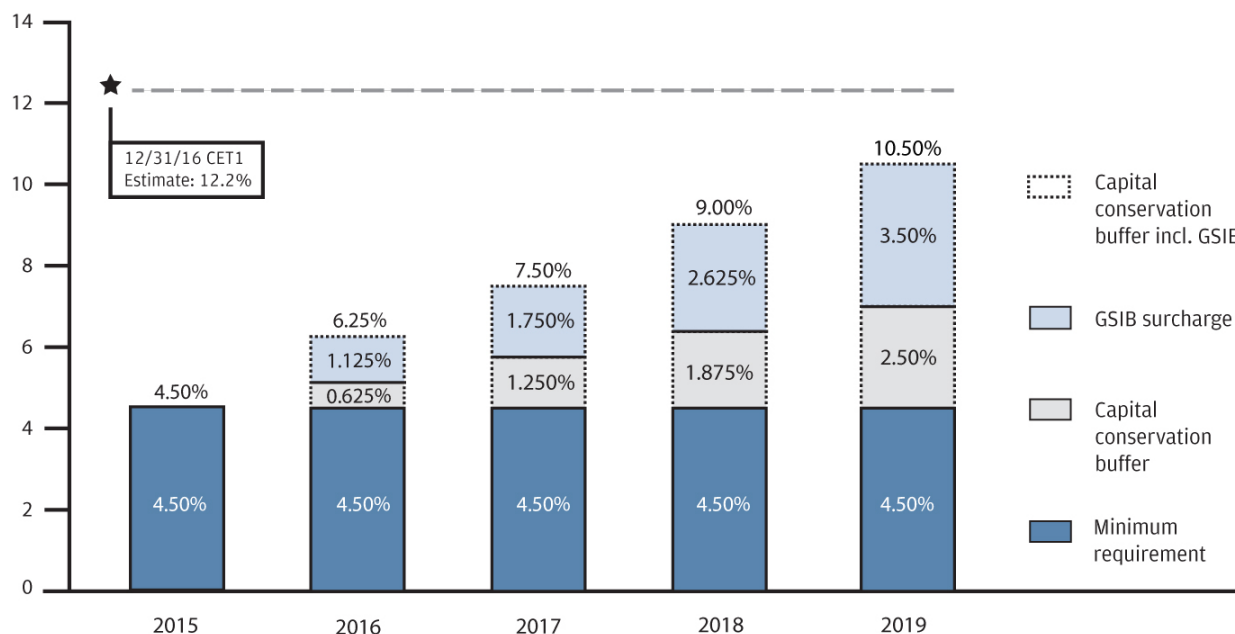
Basel III capital rules will become fully phased-in on January 1, 2019, at which point the Firm will continue to calculate its capital ratios under both the Basel III Standardized and Advanced Approaches. The Firm manages each of the businesses, as well as the corporate functions, primarily on a Basel III Fully Phased-In basis. For additional information on the Firm, JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A.'s capital, RWA and capital ratios under Basel III Standardized and Advanced Fully Phased-In rules and SLRs calculated under the Basel III Advanced Fully Phased-In rules, all of which are considered key regulatory capital measures, see Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures and Key Performance Measures on pages 48–50.

The Firm's estimates of its Basel III Standardized and Advanced Fully Phased-In capital, RWA and capital ratios and SLRs for the Firm, JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A. are based on the current published U.S. Basel III rules and on the application of such rules to the Firm's businesses as currently conducted. The actual impact on the Firm's capital ratios and SLR as of the

effective date of the rules may differ from the Firm's current estimates depending on changes the Firm may make to its businesses in the future, further implementation guidance from the regulators, and regulatory approval of certain of the Firm's internal risk models (or, alternatively, regulatory disapproval of the Firm's internal risk models that have previously been conditionally approved).

Risk-based capital regulatory minimums

The following chart presents the Basel III minimum CET1 capital ratio during the transitional periods and on a fully phased-in basis under the Basel III rules currently in effect.



The Basel III rules include minimum capital ratio requirements that are subject to phase-in periods through the end of 2018. The capital adequacy of the Firm and its national bank subsidiaries, both during the transitional period and upon full-phase in, is evaluated against the Basel III approach (Standardized or Advanced) which results for each quarter in the lower ratio as required by the Collins Amendment of the Dodd-Frank Act (the "Collins Floor"). Additional information regarding the Firm's capital ratios, as well as the U.S. federal regulatory capital standards to which the Firm is subject, is presented in Note 28. For further information on the Firm's Basel III measures, see the Firm's Pillar 3 Regulatory Capital Disclosures reports, which are available on the Firm's website (<http://investor.shareholder.com/jpmorganchase/basel.cfm>).

All banking institutions are currently required to have a minimum capital ratio of 4.5% of CET1 capital. Certain banking organizations, including the Firm, are required to hold additional amounts of capital to serve as a "capital conservation buffer". The capital conservation buffer is intended to be used to absorb potential losses in times of financial or economic stress. If not maintained, the Firm could be limited in the amount of capital that may be

distributed, including dividends and common equity repurchases. The capital conservation buffer is subject to a phase-in period that began January 1, 2016 and continues through the end of 2018.

As an expansion of the capital conservation buffer, the Firm is also required to hold additional levels of capital in the form of a GSIB surge and a countercyclical capital buffer.

Under the Federal Reserve's final rule, GSIBs, including the Firm, are required to calculate their GSIB surge on an annual basis under two separately prescribed methods, and are subject to the higher of the two. The first ("Method 1"), reflects the GSIB surge as prescribed by the Basel Committee's assessment methodology, and is calculated across five criteria: size, cross-jurisdictional activity, interconnectedness, complexity and substitutability. The second ("Method 2"), modifies the Method 1 requirements to include a measure of short-term wholesale funding in place of substitutability, and introduces a GSIB score "multiplication factor".

Management’s discussion and analysis

The Firm’s Fully Phased-In GSIB surcharge for 2016 was calculated to be 2.5% under Method 1 and 4.5% under Method 2. Accordingly, the Firm’s minimum capital ratios applicable in 2016 include a GSIB surcharge of 1.125%, resulting from the application of the transition provisions to the 4.5% fully phased-in GSIB surcharge. For 2017, the Firm has calculated its Fully Phased-In GSIB surcharge to be 2.5% under Method 1 and 3.5% under Method 2 resulting in the inclusion of a GSIB surcharge of 1.75% in the Firm’s minimum capital ratios after application of the transition provisions.

The countercyclical capital buffer takes into account the macro financial environment in which large, internationally active banks function. On September 8, 2016 the Federal Reserve published the framework that will apply to the setting of the countercyclical capital buffer. As of October 24, 2016 the Federal Reserve reaffirmed setting the U.S. countercyclical capital buffer at 0%, and stated that it will review the amount at least annually. The countercyclical capital buffer can be increased if the Federal Reserve, FDIC and OCC determine that credit growth in the economy has become excessive and can be set at up to an additional 2.5% of RWA subject to a 12-month implementation period.

Based on the Firm’s most recent estimate of its GSIB surcharge and the current countercyclical buffer being set at 0%, the Firm estimates its Fully Phased-In CET1 capital requirement, at January 1, 2019, would be 10.5% (reflecting the 4.5% CET1 capital requirement, the Fully Phased-In 2.5% capital conservation buffer and the GSIB surcharge of 3.5%). As well as meeting the capital ratio requirements of Basel III, the Firm must, in order to be “well-capitalized”, maintain a minimum 6% Tier 1 capital and a 10% Total capital requirement. At December 31, 2016 and 2015, JPMorgan Chase maintained Basel III Standardized Transitional and Basel III Advanced Transitional ratios in excess of the well-capitalized standards established by the Federal Reserve.

The Firm continues to believe that over the next several years, it will operate with a Basel III CET1 capital ratio between 11% and 12.5%. It is the Firm’s intention that the Firm’s capital ratios continue to meet regulatory minimums as they are fully implemented in 2019 and thereafter.

Each of the Firm’s IDI subsidiaries must maintain a minimum 6.5% CET1, 8% Tier 1 capital, 10% Total capital and 5% Tier 1 leverage requirement to meet the definition of “well-capitalized” under the Prompt Corrective Action (“PCA”) requirements of the FDIC Improvement Act (“FDICIA”) for IDI subsidiaries.

Capital

A reconciliation of total stockholders’ equity to Basel III Fully Phased-In CET1 capital, Tier 1 capital and Basel III Advanced and Standardized Fully Phased-In Total capital is presented in the table below. For additional information on the components of regulatory capital, see Note 28.

Capital components

(in millions)	December 31, 2016
Total stockholders’ equity	\$ 254,190
Less: Preferred stock	26,068
Common stockholders’ equity	228,122
Less:	
Goodwill	47,288
Other intangible assets	862
Add:	
Deferred tax liabilities(a)	3,230
Less: Other CET1 capital adjustments	1,468
Standardized/Advanced CET1 capital	181,734
Preferred stock	26,068
Less:	
Other Tier 1 adjustments(b)	328
Standardized/Advanced Tier 1 capital	\$ 207,474
Long-term debt and other instruments qualifying as Tier 2 capital	\$ 15,253
Qualifying allowance for credit losses	14,854
Other	(94)
Standardized Fully Phased-In Tier 2 capital	\$ 30,013
Standardized Fully Phased-in Total capital	\$ 237,487
Adjustment in qualifying allowance for credit losses for Advanced Tier 2 capital	(10,961)
Advanced Fully Phased-In Tier 2 capital	\$ 19,052
Advanced Fully Phased-In Total capital	\$ 226,526

- (a) Represents deferred tax liabilities related to tax-deductible goodwill and to identifiable intangibles created in nontaxable transactions, which are netted against goodwill and other intangibles when calculating TCE.
- (b) Includes the deduction associated with the permissible holdings of covered funds (as defined by the Volcker Rule) acquired after December 31, 2013. The deduction was not material as of December 31, 2016.

The following table presents a reconciliation of the Firm's Basel III Transitional CET1 capital to the Firm's estimated Basel III Fully Phased-In CET1 capital as of December 31, 2016.

(in millions)	December 31, 2016
Transitional CET1 capital	\$ 182,967
AOCI phase-in(a)	(156)
CET1 capital deduction phase-in(b)	(695)
Intangible assets deduction phase-in(c)	(312)
Other adjustments to CET1 capital(d)	(70)
Fully Phased-In CET1 capital	\$ 181,734

(a) Includes the remaining balance of AOCI related to AFS debt securities and defined benefit pension and other postretirement employee benefit ("OPEB") plans that will qualify as Basel III CET1 capital upon full phase-in.

(b) Predominantly includes regulatory adjustments related to changes in DVA, as well as CET1 deductions for defined benefit pension plan assets and deferred tax assets related to net operating loss ("NOL") and tax credit carryforwards.

(c) Relates to intangible assets, other than goodwill and MSRs, that are required to be deducted from CET1 capital upon full phase-in.

(d) Includes minority interest and the Firm's investments in its own CET1 capital instruments.

Capital rollforward

The following table presents the changes in Basel III Fully Phased-In CET1 capital, Tier 1 capital and Tier 2 capital for the year ended December 31, 2016.

Year Ended December 31, (in millions)	2016
Standardized/Advanced CET1 capital at December 31, 2015	\$ 173,189
Net income applicable to common equity	23,086
Dividends declared on common stock	(6,912)
Net purchase of treasury stock	(7,163)
Changes in additional paid-in capital	(873)
Changes related to AOCI(a)	(1,280)
Adjustment related to DVA(a)	954
Other	733
Increase in Standardized/Advanced CET1 capital	8,545
Standardized/Advanced CET1 capital at December 31, 2016	\$ 181,734

Standardized/Advanced Tier 1 capital at December 31, 2015	\$ 199,047
Change in CET1 capital	8,545
Net issuance of noncumulative perpetual preferred stock	—
Other	(118)
Increase in Standardized/Advanced Tier 1 capital	8,427
Standardized/Advanced Tier 1 capital at December 31, 2016	\$ 207,474

Standardized Tier 2 capital at December 31, 2015	\$ 30,929
Change in long-term debt and other instruments qualifying as Tier 2	(1,426)
Change in qualifying allowance for credit losses	513
Other	(3)
Increase in Standardized Tier 2 capital	(916)

Standardized Tier 2 capital at December 31, 2016 **\$ 30,013**

Standardized Total capital at December 31, 2016 **\$ 237,487**

Advanced Tier 2 capital at December 31, 2015	\$ 21,132
Change in long-term debt and other instruments qualifying as Tier 2	(1,426)
Change in qualifying allowance for credit losses	(651)
Other	(3)
Increase in Advanced Tier 2 capital	(2,080)

Advanced Tier 2 capital at December 31, 2016 **\$ 19,052**

Advanced Total capital at December 31, 2016 **\$ 226,526**

(a) Effective January 1, 2016, the adjustment reflects the impact of the adoption of DVA through OCI. For further discussion of the accounting change refer to Note 25.

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RWA rollforward

The following table presents changes in the components of RWA under Basel III Standardized and Advanced Fully Phased-In for the year ended December 31, 2016. The amounts in the rollforward categories are estimates, based on the predominant driver of the change.

Year ended December 31, 2016 (in billions)	Standardized			Advanced			
	Credit risk RWA	Market risk RWA	Total RWA	Credit risk RWA	Market risk RWA	Operational risk RWA	Total RWA
December 31, 2015	\$ 1,333	\$ 142	\$ 1,475	\$ 954	\$ 142	\$ 400	\$ 1,496
Model & data changes(a)	—	(14)	(14)	2	(14)	—	(12)
Portfolio runoff(b)	(13)	(2)	(15)	(15)	(2)	—	(17)
Movement in portfolio levels(c)	27	2	29	18	2	—	20
Changes in RWA	14	(14)	—	5	(14)	—	(9)
December 31, 2016	\$ 1,347	\$ 128	\$ 1,475	\$ 959	\$ 128	\$ 400	\$ 1,487

(a) Model & data changes refer to movements in levels of RWA as a result of revised methodologies and/or treatment per regulatory guidance (exclusive of rule changes).

(b) Portfolio runoff for credit risk RWA reflects reduced risk from position rollofs in legacy portfolios in Mortgage Banking (under both the Standardized and Advanced framework), and for market risk RWA reflects reduced risk from position rollofs in legacy portfolios in the wholesale businesses.

(c) Movement in portfolio levels for credit risk RWA refers to changes in book size, composition, credit quality, and market movements; and for market risk RWA refers to changes in position and market movements.

Supplementary leverage ratio

The SLR is defined as Tier 1 capital under Basel III divided by the Firm's total leverage exposure. Total leverage exposure is calculated by taking the Firm's total average on-balance sheet assets, less amounts permitted to be deducted for Tier 1 capital, and adding certain off-balance sheet exposures, such as undrawn commitments and derivatives potential future exposure.

U.S. bank holding companies, including the Firm, are required to have a minimum SLR of 5% and IDI subsidiaries, including JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A., are required to have a minimum SLR of 6%, both beginning January 1, 2018. As of December 31, 2016, the Firm estimates that JPMorgan Chase Bank, N.A.'s and Chase Bank USA, N.A.'s Fully Phased-In SLRs are approximately 6.6% and 9.6%, respectively.

The following table presents the components of the Firm's Fully Phased-In SLR as of December 31, 2016.

(in millions, except ratio)	December 31, 2016
Fully Phased-in Tier 1 Capital	\$ 207,474
Total average assets	2,532,457
Less: amounts deducted from Tier 1 capital	46,977
Total adjusted average assets(a)	2,485,480
Off-balance sheet exposures(b)	707,359
SLR leverage exposure	\$ 3,192,839
SLR	6.5%

(a) Adjusted average assets, for purposes of calculating the SLR, includes total quarterly average assets adjusted for on-balance sheet assets that are subject to deduction from Tier 1 capital, predominantly goodwill and other intangible assets.

(b) Off-balance sheet exposures are calculated as the average of the three month-end spot balances in the reporting quarter.

Line of business equity

The Firm's framework for allocating capital to its business segments (line of business equity) is based on the following objectives:

- Integrate firmwide and line of business capital management activities;
- Measure performance consistently across all lines of business; and
- Provide comparability with peer firms for each of the lines of business.

Each business segment is allocated capital by taking into consideration stand-alone peer comparisons and regulatory capital requirements (as estimated under Basel III Advanced Fully Phased-In). For 2016, capital was allocated to each business segment for, among other things, goodwill and other intangibles associated with acquisitions effected by the line of business. ROE is measured and internal targets for expected returns are established as key measures of a business segment's performance.

Line of business common equity

Year ended December 31, (in billions)	Yearly average		
	2016	2015	2014
Consumer & Community Banking	\$ 51.0	\$ 51.0	\$ 51.0
Corporate & Investment Bank	64.0	62.0	61.0
Commercial Banking	16.0	14.0	14.0
Asset & Wealth Management	9.0	9.0	9.0
Corporate	84.6	79.7	72.4
Total common stockholders' equity	\$ 224.6	\$ 215.7	\$ 207.4

On at least an annual basis, the Firm assesses the level of capital required for each line of business as well as the assumptions and methodologies used to allocate capital. Through the end of 2016, capital was allocated to the lines of business based on a single measure, Basel III Advanced Fully Phased-In RWA. Effective January 1, 2017, the Firm's methodology used to allocate capital to the Firm's business segments was updated. The new methodology incorporates Basel III Standardized Fully Phased-In RWA (as well as Basel III Advanced Fully Phased-In RWA), leverage, the GSIB surcharge, and a simulation of capital in a severe stress environment. The methodology will continue to be weighted towards Basel III Advanced Fully Phased-In RWA because the Firm believes it to be the best proxy for economic risk. The Firm will consider further changes to its capital allocation methodology as the regulatory framework evolves. In addition, under the new methodology, capital is no longer allocated to each line of business for goodwill and other intangibles associated with acquisitions effected by the line of business. The Firm will continue to establish internal ROE targets for its business segments, against which they will be measured, as a key performance indicator.

The table below reflects the Firm's assessed level of capital required for each line of business as of the dates indicated.

Line of business common equity

(in billions)	January 1, 2017	December 31,	
		2016	2015
Consumer & Community Banking	\$ 51.0	\$ 51.0	\$ 51.0
Corporate & Investment Bank	70.0	64.0	62.0
Commercial Banking	20.0	16.0	14.0
Asset & Wealth Management	9.0	9.0	9.0
Corporate	78.1	88.1	85.5
Total common stockholders' equity	\$ 228.1	\$ 228.1	\$ 221.5

Planning and stress testing

Comprehensive Capital Analysis and Review

The Federal Reserve requires large bank holding companies, including the Firm, to submit a capital plan on an annual basis. The Federal Reserve uses the CCAR and Dodd-Frank Act stress test processes to ensure that large BHCs have sufficient capital during periods of economic and financial stress, and have robust, forward-looking capital assessment and planning processes in place that address each BHC's unique risks to enable them to absorb losses under certain stress scenarios. Through the CCAR, the Federal Reserve evaluates each BHC's capital adequacy and internal capital adequacy assessment processes ("ICAAP"), as well as its plans to make capital distributions, such as dividend payments or stock repurchases.

On June 29, 2016, the Federal Reserve informed the Firm that it did not object, on either a quantitative or qualitative basis, to the Firm's 2016 capital plan. For information on actions taken by the Firm's Board of Directors following the 2016 CCAR results, see Capital actions on page 84.

The Firm's CCAR process is integrated into and employs the same methodologies utilized in the Firm's ICAAP process, as discussed below.

Internal Capital Adequacy Assessment Process

Semiannually, the Firm completes the ICAAP, which provides management with a view of the impact of severe and unexpected events on earnings, balance sheet positions, reserves and capital. The Firm's ICAAP integrates stress testing protocols with capital planning.

The process assesses the potential impact of alternative economic and business scenarios on the Firm's earnings and capital. Economic scenarios, and the parameters underlying those scenarios, are defined centrally and applied uniformly across the businesses. These scenarios are articulated in terms of macroeconomic factors, which are key drivers of business results; global market shocks, which generate short-term but severe trading losses; and idiosyncratic operational risk events. The scenarios are intended to capture and stress key vulnerabilities and idiosyncratic risks facing the Firm. However, when defining a broad range of scenarios, realized events can always be worse. Accordingly,

Management's discussion and analysis

management considers additional stresses outside these scenarios, as necessary. ICAAP results are reviewed by management and the Board of Directors.

Capital actions

Dividends

The Firm's common stock dividend policy reflects JPMorgan Chase's earnings outlook, desired dividend payout ratio, capital objectives, and alternative investment opportunities.

On May 17, 2016, the Firm announced that its Board of Directors increased the quarterly common stock dividend to \$0.48 per share, effective with the dividend paid on July 31, 2016. The Firm's dividends are subject to the Board of Directors' approval at the customary times those dividends are to be declared.

For information regarding dividend restrictions, see Note 22 and Note 27.

The following table shows the common dividend payout ratio based on net income applicable to common equity.

Year ended December 31,	2016	2015	2014
Common dividend payout ratio	30%	28%	29%

Common equity

During the year ended December 31, 2016, warrant holders exercised their right to purchase 22.5 million shares of the Firm's common stock. The Firm issued from treasury stock 11.1 million shares of its common stock as a result of these exercises. As of December 31, 2016, 24.9 million warrants remained outstanding, compared with 47.4 million outstanding as of December 31, 2015.

On March 17, 2016, the Firm announced that its Board of Directors had authorized the repurchase of up to an additional \$1.9 billion of common equity (common stock and warrants) through June 30, 2016 under its equity repurchase program. This amount is in addition to the \$6.4 billion of common equity that was previously authorized for repurchase between April 1, 2015 and June 30, 2016.

Following receipt in June 2016 of the Federal Reserve's non-objection to the Firm's 2016 capital plan, the Firm's Board of Directors authorized the repurchase of up to \$10.6 billion of common equity (common stock and warrants) between July 1, 2016 and June 30, 2017.

This authorization includes shares repurchased to offset issuances under the Firm's equity-based compensation plans.

As of December 31, 2016, \$6.1 billion of authorized repurchase capacity remained under the program.

The following table sets forth the Firm's repurchases of common equity for the years ended December 31, 2016, 2015 and 2014. There were no warrants repurchased during the years ended December 31, 2016, 2015 and 2014.

Year ended December 31, (in millions)	2016	2015	2014
Total number of shares of common stock repurchased	140.4	89.8	82.3
Aggregate purchase price of common stock repurchases	\$ 9,082	\$ 5,616	\$ 4,760

The Firm may, from time to time, enter into written trading plans under Rule 10b5-1 of the Securities Exchange Act of 1934 to facilitate repurchases in accordance with the common equity repurchase program. A Rule 10b5-1 repurchase plan allows the Firm to repurchase its equity during periods when it would not otherwise be repurchasing common equity — for example, during internal trading blackout periods. All purchases under a Rule 10b5-1 plan must be made according to a predefined plan established when the Firm is not aware of material nonpublic information.

The authorization to repurchase common equity will be utilized at management's discretion, and the timing of purchases and the exact amount of common equity that may be repurchased is subject to various factors, including market conditions; legal and regulatory considerations affecting the amount and timing of repurchase activity; the Firm's capital position (taking into account goodwill and intangibles); internal capital generation; and alternative investment opportunities. The repurchase program does not include specific price targets or timetables; may be executed through open market purchases or privately negotiated transactions, or utilize Rule 10b5-1 programs; and may be suspended at any time.

For additional information regarding repurchases of the Firm's equity securities, see Part II, Item 5: Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities on page 22.

Preferred stock

Preferred stock dividends declared were \$1.6 billion for the year ended December 31, 2016. For additional information on the Firm's preferred stock, see Note 22.

Redemption of outstanding trust preferred securities

The Firm redeemed \$1.6 billion and \$1.5 billion of trust preferred securities in the years ended December 31, 2016 and 2015, respectively.

Other capital requirements

TLAC

On December 15, 2016, the Federal Reserve issued its final TLAC rule which requires the top-tier holding companies of eight U.S. global systemically important bank holding companies, including the Firm, among other things, to maintain minimum levels of external TLAC and external long-term debt that satisfies certain eligibility criteria (“eligible LTD”) by January 1, 2019. The minimum external TLAC requirement is the greater of (A) 18% of the financial institution’s RWA plus applicable buffers, including its GSIB surcharge as calculated under Method 1 and (B) 7.5% of its total leverage exposure plus a buffer equal to 2.0%. The required minimum level of eligible long-term debt is equal to the greater of (A) 6% of the financial institution’s RWA, plus its U.S. Method 2 GSIB surcharge and (B) 4.5% of the Firm’s total leverage exposure. The final rule permanently grandfathered all long-term debt issued before December 31, 2016, to the extent these securities would be ineligible only due to containing impermissible acceleration rights or being governed by foreign law. While the Firm may have to raise long-term debt to be in full compliance with the rule, management estimates the net amount to be raised is not material and the timing for raising such funds is manageable.

Broker-dealer regulatory capital

JPMorgan Chase’s principal U.S. broker-dealer subsidiary is JPMorgan Securities. Prior to October 1, 2016 the Firm had two principal U.S. broker-dealer subsidiaries. Effective October 1, 2016 JPMorgan Clearing merged with JPMorgan Securities. JPMorgan Securities is the surviving entity in the merger and its name remain unchanged.

JPMorgan Securities is subject to Rule 15c3-1 under the Securities Exchange Act of 1934 (the “Net Capital Rule”). JPMorgan Securities is also registered as futures commission merchants and subject to Rule 1.17 of the CFTC.

JPMorgan Securities has elected to compute its minimum net capital requirements in accordance with the “Alternative Net Capital Requirements” of the Net Capital Rule. At December 31, 2016, JPMorgan Securities’ net capital, as defined by the Net Capital Rule, was \$14.7 billion, exceeding the minimum requirement by \$11.9 billion.

In addition to its minimum net capital requirement, JPMorgan Securities is required to hold tentative net capital in excess of \$1.0 billion and is also required to notify the SEC in the event that tentative net capital is less than \$5.0 billion, in accordance with the market and credit risk standards of Appendix E of the Net Capital Rule. As of December 31, 2016, JPMorgan Securities had tentative net capital in excess of the minimum and notification requirements.

J.P. Morgan Securities plc is a wholly owned subsidiary of JPMorgan Chase Bank, N.A. and is the Firm’s principal operating subsidiary in the U.K. It has authority to engage in banking, investment banking and broker-dealer activities. J.P. Morgan Securities plc is jointly regulated by the U.K. PRA and the FCA. J.P. Morgan Securities plc is subject to the European Union Capital Requirements Regulation and the U.K. PRA capital rules, under which it has implemented Basel III.

At December 31, 2016, J.P. Morgan Securities plc had estimated total capital of \$34.5 billion, its estimated CET1 capital ratio was 13.8% and its estimated total capital ratio was 17.4%. Both ratios exceeded the minimum standards of 4.5% and 8.0%, respectively, under the transitional requirements of the European Union’s (“EU”) Basel III Capital Requirements Directive and Regulation, as well as the additional capital requirements specified by the PRA.

CREDIT RISK MANAGEMENT

Credit risk is the risk of loss arising from the default of a customer, client or counterparty. The Firm provides credit to a variety of customers, ranging from large corporate and institutional clients to individual consumers and small businesses. In its consumer businesses, the Firm is exposed to credit risk primarily through its mortgage banking, credit card, auto, business banking and student lending businesses. Originated mortgage loans are retained in the mortgage portfolio, securitized or sold to U.S. government agencies and U.S. government-sponsored enterprises; other types of consumer loans are typically retained on the balance sheet. In its wholesale businesses, the Firm is exposed to credit risk through its underwriting, lending, market-making, and hedging activities with and for clients and counterparties, as well as through its operating services activities (such as cash management and clearing activities), securities financing activities, investment securities portfolio, and cash placed with banks. A portion of the loans originated or acquired by the Firm's wholesale businesses are generally retained on the balance sheet; the Firm's syndicated loan business distributes a significant percentage of originations into the market and is an important component of portfolio management.

Credit risk management

Credit risk management is an independent risk management function that monitors and measures credit risk throughout the Firm and defines credit risk policies and procedures. The credit risk function reports to the Firm's CRO. The Firm's credit risk management governance includes the following activities:

- Establishing a comprehensive credit risk policy framework
- Monitoring and managing credit risk across all portfolio segments, including transaction and exposure approval
- Setting industry concentration limits and establishing underwriting guidelines
- Assigning and managing credit authorities in connection with the approval of all credit exposure
- Managing criticized exposures and delinquent loans
- Estimating credit losses and ensuring appropriate credit risk-based capital management

Risk identification and measurement

The Credit Risk Management function measures, limits, manages and monitors credit risk across the Firm's businesses. To measure credit risk, the Firm employs several methodologies for estimating the likelihood of obligor or counterparty default. Methodologies for measuring credit risk vary depending on several factors, including type of asset (e.g., consumer versus wholesale), risk measurement parameters (e.g., delinquency status and borrower's credit score versus wholesale risk-rating) and risk management and collection processes (e.g., retail collection center versus centrally managed workout groups). Credit risk measurement is based on the

probability of default of an obligor or counterparty, the loss severity given a default event and the exposure at default.

Based on these factors and related market-based inputs, the Firm estimates credit losses for its exposures. Probable credit losses inherent in the consumer and wholesale held-for-investment loan portfolios are reflected in the allowance for loan losses, and probable credit losses inherent in lending-related commitments are reflected in the allowance for lending-related commitments. These losses are estimated using statistical analyses and other factors as described in Note 15. In addition, potential and unexpected credit losses are reflected in the allocation of credit risk capital and represent the potential volatility of actual losses relative to the established allowances for loan losses and lending-related commitments. The analyses for these losses include stress testing that considers alternative economic scenarios as described in the Stress testing section below. For further information, see Critical Accounting Estimates used by the Firm on pages 132–134.

The methodologies used to estimate credit losses depend on the characteristics of the credit exposure, as described below.

Scored exposure

The scored portfolio is generally held in CCB and predominantly includes residential real estate loans, credit card loans, certain auto and business banking loans, and student loans. For the scored portfolio, credit loss estimates are based on statistical analysis of credit losses over discrete periods of time. The statistical analysis uses portfolio modeling, credit scoring, and decision-support tools, which consider loan-level factors such as delinquency status, credit scores, collateral values, and other risk factors. Credit loss analyses also consider, as appropriate, uncertainties and other factors, including those related to current macroeconomic and political conditions, the quality of underwriting standards, and other internal and external factors. The factors and analysis are updated on a quarterly basis or more frequently as market conditions dictate.

Risk-rated exposure

Risk-rated portfolios are generally held in CIB, CB and AWM, but also include certain business banking and auto dealer loans held in CCB that are risk-rated because they have characteristics similar to commercial loans. For the risk-rated portfolio, credit loss estimates are based on estimates of the probability of default ("PD") and loss severity given a default. The probability of default is the likelihood that a borrower will default on its obligation; the loss given default ("LGD") is the estimated loss on the loan that would be realized upon the default and takes into consideration collateral and structural support for each credit facility. The estimation process includes assigning risk ratings to each borrower and credit facility to differentiate risk within the portfolio. These risk ratings are reviewed regularly by Credit Risk Management and revised as needed to reflect the

borrower's current financial position, risk profile and related collateral. The calculations and assumptions are based on both internal and external historical experience and management judgment and are reviewed regularly.

Stress testing

Stress testing is important in measuring and managing credit risk in the Firm's credit portfolio. The process assesses the potential impact of alternative economic and business scenarios on estimated credit losses for the Firm. Economic scenarios and the underlying parameters are defined centrally, articulated in terms of macroeconomic factors and applied across the businesses. The stress test results may indicate credit migration, changes in delinquency trends and potential losses in the credit portfolio. In addition to the periodic stress testing processes, management also considers additional stresses outside these scenarios, including industry and country-specific stress scenarios, as necessary. The Firm uses stress testing to inform decisions on setting risk appetite both at a Firm and LOB level, as well as to assess the impact of stress on individual counterparties.

Risk monitoring and management

The Firm has developed policies and practices that are designed to preserve the independence and integrity of the approval and decision-making process of extending credit to ensure credit risks are assessed accurately, approved properly, monitored regularly and managed actively at both the transaction and portfolio levels. The policy framework establishes credit approval authorities, concentration limits, risk-rating methodologies, portfolio review parameters and guidelines for management of distressed exposures. In addition, certain models, assumptions and inputs used in evaluating and monitoring credit risk are independently validated by groups that are separate from the line of businesses.

Consumer credit risk is monitored for delinquency and other trends, including any concentrations at the portfolio level, as certain of these trends can be modified through changes in underwriting policies and portfolio guidelines. Consumer Risk Management evaluates delinquency and other trends against business expectations, current and forecasted economic conditions, and industry benchmarks. Historical and forecasted trends are incorporated into the modeling of estimated consumer credit losses and are part of the monitoring of the credit risk profile of the portfolio.

Wholesale credit risk is monitored regularly at an aggregate portfolio, industry, and individual client and counterparty level with established concentration limits that are reviewed and revised as deemed appropriate by management, typically on an annual basis. Industry and counterparty limits, as measured in terms of exposure and economic risk appetite, are subject to stress-based loss constraints. In addition, wrong-way risk — the risk that exposure to a counterparty is positively correlated with the impact of a default by the same counterparty, which could cause exposure to increase at the same time as the counterparty's capacity to meet its obligations is decreasing — is actively monitored as this risk could result in greater exposure at default compared with a transaction with another counterparty that does not have this risk.

Management of the Firm's wholesale credit risk exposure is accomplished through a number of means, including:

- Loan underwriting and credit approval process
- Loan syndications and participations
- Loan sales and securitizations
- Credit derivatives
- Master netting agreements
- Collateral and other risk-reduction techniques

In addition to Credit Risk Management, an independent Credit Review function, is responsible for:

- Independently validating or changing the risk grades assigned to exposures in the Firm's wholesale and commercial-oriented retail credit portfolios, and assessing the timeliness of risk grade changes initiated by responsible business units; and
- Evaluating the effectiveness of business units' credit management processes, including the adequacy of credit analyses and risk grading/LGD rationales, proper monitoring and management of credit exposures, and compliance with applicable grading policies and underwriting guidelines.

For further discussion of consumer and wholesale loans, see Note 14.

Risk reporting

To enable monitoring of credit risk and effective decision-making, aggregate credit exposure, credit quality forecasts, concentration levels and risk profile changes are reported regularly to senior members of Credit Risk Management. Detailed portfolio reporting of industry, customer, product and geographic concentrations occurs monthly, and the appropriateness of the allowance for credit losses is reviewed by senior management at least on a quarterly basis. Through the risk reporting and governance structure, credit risk trends and limit exceptions are provided regularly to, and discussed with, risk committees, senior management and the Board of Directors as appropriate.

CREDIT PORTFOLIO

In the following tables, reported loans include loans retained (i.e., held-for-investment); loans held-for-sale; and certain loans accounted for at fair value. In addition, the Firm records certain loans accounted for at fair value in trading assets. For further information regarding these loans, see Note 3 and Note 4. For additional information on the Firm's loans, lending-related commitments, and derivative receivables, including the Firm's accounting policies, see Note 14, Note 29, and Note 6, respectively. For further information regarding the credit risk inherent in the Firm's cash placed with banks, investment securities portfolio, and securities financing portfolio, see Note 5, Note 12, and Note 13, respectively.

For discussion of the consumer credit environment and consumer loans, see Consumer Credit Portfolio on pages 89–95 and Note 14. For discussion of wholesale credit environment and wholesale loans, see Wholesale Credit Portfolio on pages 96–104 and Note 14.

Total credit portfolio

December 31, (in millions)	Credit exposure		Nonperforming(b)(c)	
	2016	2015	2016	2015
Loans retained	\$ 889,907	\$ 832,792	\$ 6,721	\$ 6,303
Loans held-for-sale	2,628	1,646	162	101
Loans at fair value	2,230	2,861	—	25
Total loans – reported	894,765	837,299	6,883	6,429
Derivative receivables	64,078	59,677	223	204
Receivables from customers and other	17,560	13,497	—	—
Total credit-related assets	976,403	910,473	7,106	6,633
Assets acquired in loan satisfactions				
Real estate owned	NA	NA	370	347
Other	NA	NA	59	54
Total assets acquired in loan satisfactions	NA	NA	429	401
Total assets	976,403	910,473	7,535	7,034
Lending-related commitments	976,702	940,395	506	193
Total credit portfolio	\$ 1,953,105	\$ 1,850,868	\$ 8,041	\$ 7,227
Credit derivatives used in credit portfolio management activities(a)	\$ (22,114)	\$ (20,681)	\$ —	\$ (9)
Liquid securities and other cash collateral held against derivatives	(22,705)	(16,580)	NA	NA

Year ended December 31, (in millions, except ratios)	2016	2015
Net charge-offs	\$ 4,692	\$ 4,086
Average retained loans		
Loans – reported	861,345	780,293
Loans – reported, excluding residential real estate PCI loans	822,973	736,543
Net charge-off rates		
Loans – reported	0.54%	0.52%
Loans – reported, excluding PCI	0.57	0.55

- (a) Represents the net notional amount of protection purchased and sold through credit derivatives used to manage both performing and nonperforming wholesale credit exposures; these derivatives do not qualify for hedge accounting under U.S. GAAP. For additional information, see Credit derivatives on pages 103–104 and Note 6.
- (b) Excludes PCI loans. The Firm is recognizing interest income on each pool of PCI loans as each of the pools is performing.
- (c) At December 31, 2016 and 2015, nonperforming assets excluded: (1) mortgage loans insured by U.S. government agencies of \$5.0 billion and \$6.3 billion, respectively, that are 90 or more days past due; (2) student loans insured by U.S. government agencies under the FFELP of \$263 million and \$290 million, respectively, that are 90 or more days past due; and (3) Real estate owned (“REO”) insured by U.S. government agencies of \$142 million and \$343 million, respectively. These amounts have been excluded based upon the government guarantee. In addition, the Firm's policy is generally to exempt credit card loans from being placed on nonaccrual status as permitted by regulatory guidance issued by the Federal Financial Institutions Examination Council (“FFIEC”).

CONSUMER CREDIT PORTFOLIO

The Firm's consumer portfolio consists primarily of residential real estate loans, credit card loans, auto loans, business banking loans and student loans, and associated lending-related commitments. The Firm's focus is on serving primarily the prime segment of the consumer credit market. The credit performance of the consumer portfolio continues to benefit from discipline in credit underwriting as well as improvement in the economy driven by increasing home

prices and lower unemployment. Both early-stage delinquencies (30–99 days delinquent) and late-stage delinquencies (150+ days delinquent) for residential real estate, excluding government guaranteed loans, declined from December 31, 2015 levels. The Credit Card 30+ day delinquency rate and the net charge-off rate increased from the prior year but remain near record lows. For further information on consumer loans, see Note 14.

The following table presents consumer credit-related information with respect to the credit portfolio held by CCB, prime mortgage and home equity loans held by AWM, and prime mortgage loans held by Corporate. For further information about the Firm's nonaccrual and charge-off accounting policies, see Note 14.

Consumer credit portfolio

As of or for the year ended December 31, (in millions, except ratios)	Credit exposure		Nonaccrual loans(h)(i)		Net charge-offs/(recoveries)(j)		Average annual net charge-off rate(j)(k)	
	2016	2015	2016	2015	2016	2015	2016	2015
Consumer, excluding credit card								
Loans, excluding PCI loans and loans held-for-sale								
Home equity	\$ 39,063	\$ 45,559	\$ 1,845	\$ 2,191	\$ 189	\$ 291	0.45%	0.59%
Residential mortgage	192,163	166,239	2,247	2,503	12	(4)	0.01	—
Auto(a)	65,814	60,255	214	116	285	214	0.45	0.38
Business banking(b)	22,698	21,208	286	263	257	253	1.17	1.23
Student and other	8,989	10,096	175	242	166	200	1.74	1.89
Total loans, excluding PCI loans and loans held-for-sale	328,727	303,357	4,767	5,315	909	954	0.28	0.35
Loans – PCI								
Home equity	12,902	14,989	NA	NA	NA	NA	NA	NA
Prime mortgage	7,602	8,893	NA	NA	NA	NA	NA	NA
Subprime mortgage	2,941	3,263	NA	NA	NA	NA	NA	NA
Option ARMs(c)	12,234	13,853	NA	NA	NA	NA	NA	NA
Total loans – PCI	35,679	40,998	NA	NA	NA	NA	NA	NA
Total loans – retained	364,406	344,355	4,767	5,315	909	954	0.25	0.30
Loans held-for-sale	238 (g)	466 (g)	53	98	—	—	—	—
Total consumer, excluding credit card loans	364,644	344,821	4,820	5,413	909	954	0.25	0.30
Lending-related commitments(d)	54,797	58,478						
Receivables from customers(e)	120	125						
Total consumer exposure, excluding credit card	419,561	403,424						
Credit Card								
Loans retained(f)	141,711	131,387	—	—	3,442	3,122	2.63	2.51
Loans held-for-sale	105	76	—	—	—	—	—	—
Total credit card loans	141,816	131,463	—	—	3,442	3,122	2.63	2.51
Lending-related commitments(d)	553,891	515,518						
Total credit card exposure	695,707	646,981						
Total consumer credit portfolio	\$ 1,115,268	\$ 1,050,405	\$ 4,820	\$ 5,413	\$ 4,351	\$ 4,076	0.89%	0.92%
Memo: Total consumer credit portfolio, excluding PCI	\$ 1,079,589	\$ 1,009,407	\$ 4,820	\$ 5,413	\$ 4,351	\$ 4,076	0.96%	1.02%

(a) At December 31, 2016 and 2015, excluded operating lease assets of \$13.2 billion and \$9.2 billion, respectively.

(b) Predominantly includes Business Banking loans as well as deposit overdrafts.

(c) At December 31, 2016 and 2015, approximately 66% and 64%, respectively, of the PCI option adjustable rate mortgages ("ARMs") portfolio has been modified into fixed-rate, fully amortizing loans.

(d) Credit card and home equity lending-related commitments represent the total available lines of credit for these products. The Firm has not experienced, and does not anticipate, that all available lines of credit would be used at the same time. For credit card and home equity commitments (if certain conditions are met), the Firm can reduce or cancel these lines of credit by providing the borrower notice or, in some cases as permitted by law, without notice.

(e) Receivables from customers represent margin loans to brokerage customers that are collateralized through assets maintained in the clients' brokerage accounts, as such no allowance is held against these receivables. These receivables are reported within accrued interest and accounts receivable on the Firm's Consolidated balance sheets.

(f) Includes billed interest and fees net of an allowance for uncollectible interest and fees.

(g) Predominantly represents prime mortgage loans held-for-sale.

(h) At December 31, 2016 and 2015, nonaccrual loans excluded loans 90 or more days past due as follows: (1) mortgage loans insured by U.S. government agencies of \$5.0 billion and \$6.3 billion, respectively; and (2) student loans insured by U.S. government agencies under the FFELP of \$263 million and \$290 million, respectively. These amounts have been excluded from nonaccrual loans based upon the government guarantee. In addition, the Firm's policy is generally to exempt credit card loans from being placed on nonaccrual status, as permitted by regulatory guidance issued by the FFIEC.

(i) Excludes PCI loans. The Firm is recognizing interest income on each pool of PCI loans as they are all performing.

Management's discussion and analysis

- (j) Net charge-offs and net charge-off rates excluded write-offs in the PCI portfolio of \$156 million and \$208 million for the years ended December 31, 2016 and 2015. These write-offs decreased the allowance for loan losses for PCI loans. See Allowance for Credit Losses on pages 105–107 for further details.
- (k) Average consumer loans held-for-sale were \$496 million and \$2.1 billion for the years ended December 31, 2016 and 2015, respectively. These amounts were excluded when calculating net charge-off rates.

Consumer, excluding credit card

Portfolio analysis

Consumer loan balances increased during the year ended December 31, 2016, predominantly due to originations of high-quality prime mortgage and auto loans that have been retained on the balance sheet, partially offset by paydowns and the charge-off or liquidation of delinquent loans. The credit environment remained favorable as the economy strengthened and home prices increased.

PCI loans are excluded from the following discussions of individual loan products and are addressed separately below. For further information about the Firm's consumer portfolio, including information about delinquencies, loan modifications and other credit quality indicators, see Note 14.

Home equity: The home equity portfolio declined from December 31, 2015 primarily reflecting loan paydowns and charge-offs. Both early-stage and late-stage delinquencies declined from December 31, 2015. Nonaccrual loans improved from December 31, 2015 primarily as a result of loss mitigation activities. Net charge-offs for the year ended December 31, 2016, declined when compared with the prior year as a result of improvement in home prices and delinquencies.

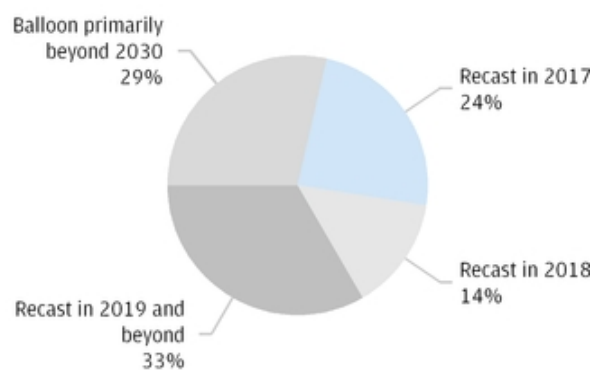
At December 31, 2016, approximately 90% of the Firm's home equity portfolio consists of home equity lines of credit ("HELOCs") and the remainder consists of home equity loans ("HELOANs"). HELOANs are generally fixed-rate, closed-end, amortizing loans, with terms ranging from 3–30 years. In general, HELOCs originated by the Firm are revolving loans for a 10-year period, after which time the HELOC recasts into a loan with a 20-year amortization period. At the time of origination, the borrower typically selects one of two minimum payment options that will generally remain in effect during the revolving period: a monthly payment of 1% of the outstanding balance, or interest-only payments based on a variable index (typically Prime). HELOCs originated by Washington Mutual were generally revolving loans for a 10-year period, after which time the HELOC converts to an interest-only loan with a balloon payment at the end of the loan's term.

The carrying value of HELOCs outstanding was \$34 billion at December 31, 2016. Of such amounts, approximately:

- \$13 billion have recast from interest-only to fully amortizing payments or have been modified,
- \$15 billion are scheduled to recast from interest-only to fully amortizing payments in future periods, and
- \$6 billion are interest-only balloon HELOCs, which primarily mature after 2030.

The following chart illustrates the payment recast composition of the approximately \$21 billion of HELOCs scheduled to recast in the future, based upon their current contractual terms.

**HELOCs scheduled to recast
(at December 31, 2016)**



The Firm has considered this payment recast risk in its allowance for loan losses based upon the estimated amount of payment shock (i.e., the excess of the fully-amortizing payment over the interest-only payment in effect prior to recast) expected to occur at the payment recast date, along with the corresponding estimated PD and loss severity assumptions. As part of its allowance estimate, the Firm also expects, based on observed activity in recent years, that approximately 30% of the carrying value of HELOCs scheduled to recast will voluntarily prepay prior to or after the recast. The HELOCs that have previously recast to fully amortizing payments generally have higher delinquency rates than the HELOCs within the revolving period, primarily as a result of the payment shock at the time of recast. Certain other factors, such as future developments in both unemployment rates and home prices, could also have a significant impact on the performance of these loans.

The Firm manages the risk of HELOCs during their revolving period by closing or reducing the undrawn line to the extent permitted by law when borrowers are exhibiting a material deterioration in their credit risk profile. The Firm will continue to evaluate both the near-term and longer-term recast risks inherent in its HELOC portfolio to ensure that changes in the Firm's estimate of incurred losses are appropriately considered in the allowance for loan losses and that the Firm's account management practices are appropriate given the portfolio's risk profile.

Junior lien loans where the borrower has a senior lien loan that is either delinquent or has been modified are considered high-risk seconds. Such loans are considered to pose a higher risk of default than junior lien loans for which the senior lien loan is neither delinquent nor modified. At December 31, 2016, the Firm estimated that the carrying value of its home equity portfolio contained approximately \$1.1 billion of current junior lien loans that were considered high risk seconds, compared with \$1.4 billion at December 31, 2015. The Firm estimates the balance of its total exposure to high-risk seconds on a quarterly basis using internal data and loan level credit bureau data (which typically provides the delinquency status of the senior lien loan). The Firm considers the increased PD associated with these high-risk seconds in estimating the allowance for loan losses and classifies those loans that are subordinated to a first lien loan that is more than 90 days delinquent as nonaccrual loans. The estimated balance of these high-risk seconds may vary from quarter to quarter for reasons such as the movement of related senior lien loans into and out of the 30+ day delinquency bucket. The Firm continues to monitor the risks associated with these loans. For further information, see Note 14.

Residential mortgage: The residential mortgage portfolio predominantly consists of high-quality prime mortgage loans with a small component (approximately 2%) of the residential mortgage portfolio in subprime mortgage loans. These subprime mortgage loans continue to run-off and are performing in line with expectations. The residential mortgage portfolio, including loans held-for-sale, increased from December 31, 2015 due to retained originations of primarily high-quality fixed rate prime mortgage loans partially offset by paydowns. Both early-stage and late-stage delinquencies showed improvement from December 31, 2015. Nonaccrual loans decreased from the prior year primarily as a result of loss mitigation activities. Net charge-offs for the year ended December 31, 2016 remain low, reflecting continued improvement in home prices and delinquencies.

At December 31, 2016 and 2015, the Firm's residential mortgage portfolio, including loans held-for-sale, included \$9.5 billion and \$11.1 billion, respectively, of mortgage loans insured and/or guaranteed by U.S. government agencies, of which \$7.0 billion and \$8.4 billion, respectively, were 30 days or more past due (of these past due loans, \$5.0 billion and \$6.3 billion, respectively, were 90 days or more past due). The Firm monitors its exposure to certain potential unrecoverable claim payments related to government insured loans and considers this exposure in estimating the allowance for loan losses.

At December 31, 2016 and 2015, the Firm's residential mortgage portfolio included \$19.1 billion and \$17.8 billion, respectively, of interest-only loans. These loans have an interest-only payment period generally followed by an adjustable-rate or fixed-rate fully amortizing payment period to maturity and are typically originated as higher-balance loans to higher-income borrowers. To date, losses on this portfolio generally have been consistent with the broader residential mortgage portfolio and the Firm's expectations. The Firm continues to monitor the risks associated with these loans.

Auto: Auto loans increased from December 31, 2015, as a result of growth in new originations. Nonaccrual loans increased compared with December 31, 2015, primarily due to downgrades of select auto dealer risk-rated loans. Net charge-offs for the year ended December 31, 2016 increased compared with the prior year, as a result of higher retail auto loan balances and a moderate increase in loss severity. The auto portfolio predominantly consists of prime-quality loans.

Business banking: Business banking loans increased compared with December 31, 2015 as a result of growth in loan originations. Nonaccrual loans at December 31, 2016 and net charge-offs for the year ended December 31, 2016 increased from the prior year as a result of growth in the portfolio.

Student and other: Student and other loans decreased from December 31, 2015 primarily as a result of the run-off of the student loan portfolio as the Firm ceased originations of student loans during the fourth quarter of 2013. Nonaccrual loans and net charge-offs also declined as a result of the run-off of the student loan portfolio.

Purchased credit-impaired loans: PCI loans decreased as the portfolio continues to run off. As of December 31, 2016, approximately 12% of the option ARM PCI loans were delinquent and approximately 66% of the portfolio had been modified into fixed-rate, fully amortizing loans. Substantially all of the remaining loans are making amortizing payments, although such payments are not necessarily fully amortizing. This latter group of loans is subject to the risk of payment shock due to future payment recast. Default rates generally increase on option ARM loans when payment recast results in a payment increase. The expected increase in default rates is considered in the Firm's quarterly impairment assessment.

Management's discussion and analysis

The following table provides a summary of lifetime principal loss estimates included in either the nonaccretable difference or the allowance for loan losses.

Summary of PCI loans lifetime principal loss estimates

December 31, (in billions)	Lifetime loss estimates ^(a)		Life-to-date liquidation losses ^(b)	
	2016	2015	2016	2015
Home equity	\$ 14.4	\$ 14.5	\$ 12.8	\$ 12.7
Prime mortgage	4.0	4.0	3.7	3.7
Subprime mortgage	3.2	3.3	3.1	3.0
Option ARMs	10.0	10.0	9.7	9.5
Total	\$ 31.6	\$ 31.8	\$ 29.3	\$ 28.9

(a) Includes the original nonaccretable difference established in purchase accounting of \$30.5 billion for principal losses plus additional principal losses recognized subsequent to acquisition through the provision and allowance for loan losses. The remaining nonaccretable difference for principal losses was \$1.1 billion and \$1.5 billion at December 31, 2016 and 2015, respectively.

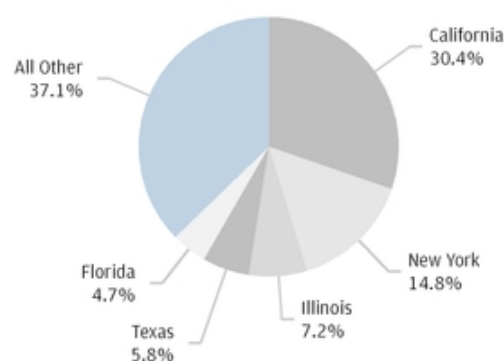
(b) Life-to-date liquidation losses represent both realization of loss upon loan resolution and any principal forgiven upon modification.

For further information on the Firm's PCI loans, including write-offs, see Note 14.

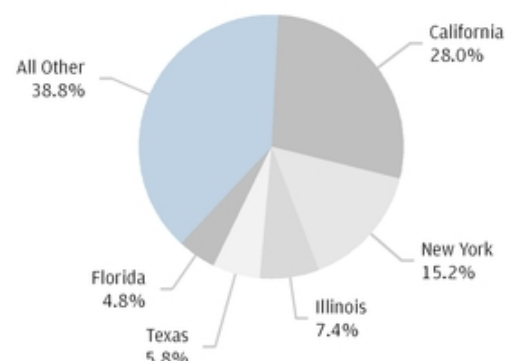
Geographic composition of residential real estate loans

At December 31, 2016, \$139.7 billion, or 63% of total retained residential real estate loan portfolio, excluding mortgage loans insured by U.S. government agencies and PCI loans, were concentrated in California, New York, Illinois, Texas and Florida, compared with \$123.0 billion, or 61%, at December 31, 2015. California had the greatest concentration of retained residential loans with 30% at December 31, 2016, compared with 28% at December 31, 2015. The unpaid principal balance of PCI loans concentrated in California represented 55% of total PCI loans at both December 31, 2016 and 2015. The following charts illustrate the percentages of the total retained residential real estate portfolio held in the top 5 states, excluding mortgage loans insured by U.S. government agencies and PCI loans. For further information on the geographic composition of the Firm's residential real estate loans, see Note 14.

**Top 5 States - Residential real estate, excluding PCI loans
(at December 31, 2016)**



**Top 5 States - Residential real estate, excluding PCI loans
(at December 31, 2015)**



Current estimated loan-to-values of residential real estate loans

The current estimated average loan-to-value (“LTV”) ratio for residential real estate loans retained, excluding mortgage loans insured by U.S. government agencies and PCI loans, was 58% at December 31, 2016 compared with 59% at December 31, 2015.

Although the delinquency rate for loans with high LTV ratios is generally greater than the delinquency rate for loans in which the borrower has greater equity in the collateral, the average LTV ratios have declined consistent with improvements in home prices, reducing the number of loans with a current estimated LTV ratio greater than 100%.

The current estimated average LTV ratio for residential real estate PCI loans, based on the unpaid principal balances, was 64% at December 31, 2016, compared with 69% at December 31, 2015. Of the total PCI portfolio, 4% of the loans had a current estimated LTV ratio greater than 100%, and 1% had a current LTV ratio greater than 125% at December 31, 2016, compared with 6% and 1%, respectively, at December 31, 2015.

While the current estimated collateral value is greater than the net carrying value of PCI loans, the ultimate performance of this portfolio is highly dependent on borrowers’ behavior and ongoing ability and willingness to continue to make payments on homes with negative equity, as well as on the cost of alternative housing.

For further information on current estimated LTVs of residential real estate loans, see Note 14.

Loan modification activities – residential real estate loans

The performance of modified loans generally differs by product type due to differences in both the credit quality and the types of modifications provided. Performance metrics for modifications to the residential real estate portfolio, excluding PCI loans, that have been seasoned more than six months show weighted-average redefault rates of 21% for home equity and 22% for residential mortgages. The cumulative performance metrics for modifications to the PCI residential real estate portfolio that have been seasoned more than six months show weighted average redefault rates of 20% for home equity, 19% for prime mortgages, 16% for option ARMs and 32% for subprime mortgages. The cumulative redefault rates reflect the performance of modifications completed under both the U.S. Government’s Home Affordable Modification Program (“HAMP”) and the Firm’s proprietary modification programs (primarily the Firm’s modification program that was modeled after HAMP) from October 1, 2009, through December 31, 2016.

Certain loans that were modified under HAMP and the Firm’s proprietary modification programs have interest rate reset provisions (“step-rate modifications”). Interest rates on these loans generally began to increase commencing in 2014 by 1% per year, and continue to do so, until the rate reaches a specified cap, typically at a prevailing market interest rate for a fixed-rate loan as of the modification date. At December 31, 2016, the carrying value of non-PCI loans and the unpaid principal balance of PCI loans

modified in active step-rate modifications were \$3 billion and \$9 billion, respectively. The Firm continues to monitor this risk exposure and the impact of these potential interest rate increases is considered in the Firm’s allowance for loan losses.

The following table presents information as of December 31, 2016 and 2015, relating to modified retained residential real estate loans for which concessions have been granted to borrowers experiencing financial difficulty. Modifications of PCI loans continue to be accounted for and reported as PCI loans, and the impact of the modification is incorporated into the Firm’s quarterly assessment of estimated future cash flows. Modifications of consumer loans other than PCI loans are generally accounted for and reported as TDRs. For further information on modifications for the years ended December 31, 2016 and 2015, see Note 14.

Modified residential real estate loans

December 31, (in millions)	2016		2015	
	Retained loans	Nonaccrual retained loans(d)	Retained loans	Nonaccrual retained loans(d)
Modified residential real estate loans, excluding PCI loans(a)(b)				
Home equity	\$ 2,264	\$ 1,116	\$ 2,358	\$ 1,220
Residential mortgage	6,032	1,755	6,690	1,957
Total modified residential real estate loans, excluding PCI loans	\$ 8,296	\$ 2,871	\$ 9,048	\$ 3,177
Modified PCI loans(c)				
Home equity	\$ 2,447	NA	\$ 2,526	NA
Prime mortgage	5,052	NA	5,686	NA
Subprime mortgage	2,951	NA	3,242	NA
Option ARMs	9,295	NA	10,427	NA
Total modified PCI loans	\$ 19,745	NA	\$ 21,881	NA

(a) Amounts represent the carrying value of modified residential real estate loans.

(b) At December 31, 2016 and 2015, \$3.4 billion and \$3.8 billion, respectively, of loans modified subsequent to repurchase from Ginnie Mae in accordance with the standards of the appropriate government agency (i.e., Federal Housing Administration (“FHA”), U.S. Department of Veterans Affairs (“VA”), Rural Housing Service of the U.S. Department of Agriculture (“RHS”)) are not included in the table above. When such loans perform subsequent to modification in accordance with Ginnie Mae guidelines, they are generally sold back into Ginnie Mae loan pools. Modified loans that do not re-perform become subject to foreclosure. For additional information about sales of loans in securitization transactions with Ginnie Mae, see Note 16.

(c) Amounts represent the unpaid principal balance of modified PCI loans.

(d) As of December 31, 2016 and 2015, nonaccrual loans included \$2.3 billion and \$2.5 billion, respectively, of TDRs for which the borrowers were less than 90 days past due. For additional information about loans modified in a TDR that are on nonaccrual status, see Note 14.

Management's discussion and analysis

Nonperforming assets

The following table presents information as of December 31, 2016 and 2015, about consumer, excluding credit card, nonperforming assets.

Nonperforming assets(a)

December 31, (in millions)	2016	2015
Nonaccrual loans(b)		
Residential real estate	\$ 4,145	\$ 4,792
Other consumer	675	621
Total nonaccrual loans	4,820	5,413
Assets acquired in loan satisfactions		
Real estate owned	292	277
Other	57	48
Total assets acquired in loan satisfactions	349	325
Total nonperforming assets	\$ 5,169	\$ 5,738

- (a) At December 31, 2016 and 2015, nonperforming assets excluded: (1) mortgage loans insured by U.S. government agencies of \$5.0 billion and \$6.3 billion, respectively, that are 90 or more days past due; (2) student loans insured by U.S. government agencies under the FFELP of \$263 million and \$290 million, respectively, that are 90 or more days past due; and (3) real estate owned insured by U.S. government agencies of \$142 million and \$343 million, respectively. These amounts have been excluded based upon the government guarantee.
- (b) Excludes PCI loans which are accounted for on a pool basis. Since each pool is accounted for as a single asset with a single composite interest rate and an aggregate expectation of cash flows, the past-due status of the pools, or that of individual loans within the pools, is not meaningful. The Firm is recognizing interest income on each pool of loans as they are all performing.

Nonaccrual loans in the residential real estate portfolio decreased to \$4.1 billion from \$4.8 billion at December 31, 2016, and 2015, respectively, of which 29% and 31% were greater than 150 days past due, respectively. In the aggregate, the unpaid principal balance of residential real estate loans greater than 150 days past due was charged down by approximately 43% and 44% to the estimated net realizable value of the collateral at December 31, 2016 and 2015, respectively.

Active and suspended foreclosure: For information on loans that were in the process of active or suspended foreclosure, see Note 14.

Nonaccrual loans: The following table presents changes in the consumer, excluding credit card, nonaccrual loans for the years ended December 31, 2016 and 2015.

Nonaccrual loans

Year ended December 31, (in millions)	2016	2015
Beginning balance	\$ 5,413	\$ 6,509
Additions	3,858	3,662
Reductions:		
Principal payments and other(a)	1,437	1,668
Charge-offs	843	800
Returned to performing status	1,589	1,725
Foreclosures and other liquidations	582	565
Total reductions	4,451	4,758
Net changes	(593)	(1,096)
Ending balance	\$ 4,820	\$ 5,413

- (a) Other reductions includes loan sales.

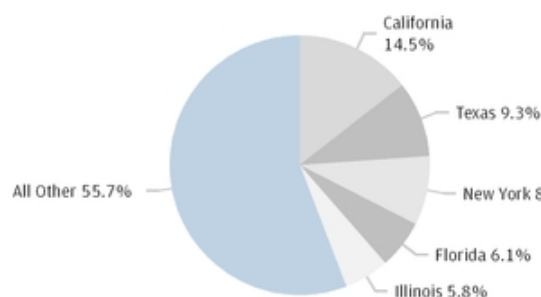
Credit card

Total credit card loans increased from December 31, 2015 due to strong new account growth and higher sales volume. The December 31, 2016 30+ day delinquency rate increased to 1.61% from 1.43% at December 31, 2015. For the years ended December 31, 2016 and 2015, the net charge-off rates were 2.63% and 2.51%, respectively. The credit card portfolio continues to reflect a largely well-seasoned, rewards-based portfolio that has good U.S. geographic diversification. New originations continue to grow as a percentage of the total portfolio, in line with the Firm's credit parameters; these originations have generated higher loss rates, as anticipated, than the more seasoned portion of the portfolio, given the higher mix of near-prime accounts being originated. These near-prime accounts have

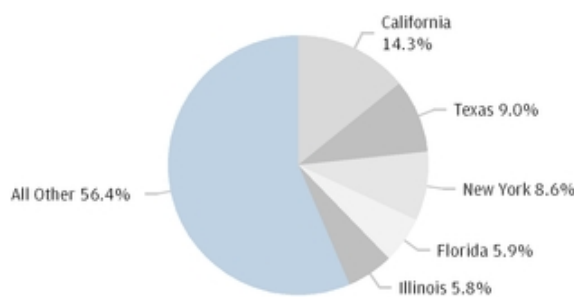
net revenue rates and returns on equity that are higher than the portfolio average.

Loans outstanding in the top five states of California, Texas, New York, Florida and Illinois consisted of \$62.8 billion in receivables, or 44% of the retained loan portfolio, at December 31, 2016, compared with \$57.5 billion, or 44%, at December 31, 2015. The greatest geographic concentration of credit card retained loans is in California, which represented 15% and 14% of total retained loans at December 31, 2016 and 2015, respectively. For further information on the geographic and FICO composition of the Firm's credit card loans, see Note 14.

**Top 5 States Credit Card - Retained
(at December 31, 2016)**



**Top 5 States Credit Card - Retained
(at December 31, 2015)**



Modifications of credit card loans

At December 31, 2016 and 2015, the Firm had \$1.2 billion and \$1.5 billion, respectively, of credit card loans outstanding that have been modified in TDRs. These balances included both credit card loans with modified payment terms and credit card loans that reverted back to their pre-modification payment terms because the cardholder did not comply with the modified payment terms. The decrease in modified credit card loans outstanding from December 31, 2015, was attributable to a reduction in new modifications as well as ongoing payments and charge-offs on previously modified credit card loans.

Consistent with the Firm's policy, all credit card loans typically remain on accrual status until charged off. However, the Firm establishes an allowance, which is offset against loans and charged to interest income, for the estimated uncollectible portion of accrued and billed interest and fee income.

For additional information about loan modification programs to borrowers, see Note 14.

WHOLESALE CREDIT PORTFOLIO

The Firm's wholesale businesses are exposed to credit risk through underwriting, lending, market-making, and hedging activities with and for clients and counterparties, as well as through various operating services such as cash management and clearing activities. A portion of the loans originated or acquired by the Firm's wholesale businesses is generally retained on the balance sheet. The Firm distributes a significant percentage of the loans it originates into the market as part of its syndicated loan business and to manage portfolio concentrations and credit risk.

The wholesale credit portfolio, excluding the Oil & Gas, Natural Gas Pipelines, and Metals & Mining portfolios, continued to be generally stable for the year ended December 31, 2016, characterized by low levels of criticized exposure, nonaccrual loans and charge-offs. See industry discussion on pages 97–101 for further information. Growth in retained loans was predominantly driven within the commercial real estate portfolio in Commercial Banking, and across multiple commercial and industrial industries in Commercial Banking and the Corporate & Investment Bank. Discipline in underwriting across all areas of lending continues to remain a key point of focus. The wholesale portfolio is actively managed, in part by conducting ongoing, in-depth reviews of client credit quality and transaction structure, inclusive of collateral where applicable; and of industry, product and client concentrations.

Wholesale credit portfolio

December 31, (in millions)	Credit exposure		Nonperforming(c)	
	2016	2015	2016	2015
Loans retained	\$ 383,790	\$ 357,050	\$ 1,954	\$ 988
Loans held-for-sale	2,285	1,104	109	3
Loans at fair value	2,230	2,861	—	25
Loans – reported	388,305	361,015	2,063	1,016
Derivative receivables	64,078	59,677	223	204
Receivables from customers and other(a)	17,440	13,372	—	—
Total wholesale credit-related assets	469,823	434,064	2,286	1,220
Lending-related commitments	368,014	366,399	506	193
Total wholesale credit exposure	\$ 837,837	\$ 800,463	\$ 2,792	\$ 1,413
Credit derivatives used in credit portfolio management activities(b)	\$ (22,114)	\$ (20,681)	\$ —	\$ (9)
Liquid securities and other cash collateral held against derivatives	(22,705)	(16,580)	NA	NA

- (a) Receivables from customers and other include \$17.3 billion and \$13.3 billion of margin loans at December 31, 2016 and 2015, respectively, to prime brokerage customers; these are classified in accrued interest and accounts receivable on the Consolidated balance sheets.
- (b) Represents the net notional amount of protection purchased and sold through credit derivatives used to manage both performing and nonperforming wholesale credit exposures; these derivatives do not qualify for hedge accounting under U.S. GAAP. For additional information, see Credit derivatives on pages 103–104, and Note 6.
- (c) Excludes assets acquired in loan satisfactions.

The following tables present the maturity and ratings profiles of the wholesale credit portfolio as of December 31, 2016 and 2015. The ratings scale is based on the Firm's internal risk ratings, which generally correspond to the ratings defined by S&P and Moody's. For additional information on wholesale loan portfolio risk ratings, see Note 14.

Wholesale credit exposure – maturity and ratings profile

December 31, 2016 (in millions, except ratios)	Maturity profile(d)					Ratings profile				Total % of IG
	Due in 1 year or less	Due after 1 year through 5 years	Due after 5 years	Total	Investment- grade	Noninvestment- grade	Total			
					AAA/Aaa to BBB-/Baa3	BB+/Ba1 & below				
Loans retained	\$ 117,238	\$ 167,235	\$ 99,317	\$ 383,790	\$ 289,923	\$ 93,867	\$ 383,790	76%		
Derivative receivables				64,078			64,078			
Less: Liquid securities and other cash collateral held against derivatives				(22,705)			(22,705)			
Total derivative receivables, net of all collateral	14,019	8,510	18,844	41,373	33,081	8,292	41,373	80		
Lending-related commitments	88,399	271,825	7,790	368,014	269,820	98,194	368,014	73		
Subtotal	219,656	447,570	125,951	793,177	592,824	200,353	793,177	75		
Loans held-for-sale and loans at fair value(a)				4,515			4,515			
Receivables from customers and other				17,440			17,440			
Total exposure – net of liquid securities and other cash collateral held against derivatives				\$ 815,132			\$ 815,132			
Credit derivatives used in credit portfolio management activities(b)(c)	\$ (1,354)	\$ (16,537)	\$ (4,223)	\$ (22,114)	\$ (18,710)	\$ (3,404)	\$ (22,114)	85%		

December 31, 2015 (in millions, except ratios)	Maturity profile(d)					Ratings profile			
	Due in 1 year or less	Due after 1 year through 5 years	Due after 5 years	Total	Investment-grade	Noninvestment-grade		Total	Total % of IG
					AAA/Aaa to BBB-/Baa3	BB+/Ba1 & below			
Loans retained	\$ 110,348	\$ 155,902	\$ 90,800	\$ 357,050	\$ 267,736	\$ 89,314	\$ 357,050	75%	
Derivative receivables				59,677			59,677		
Less: Liquid securities and other cash collateral held against derivatives				(16,580)			(16,580)		
Total derivative receivables, net of all collateral	11,399	12,836	18,862	43,097	34,773	8,324	43,097	81	
Lending-related commitments	105,514	251,042	9,843	366,399	267,922	98,477	366,399	73	
Subtotal	227,261	419,780	119,505	766,546	570,431	196,115	766,546	74	
Loans held-for-sale and loans at fair value(a)				3,965			3,965		
Receivables from customers and other				13,372			13,372		
Total exposure – net of liquid securities and other cash collateral held against derivatives				\$ 783,883			\$ 783,883		
Credit derivatives used in credit portfolio management activities (b)(c)	\$ (808)	\$ (14,427)	\$ (5,446)	\$ (20,681)	\$ (17,754)	\$ (2,927)	\$ (20,681)	86%	

(a) Represents loans held-for-sale, primarily related to syndicated loans and loans transferred from the retained portfolio, and loans at fair value.

(b) These derivatives do not qualify for hedge accounting under U.S. GAAP.

(c) The notional amounts are presented on a net basis by underlying reference entity and the ratings profile shown is based on the ratings of the reference entity on which protection has been purchased. Predominantly all of the credit derivatives entered into by the Firm where it has purchased protection for credit portfolio management activities are executed with investment-grade counterparties.

(d) The maturity profile of retained loans, lending-related commitments and derivative receivables is based on remaining contractual maturity. Derivative contracts that are in a receivable position at December 31, 2016, may become a payable prior to maturity based on their cash flow profile or changes in market conditions.

Wholesale credit exposure – industry exposures

The Firm focuses on the management and diversification of its industry exposures, paying particular attention to industries with actual or potential credit concerns. Exposures deemed criticized align with the U.S. banking regulators' definition of criticized exposures, which consist of the special mention, substandard and doubtful

categories. The total criticized component of the portfolio, excluding loans held-for-sale and loans at fair value, was \$19.8 billion at December 31, 2016, compared with \$14.6 billion at December 31, 2015, driven by downgrades, including within the Oil & Gas, Natural Gas Pipelines, and Metals & Mining portfolios.

Management's discussion and analysis

Below are summaries of the Firm's exposures as of December 31, 2016 and 2015. For additional information on industry concentrations, see Note 5.

Wholesale credit exposure – industries^(a)

										Selected metrics								
										Noninvestment-grade								
As of or for the year ended December 31, 2016 (in millions)	Credit exposure(e)		Investment-grade		Noncriticized		Criticized performing		Criticized nonperforming		30 days or more past due and accruing loans	Net charge-offs/(recoveries)	Credit derivative hedges(f)	Liquid securities and other cash collateral held against derivative receivables				
Real Estate	\$	135,041	\$	104,575	\$	29,295	\$	971	\$	200	\$	157	\$	(7)	\$	(54)	\$	(27)
Consumer & Retail		85,435		55,495		28,146		1,554		240		75		24		(424)		(69)
Technology, Media & Telecommunications		62,950		39,756		21,619		1,559		16		9		2		(589)		(30)
Industrials		55,449		36,597		17,690		1,026		136		128		3		(434)		(40)
Healthcare		47,866		37,852		9,092		882		40		86		37		(286)		(246)
Banks & Finance Cos		44,614		35,308		8,892		404		10		21		(2)		(1,336)		(7,319)
Oil & Gas		40,099		18,497		12,138		8,069		1,395		31		222		(1,532)		(18)
Asset Managers		31,886		27,378		4,507		1		—		14		—		—		(5,737)
Utilities		29,622		24,184		4,960		392		86		8		—		(306)		39
State & Municipal Govt(b)		28,263		27,603		624		6		30		107		(1)		(130)		398
Central Govt		20,408		20,123		276		9		—		4		—		(11,691)		(4,183)
Transportation		19,029		12,170		6,362		444		53		9		10		(93)		(188)
Automotive		16,635		9,229		7,204		201		1		7		—		(401)		(14)
Chemicals & Plastics		14,988		10,365		4,451		142		30		3		—		(35)		(3)
Metals & Mining		13,419		5,523		6,744		1,133		19		—		36		(621)		(62)
Insurance		13,151		10,766		2,252		—		133		9		—		(275)		(2,538)
Financial Markets Infrastructure		8,732		7,980		752		—		—		—		—		—		(390)
Securities Firms		3,867		1,543		2,324		—		—		—		—		(273)		(491)
All other(c)		144,428		128,456		15,305		373		294		650		17		(3,634)		(1,787)
Subtotal	\$	815,882	\$	613,400	\$	182,633	\$	17,166	\$	2,683	\$	1,318	\$	341	\$	(22,114)	\$	(22,705)
Loans held-for-sale and loans at fair value		4,515																
Receivables from customers and other		17,440																
Total(d)	\$	837,837																

							Selected metrics				
As of or for the year ended December 31, 2015 (in millions)	Credit exposure(e)	Investment- grade	Noninvestment-grade			30 days or more past due and accruing loans	Net charge-offs/ (recoveries)	Credit derivative hedges(f)	Liquid securities and other cash collateral held against derivative receivables		
			Noncriticized	Criticized performing	Criticized nonperforming						
Real Estate	\$ 116,857	\$ 88,076	\$ 27,087	\$ 1,463	\$ 231	\$ 208	\$ (14)	\$ (54)	\$ (47)		
Consumer & Retail	85,460	53,647	29,659	1,947	207	18	13	(288)	(94)		
Technology, Media & Telecommunications	57,382	29,205	26,925	1,208	44	5	(1)	(806)	(21)		
Industrials	54,386	36,519	16,663	1,164	40	59	8	(386)	(39)		
Healthcare	46,053	37,858	7,755	394	46	129	(7)	(24)	(245)		
Banks & Finance Cos	43,398	35,071	7,654	610	63	17	(5)	(974)	(5,509)		
Oil & Gas	42,077	24,379	13,158	4,263	277	22	13	(530)	(37)		
Asset Managers	23,815	20,214	3,570	31	—	18	—	(6)	(4,453)		
Utilities	30,853	24,983	5,655	168	47	3	—	(190)	(289)		
State & Municipal Govt(b)	29,114	28,307	745	7	55	55	(8)	(146)	(81)		
Central Govt	17,968	17,871	97	—	—	7	—	(9,359)	(2,393)		
Transportation	19,227	13,258	5,801	167	1	15	3	(51)	(243)		
Automotive	13,864	9,182	4,580	101	1	4	(2)	(487)	(1)		
Chemicals & Plastics	15,232	10,910	4,017	274	31	9	—	(17)	—		
Metals & Mining	14,049	6,522	6,434	1,008	85	1	—	(449)	(4)		
Insurance	11,889	9,812	1,958	26	93	23	—	(157)	(1,410)		
Financial Markets Infrastructure	7,973	7,304	669	—	—	—	—	—	(167)		
Securities Firms	4,412	1,505	2,907	—	—	3	—	(102)	(256)		
All other(c)	149,117	130,488	18,095	370	164	1,015	10	(6,655)	(1,291)		
Subtotal	\$ 783,126	\$ 585,111	\$ 183,429	\$ 13,201	\$ 1,385	\$ 1,611	\$ 10	\$ (20,681)	\$ (16,580)		
Loans held-for-sale and loans at fair value	3,965										
Receivables from customers and other	13,372										
Total(d)	\$ 800,463										

- (a) The industry rankings presented in the table as of December 31, 2015, are based on the industry rankings of the corresponding exposures at December 31, 2016, not actual rankings of such exposures at December 31, 2015.
- (b) In addition to the credit risk exposure to states and municipal governments (both U.S. and non-U.S.) at December 31, 2016 and 2015, noted above, the Firm held: \$9.1 billion and \$7.6 billion, respectively, of trading securities; \$31.6 billion and \$33.6 billion, respectively, of AFS securities; and \$14.5 billion and \$12.8 billion, respectively, of HTM securities, issued by U.S. state and municipal governments. For further information, see Note 3 and Note 12.
- (c) All other includes: individuals; SPEs; holding companies; and private education and civic organizations, representing approximately 56%, 36%, 4% and 4%, respectively, at December 31, 2016, and 54%, 37%, 5% and 4%, respectively, at December 31, 2015.
- (d) Excludes cash placed with banks of \$380.2 billion and \$351.0 billion, at December 31, 2016 and 2015, respectively, which is predominantly placed with various central banks, primarily Federal Reserve Banks.
- (e) Credit exposure is net of risk participations and excludes the benefit of credit derivatives used in credit portfolio management activities held against derivative receivables or loans and liquid securities and other cash collateral held against derivative receivables.
- (f) Represents the net notional amounts of protection purchased and sold through credit derivatives used to manage the credit exposures; these derivatives do not qualify for hedge accounting under U.S. GAAP. The All other category includes purchased credit protection on certain credit indices.

Management's discussion and analysis

Presented below is a discussion of certain industries to which the Firm has significant exposures and/or which present actual or potential credit concerns.

Real Estate

Exposure to the Real Estate industry was approximately 16.1% and 14.6% of the Firm's total wholesale exposure as of December 31, 2016 and 2015, respectively. Exposure to this industry increased by \$18.2 billion, or 16%, in 2016 to \$135.0 billion primarily driven by Commercial Banking. The investment-grade percentage of the portfolio increased to 77% in 2016, up from 75% in 2015. As of December 31,

2016, \$106.3 billion of the exposure was drawn, of which 83% was investment-grade, and 83% of the \$135.0 billion exposure was secured. As of December 31, 2016, \$80.1 billion of the \$135.0 billion was multifamily, largely in California; of the \$80.1 billion, 82% was investment-grade and 98% was secured. For further information on commercial real estate loans, see Note 14.

Oil & Gas and Natural Gas Pipelines

The following table presents Oil & Gas and Natural Gas Pipeline exposures as of December 31, 2016, and December 31, 2015.

(in millions, except ratios)	December 31, 2016				
	Loans and Lending-related Commitments	Derivative Receivables	Credit exposure	% Investment-grade	% Drawn
Exploration & Production ("E&P") and Oilfield Services(a)	\$ 20,829	\$ 1,256	\$ 22,085	26%	34%
Other Oil & Gas(b)	17,392	622	18,014	71	30
Total Oil & Gas	38,221	1,878	40,099	46	33
Natural Gas Pipelines(c)	4,253	106	4,359	66	30
Total Oil & Gas and Natural Gas Pipelines	\$ 42,474	\$ 1,984	\$ 44,458	48	32

(in millions, except ratios)	December 31, 2015				
	Loans and Lending-related Commitments	Derivative Receivables	Credit exposure	% Investment-grade	% Drawn
E&P and Oilfield Services(a)	\$ 23,055	\$ 400	\$ 23,455	44%	36%
Other Oil & Gas(b)	17,120	1,502	18,622	76	27
Total Oil & Gas	40,175	1,902	42,077	58	32
Natural Gas Pipelines(c)	4,093	158	4,251	64	21
Total Oil & Gas and Natural Gas Pipelines	\$ 44,268	\$ 2,060	\$ 46,328	59	31

(a) Noninvestment-grade exposure to E&P and Oilfield Services is largely secured.

(b) Other Oil & Gas includes Integrated Oil & Gas companies, Midstream/Oil Pipeline companies and refineries.

(c) Natural Gas Pipelines is reported within the Utilities Industry.

Exposure to the Oil & Gas and Natural Gas Pipelines portfolios was approximately 5.3% and 5.8% of the Firm's total wholesale exposure as of December 31, 2016 and 2015, respectively. Exposure to these industries decreased by \$1.9 billion in 2016 to \$44.5 billion; of the \$44.5 billion, \$14.4 billion was drawn at year-end. As of December 31, 2016, approximately \$21.4 billion of the exposure was investment-grade, of which approximately \$5.3 billion was drawn, and approximately \$23.1 billion of the exposure was noninvestment grade, of which approximately \$9.0 billion was drawn; 21% of the total exposure to the Oil & Gas and Natural Gas Pipelines industries was criticized. Secured lending, of which approximately half is reserve-based lending to the Exploration & Production sub-sector of the Oil & Gas industry, was \$14.3 billion as of December 31, 2016; 44% of the secured lending exposure was drawn. Exposure to commercial real estate, which is reported within the Real Estate industry, in certain areas of Texas, California and Colorado that are deemed sensitive to the Oil & Gas industry, was \$4.5 billion as of December 31, 2016. While the overall trends and sentiment have been stabilizing, the Firm continues to actively monitor and manage its exposure to these portfolios.

Metals & Mining

Exposure to the Metals & Mining industry was approximately 1.6% and 1.8% of the Firm's total wholesale exposure as of December 31, 2016 and 2015, respectively. Exposure to the Metals & Mining industry decreased by \$630 million in 2016 to \$13.4 billion, of which \$4.4 billion was drawn. The portfolio largely consisted of exposure in North America, and was concentrated in the Steel and Diversified Mining sub-sectors. Approximately 41% and 46% of the exposure in the Metals & Mining portfolio was investment-grade as of December 31, 2016 and December 31, 2015, respectively. While the overall trends and sentiment have been stabilizing, the Firm continues to actively monitor and manage its exposure to this industry.

Loans

In the normal course of its wholesale business, the Firm provides loans to a variety of customers, ranging from large corporate and institutional clients to high-net-worth individuals. For further discussion on loans, including information on credit quality indicators and sales of loans, see Note 14.

The following table presents the change in the nonaccrual loan portfolio for the years ended December 31, 2016 and 2015. Wholesale nonaccrual loans increased primarily driven by downgrades in the Oil & Gas portfolio.

Wholesale nonaccrual loan activity^(a)

Year ended December 31, (in millions)	2016	2015
Beginning balance	\$ 1,016	\$ 624
Additions	2,981	1,307
Reductions:		
Paydowns and other	1,148	534
Gross charge-offs	385	87
Returned to performing status	242	286
Sales	159	8
Total reductions	1,934	915
Net changes	1,047	392
Ending balance	\$ 2,063	\$ 1,016

(a) Loans are placed on nonaccrual status when management believes full payment of principal or interest is not expected, regardless of delinquency status, or when principal or interest have been in default for a period of 90 days or more unless the loan is both well-secured and in the process of collection.

The following table presents net charge-offs/recoveries, which are defined as gross charge-offs less recoveries, for the years ended December 31, 2016 and 2015. The amounts in the table below do not include gains or losses from sales of nonaccrual loans.

Wholesale net charge-offs/(recoveries)

Year ended December 31, (in millions, except ratios)	2016	2015
Loans – reported		
Average loans retained	\$ 371,778	\$ 337,407
Gross charge-offs	398	95
Gross recoveries	(57)	(85)
Net charge-offs	341	10
Net charge-off rate	0.09%	—%

Lending-related commitments

The Firm uses lending-related financial instruments, such as commitments (including revolving credit facilities) and guarantees, to meet the financing needs of its customers. The contractual amounts of these financial instruments represent the maximum possible credit risk should the counterparties draw down on these commitments or the Firm fulfill its obligations under these guarantees, and the counterparties subsequently fail to perform according to the terms of these contracts.

In the Firm's view, the total contractual amount of these wholesale lending-related commitments is not representative of the Firm's future credit exposure or funding requirements. In determining the amount of credit risk exposure the Firm has to wholesale lending-related commitments, the Firm has estimated a loan-equivalent amount for each commitment. The loan-equivalent amount of the Firm's lending-related commitments was \$204.6 billion and \$212.4 billion as of December 31, 2016 and 2015, respectively.

Clearing services

The Firm provides clearing services for clients entering into securities and derivative transactions. Through the provision of these services the Firm is exposed to the risk of non-performance by its clients and may be required to share in losses incurred by central counterparties. Where possible, the Firm seeks to mitigate its credit risk to its clients through the collection of adequate margin at inception and throughout the life of the transactions and can also cease provision of clearing services if clients do not adhere to their obligations under the clearing agreement. For further discussion of clearing services, see Note 29.

Management's discussion and analysis

Derivative contracts

In the normal course of business, the Firm uses derivative instruments predominantly for market-making activities. Derivatives enable customers to manage exposures to fluctuations in interest rates, currencies and other markets. The Firm also uses derivative instruments to manage its own credit and other market risk exposure. The nature of the counterparty and the settlement mechanism of the derivative affect the credit risk to which the Firm is exposed. For OTC derivatives the Firm is exposed to the credit risk of the derivative counterparty. For exchange-traded derivatives ("ETD"), such as futures and options and "cleared" over-the-counter ("OTC-cleared") derivatives, the Firm is generally exposed to the credit risk of the relevant CCP. Where possible, the Firm seeks to mitigate its credit risk exposures arising from derivative transactions through the use of legally enforceable master netting arrangements and collateral agreements. For further discussion of derivative contracts, counterparties and settlement types, see Note 6.

The following table summarizes the net derivative receivables for the periods presented.

Derivative receivables

December 31, (in millions)	2016	2015
Interest rate	\$ 28,302	\$ 26,363
Credit derivatives	1,294	1,423
Foreign exchange	23,271	17,177
Equity	4,939	5,529
Commodity	6,272	9,185
Total, net of cash collateral	64,078	59,677
Liquid securities and other cash collateral held against derivative receivables(a)	(22,705)	(16,580)
Total, net of all collateral	\$ 41,373	\$ 43,097

(a) Includes collateral related to derivative instruments where an appropriate legal opinion has not been either sought or obtained.

Derivative receivables reported on the Consolidated balance sheets were \$64.1 billion and \$59.7 billion at December 31, 2016 and 2015, respectively. These amounts represent the fair value of the derivative contracts after giving effect to legally enforceable master netting agreements and cash collateral held by the Firm. However, in management's view, the appropriate measure of current credit risk should also take into consideration additional liquid securities (primarily U.S. government and agency securities and other group of seven nations ("G7") government bonds) and other cash collateral held by the Firm aggregating \$22.7 billion and \$16.6 billion at December 31, 2016 and 2015, respectively, that may be used as security when the fair value of the client's exposure is in the Firm's favor. The change in derivative receivables was predominantly related to client-driven market-making activities in CIB. The increase in derivative receivables reflected the impact of market movements, which increased foreign exchange receivables, partially offset by reduced commodity derivative receivables.

In addition to the collateral described in the preceding paragraph, the Firm also holds additional collateral (primarily cash, G7 government securities, other liquid government-agency and guaranteed securities, and corporate debt and equity securities) delivered by clients at the initiation of transactions, as well as collateral related to contracts that have a non-daily call frequency and collateral that the Firm has agreed to return but has not yet settled as of the reporting date. Although this collateral does not reduce the balances and is not included in the table above, it is available as security against potential exposure that could arise should the fair value of the client's derivative transactions move in the Firm's favor. The derivative receivables fair value, net of all collateral, also does not include other credit enhancements, such as letters of credit. For additional information on the Firm's use of collateral agreements, see Note 6.

While useful as a current view of credit exposure, the net fair value of the derivative receivables does not capture the potential future variability of that credit exposure. To capture the potential future variability of credit exposure, the Firm calculates, on a client-by-client basis, three measures of potential derivatives-related credit loss: Peak, Derivative Risk Equivalent ("DRE"), and Average exposure ("AVG"). These measures all incorporate netting and collateral benefits, where applicable.

Peak represents a conservative measure of potential exposure to a counterparty calculated in a manner that is broadly equivalent to a 97.5% confidence level over the life of the transaction. Peak is the primary measure used by the Firm for setting of credit limits for derivative transactions, senior management reporting and derivatives exposure management. DRE exposure is a measure that expresses the risk of derivative exposure on a basis intended to be equivalent to the risk of loan exposures. DRE is a less extreme measure of potential credit loss than Peak and is used for aggregating derivative credit risk exposures with loans and other credit risk.

Finally, AVG is a measure of the expected fair value of the Firm's derivative receivables at future time periods, including the benefit of collateral. AVG exposure over the total life of the derivative contract is used as the primary metric for pricing purposes and is used to calculate credit capital and the CVA, as further described below. The three year AVG exposure was \$31.1 billion and \$32.4 billion at December 31, 2016 and 2015, respectively, compared with derivative receivables, net of all collateral, of \$41.4 billion and \$43.1 billion at December 31, 2016 and 2015, respectively.

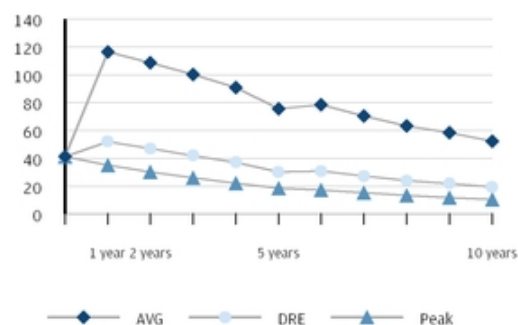
The fair value of the Firm's derivative receivables incorporates an adjustment, the CVA, to reflect the credit quality of counterparties. The CVA is based on the Firm's AVG to a counterparty and the counterparty's credit spread in the credit derivatives market. The primary components of changes in CVA are credit spreads, new deal activity or unwinds, and changes in the underlying market environment. The Firm believes that active risk management is essential to controlling the dynamic credit

risk in the derivatives portfolio. In addition, the Firm's risk management process takes into consideration the potential impact of wrong-way risk, which is broadly defined as the potential for increased correlation between the Firm's exposure to a counterparty (AVG) and the counterparty's credit quality. Many factors may influence the nature and magnitude of these correlations over time. To the extent that these correlations are identified, the Firm may adjust the CVA associated with that counterparty's AVG. The Firm risk manages exposure to changes in CVA by entering into credit derivative transactions, as well as interest rate, foreign exchange, equity and commodity derivative transactions.

The accompanying graph shows exposure profiles to the Firm's current derivatives portfolio over the next 10 years as calculated by the Peak, DRE and AVG metrics. The three measures generally show that exposure will decline after the first year, if no new trades are added to the portfolio.

Exposure profile of derivatives measures

December 31, 2016



(in billions)

The following table summarizes the ratings profile by derivative counterparty of the Firm's derivative receivables, including credit derivatives, net of all collateral, at the dates indicated. The ratings scale is based on the Firm's internal ratings, which generally correspond to the ratings as defined by S&P and Moody's.

Ratings profile of derivative receivables

Rating equivalent December 31, (in millions, except ratios)	2016		2015(a)	
	Exposure net of all collateral	% of exposure net of all collateral	Exposure net of all collateral	% of exposure net of all collateral
AAA/Aaa to AA-/Aa3	\$ 11,449	28%	\$ 10,371	24%
A+/A1 to A-/A3	8,505	20	10,595	25
BBB+/Baa1 to BBB-/Baa3	13,127	32	13,807	32
BB+/Ba1 to B-/B3	7,308	18	7,500	17
CCC+/Caa1 and below	984	2	824	2
Total	\$ 41,373	100%	\$ 43,097	100%

(a) Prior period amounts have been revised to conform with the current period presentation.

As previously noted, the Firm uses collateral agreements to mitigate counterparty credit risk. The percentage of the Firm's derivatives transactions subject to collateral agreements — excluding foreign exchange spot trades, which are not typically covered by collateral agreements due to their short maturity — was 90% as of December 31, 2016, largely unchanged compared with 87% as of December 31, 2015.

Credit derivatives

The Firm uses credit derivatives for two primary purposes: first, in its capacity as a market-maker, and second, as an end-user to manage the Firm's own credit risk associated with various exposures. For a detailed description of credit derivatives, see Credit derivatives in Note 6.

Credit portfolio management activities

Included in the Firm's end-user activities are credit derivatives used to mitigate the credit risk associated with traditional lending activities (loans and unfunded commitments) and derivatives counterparty exposure in the Firm's wholesale businesses (collectively, "credit portfolio management" activities). Information on credit portfolio management activities is provided in the table below. For further information on derivatives used in credit portfolio management activities, see Credit derivatives in Note 6.

The Firm also uses credit derivatives as an end-user to manage other exposures, including credit risk arising from certain securities held in the Firm's market-making businesses. These credit derivatives are not included in credit portfolio management activities; for further information on these credit derivatives as well as credit derivatives used in the Firm's capacity as a market-maker in credit derivatives, see Credit derivatives in Note 6.

Management's discussion and analysis

Credit derivatives used in credit portfolio management activities

December 31, (in millions)	Notional amount of protection purchased (a)	
	2016	2015
Credit derivatives used to manage:		
Loans and lending-related commitments	\$ 2,430	\$ 2,289
Derivative receivables	19,684	18,392
Credit derivatives used in credit portfolio management activities	\$ 22,114	\$ 20,681

(a) Amounts are presented net, considering the Firm's net protection purchased or sold with respect to each underlying reference entity or index.

The credit derivatives used in credit portfolio management activities do not qualify for hedge accounting under U.S. GAAP; these derivatives are reported at fair value, with gains and losses recognized in principal transactions revenue. In contrast, the loans and lending-related commitments being risk-managed are accounted for on an accrual basis. This asymmetry in accounting treatment,

between loans and lending-related commitments and the credit derivatives used in credit portfolio management activities, causes earnings volatility that is not representative, in the Firm's view, of the true changes in value of the Firm's overall credit exposure.

The effectiveness of credit default swaps ("CDS") as a hedge against the Firm's exposures may vary depending on a number of factors, including the named reference entity (i.e., the Firm may experience losses on specific exposures that are different than the named reference entities in the purchased CDS); the contractual terms of the CDS (which may have a defined credit event that does not align with an actual loss realized by the Firm); and the maturity of the Firm's CDS protection (which in some cases may be shorter than the Firm's exposures). However, the Firm generally seeks to purchase credit protection with a maturity date that is the same or similar to the maturity date of the exposure for which the protection was purchased, and remaining differences in maturity are actively monitored and managed by the Firm.

ALLOWANCE FOR CREDIT LOSSES

JPMorgan Chase's allowance for loan losses covers both the consumer (primarily scored) portfolio and wholesale (risk-rated) portfolio. The allowance represents management's estimate of probable credit losses inherent in the Firm's loan portfolio. Management also determines an allowance for wholesale and certain consumer lending-related commitments.

For a further discussion of the components of the allowance for credit losses and related management judgments, see Critical Accounting Estimates Used by the Firm on pages 132–134 and Note 15.

At least quarterly, the allowance for credit losses is reviewed by the CRO, the CFO and the Controller of the Firm, and discussed with the DRPC and the Audit Committee. As of December 31, 2016, JPMorgan Chase deemed the allowance for credit losses to be appropriate and sufficient to absorb probable credit losses inherent in the portfolio.

The consumer allowance for loan losses remained relatively unchanged from December 31, 2015. Changes to the allowance for loan losses included reductions in the residential real estate portfolio, reflecting continued improvements in home prices and lower delinquencies, as well as runoff in the student loan portfolio. These reductions were offset by increases in the allowance for loan losses reflecting loan growth in the credit card portfolio (including newer vintages which, as anticipated, have higher loss rates compared to the overall portfolio), as well as loan growth in the auto and business banking loan portfolios. For additional information about delinquencies and nonaccrual loans in the consumer, excluding credit card, loan portfolio, see Consumer Credit Portfolio on pages 89–95 and Note 14.

The wholesale allowance for credit losses increased from December 31, 2015, reflecting the impact of downgrades in the Oil & Gas and Natural Gas Pipelines portfolios. For additional information on the wholesale portfolio, see Wholesale Credit Portfolio on pages 96–104 and Note 14.

Management's discussion and analysis

Summary of changes in the allowance for credit losses

Year ended December 31, (in millions, except ratios)	2016				2015			
	Consumer, excluding credit card	Credit card	Wholesale	Total	Consumer, excluding credit card	Credit card	Wholesale	Total
Allowance for loan losses								
Beginning balance at January 1,	\$ 5,806	\$ 3,434	\$ 4,315	\$ 13,555	\$ 7,050	\$ 3,439	\$ 3,696	\$ 14,185
Gross charge-offs	1,500	3,799	398	5,697	1,658	3,488	95	5,241
Gross recoveries	(591)	(357)	(57)	(1,005)	(704)	(366)	(85)	(1,155)
Net charge-offs	909	3,442	341	4,692	954	3,122	10	4,086
Write-offs of PCI loans ^(a)	156	—	—	156	208	—	—	208
Provision for loan losses	467	4,042	571	5,080	(82)	3,122	623	3,663
Other	(10)	—	(1)	(11)	—	(5)	6	1
Ending balance at December 31,	\$ 5,198	\$ 4,034	\$ 4,544	\$ 13,776	\$ 5,806	\$ 3,434	\$ 4,315	\$ 13,555
Impairment methodology								
Asset-specific ^(b)	\$ 308	\$ 358	\$ 342	\$ 1,008	\$ 364	\$ 460	\$ 274	\$ 1,098
Formula-based	2,579	3,676	4,202	10,457	2,700	2,974	4,041	9,715
PCI	2,311	—	—	2,311	2,742	—	—	2,742
Total allowance for loan losses	\$ 5,198	\$ 4,034	\$ 4,544	\$ 13,776	\$ 5,806	\$ 3,434	\$ 4,315	\$ 13,555
Allowance for lending-related commitments								
Beginning balance at January 1,	\$ 14	\$ —	\$ 772	\$ 786	\$ 13	\$ —	\$ 609	\$ 622
Provision for lending-related commitments	—	—	281	281	1	—	163	164
Other	12	—	(1)	11	—	—	—	—
Ending balance at December 31,	\$ 26	\$ —	\$ 1,052	\$ 1,078	\$ 14	\$ —	\$ 772	\$ 786
Impairment methodology								
Asset-specific	\$ —	\$ —	\$ 169	\$ 169	\$ —	\$ —	\$ 73	\$ 73
Formula-based	26	—	883	909	14	—	699	713
Total allowance for lending-related commitments^(c)	\$ 26	\$ —	\$ 1,052	\$ 1,078	\$ 14	\$ —	\$ 772	\$ 786
Total allowance for credit losses	\$ 5,224	\$ 4,034	\$ 5,596	\$ 14,854	\$ 5,820	\$ 3,434	\$ 5,087	\$ 14,341
Memo:								
Retained loans, end of period	\$ 364,406	\$ 141,711	\$ 383,790	\$ 889,907	\$ 344,355	\$ 131,387	\$ 357,050	\$ 832,792
Retained loans, average	358,486	131,081	371,778	861,345	318,612	124,274	337,407	780,293
PCI loans, end of period	35,679	—	3	35,682	40,998	—	4	41,002
Credit ratios								
Allowance for loan losses to retained loans	1.43%	2.85%	1.18%	1.55%	1.69%	2.61%	1.21%	1.63%
Allowance for loan losses to retained nonaccrual loans ^(d)	109	NM	233	205	109	NM	437	215
Allowance for loan losses to retained nonaccrual loans excluding credit card	109	NM	233	145	109	NM	437	161
Net charge-off rates	0.25	2.63	0.09	0.54	0.30	2.51	—	0.52
Credit ratios, excluding residential real estate PCI loans								
Allowance for loan losses to retained loans	0.88	2.85	1.18	1.34	1.01	2.61	1.21	1.37
Allowance for loan losses to retained nonaccrual loans ^(d)	61	NM	233	171	58	NM	437	172
Allowance for loan losses to retained nonaccrual loans excluding credit card	61	NM	233	111	58	NM	437	117
Net charge-off rates	0.28%	2.63%	0.09%	0.57%	0.35%	2.51%	—%	0.55%

Note: In the table above, the financial measures which exclude the impact of PCI loans are non-GAAP financial measures.

- (a) Write-offs of PCI loans are recorded against the allowance for loan losses when actual losses for a pool exceed estimated losses that were recorded as purchase accounting adjustments at the time of acquisition. A write-off of a PCI loan is recognized when the underlying loan is removed from a pool (e.g., upon liquidation).
- (b) Includes risk-rated loans that have been placed on nonaccrual status and loans that have been modified in a TDR. The asset-specific credit card allowance for loan losses modified in a TDR is calculated based on the loans' original contractual interest rates and does not consider any incremental penalty rates.
- (c) The allowance for lending-related commitments is reported in accounts payable and other liabilities on the Consolidated balance sheets.
- (d) The Firm's policy is generally to exempt credit card loans from being placed on nonaccrual status as permitted by regulatory guidance.

Provision for credit losses

For the year ended December 31, 2016, the provision for credit losses was \$5.4 billion, compared with \$3.8 billion for the year ended December 31, 2015.

The total consumer provision for credit losses increased for the year ended December 31, 2016 when compared with the prior year. The increase in the provision was driven by:

- a \$920 million increase related to the credit card portfolio, due to a \$600 million addition in the allowance for loan losses, as well as \$320 million of higher net charge-offs, driven by loan growth, including growth in newer vintages which, as anticipated, have higher loss rates compared to the overall portfolio,
- a \$450 million lower benefit related to the residential real estate portfolio, as the current year reduction in the

allowance for loan losses was lower than the prior year. The reduction in both periods reflected continued improvements in home prices and lower delinquencies and

- a \$150 million increase related to the auto and business banking portfolio, due to additions to the allowance for loan losses and higher net charge-offs, reflecting loan growth in the portfolios.

The wholesale provision for credit losses increased for the year ended December 31, 2016 reflecting the impact of downgrades in the Oil & Gas and Natural Gas Pipelines portfolios.

Year ended December 31, (in millions)	Provision for loan losses			Provision for lending-related commitments			Total provision for credit losses		
	2016	2015	2014	2016	2015	2014	2016	2015	2014
Consumer, excluding credit card	\$ 467	\$ (82)	\$ 414	\$ —	\$ 1	\$ 5	\$ 467	\$ (81)	\$ 419
Credit card	4,042	3,122	3,079	—	—	—	4,042	3,122	3,079
Total consumer	4,509	3,040	3,493	—	1	5	4,509	3,041	3,498
Wholesale	571	623	(269)	281	163	(90)	852	786	(359)
Total	\$ 5,080	\$ 3,663	\$ 3,224	\$ 281	\$ 164	\$ (85)	\$ 5,361	\$ 3,827	\$ 3,139

COUNTRY RISK MANAGEMENT

Country risk is the risk that a sovereign event or action alters the value or terms of contractual obligations of obligors, counterparties and issuers or adversely affects markets related to a particular country. The Firm has a comprehensive country risk management framework for assessing country risks, determining risk tolerance, and measuring and monitoring direct country exposures in the Firm. The Country Risk Management group is responsible for developing guidelines and policies for managing country risk in both emerging and developed countries. The Country Risk Management group actively monitors the various portfolios giving rise to country risk to ensure the Firm's country risk exposures are diversified and that exposure levels are appropriate given the Firm's strategy and risk tolerance relative to a country.

Country risk organization

The Country Risk Management group, part of the independent risk management function, works in close partnership with other risk functions to assess and monitor country risk within the Firm. The Firmwide Risk Executive for Country Risk reports to the Firm's CRO.

Country Risk Management is responsible for the following functions:

- Developing guidelines and policies consistent with a comprehensive country risk framework
- Assigning sovereign ratings and assessing country risks
- Measuring and monitoring country risk exposure and stress across the Firm
- Managing country limits and reporting trends and limit breaches to senior management
- Developing surveillance tools for early identification of potential country risk concerns
- Providing country risk scenario analysis

Country risk identification and measurement

The Firm is exposed to country risk through its lending and deposits, investing, and market-making activities, whether cross-border or locally funded. Country exposure includes activity with both government and private-sector entities in a country. Under the Firm's internal country risk management approach, country exposure is reported based on the country where the majority of the assets of the obligor, counterparty, issuer or guarantor are located or where the majority of its revenue is derived, which may be different than the domicile (legal residence) or country of incorporation of the obligor, counterparty, issuer or guarantor. Country exposures are generally measured by considering the Firm's risk to an immediate default of the counterparty or obligor, with zero recovery. Assumptions are sometimes required in determining the measurement and allocation of country exposure, particularly in the case of certain tranching credit derivatives. Different measurement approaches or assumptions would affect the amount of reported country exposure.

Under the Firm's internal country risk measurement framework:

- Lending exposures are measured at the total committed amount (funded and unfunded), net of the allowance for credit losses and cash and marketable securities collateral received
- Deposits are measured as the cash balances placed with central and commercial banks
- Securities financing exposures are measured at their receivable balance, net of collateral received
- Debt and equity securities are measured at the fair value of all positions, including both long and short positions
- Counterparty exposure on derivative receivables is measured at the derivative's fair value, net of the fair value of the related collateral. Counterparty exposure on derivatives can change significantly because of market movements
- Credit derivatives protection purchased and sold is reported based on the underlying reference entity and is measured at the notional amount of protection purchased or sold, net of the fair value of the recognized derivative receivable or payable. Credit derivatives protection purchased and sold in the Firm's market-making activities is measured on a net basis, as such activities often result in selling and purchasing protection related to the same underlying reference entity; this reflects the manner in which the Firm manages these exposures

Some activities may create contingent or indirect exposure related to a country (for example, providing clearing services or secondary exposure to collateral on securities financing receivables). These exposures are managed in the normal course of business through the Firm's credit, market, and operational risk governance, rather than through Country Risk Management.

The Firm's internal country risk reporting differs from the reporting provided under the FFIEC bank regulatory requirements. For further information on the FFIEC's reporting methodology, see Cross-border outstandings on page 292.

Country risk stress testing

The country risk stress framework aims to estimate losses arising from a country crisis by capturing the impact of large asset price movements in a country based on market shocks combined with counterparty specific assumptions. Country Risk Management periodically defines and runs ad hoc stress scenarios for individual countries in response to specific market events and sector performance concerns.

Country risk monitoring and control

The Country Risk Management group establishes guidelines for sovereign ratings reviews and limit management. Country stress and nominal exposures are measured under a comprehensive country limit framework. Country ratings and limits are actively monitored and reported on a regular basis. Country limit requirements are reviewed and approved by senior management as often as necessary, but at least annually. In addition, the Country Risk Management group uses surveillance tools, such as signaling models and ratings indicators, for early identification of potential country risk concerns.

Country risk reporting

The following table presents the Firm's top 20 exposures by country (excluding the U.S.) as of December 31, 2016. The selection of countries is based solely on the Firm's largest total exposures by country, based on the Firm's internal country risk management approach, and does not represent the Firm's view of any actual or potentially adverse credit conditions. Country exposures may fluctuate from period to period due to client activity and market flows.

The increase in exposure to Germany, Japan and Luxembourg since December 31, 2015 largely reflects higher Euro and Yen balances, predominantly placed on deposit at the central banks of these countries, driven by changing client positions and prevailing market and liquidity conditions.

Top 20 country exposures

(in billions)	December 31, 2016			
	Lending and deposits(a)	Trading and investing(b)(c)	Other(d)	Total exposure
Germany	\$ 46.9	\$ 15.2	\$ —	\$ 62.1
United Kingdom	25.0	15.8	0.6	41.4
Japan	33.9	4.0	0.1	38.0
France	13.0	12.0	0.2	25.2
China	9.8	6.5	0.8	17.1
Canada	10.9	2.6	0.1	13.6
Australia	6.8	5.6	—	12.4
Netherlands	6.3	3.1	1.1	10.5
Luxembourg	10.0	0.2	—	10.2
Brazil	5.0	5.0	—	10.0
Switzerland	7.5	0.6	1.6	9.7
India	3.8	4.5	0.4	8.7
Italy	3.3	3.7	—	7.0
Korea	3.9	2.3	0.8	7.0
Hong Kong	2.1	1.4	1.9	5.4
Singapore	2.5	1.3	1.2	5.0
Mexico	3.1	1.4	—	4.5
Saudi Arabia	3.5	0.8	—	4.3
United Arab Emirates	3.2	1.1	—	4.3
Ireland	1.6	0.3	2.3	4.2

(a) Lending and deposits includes loans and accrued interest receivable (net of collateral and the allowance for loan losses), deposits with banks (including central banks), acceptances, other monetary assets, issued letters of credit net of participations, and unused commitments to extend credit. Excludes intra-day and operating exposures, such as from settlement and clearing activities.

(b) Includes market-making inventory, AFS securities, counterparty exposure on derivative and securities financings net of collateral and hedging.

(c) Includes single reference entity ("single-name"), index and tranch credit derivatives for which one or more of the underlying reference entities is in a country listed in the above table.

(d) Includes capital invested in local entities and physical commodity inventory.

LIQUIDITY RISK MANAGEMENT

Liquidity risk is the risk that the Firm will be unable to meet its contractual and contingent obligations or that it does not have the appropriate amount, composition and tenor of funding and liquidity to support its assets and liabilities.

Liquidity risk oversight

The Firm has a liquidity risk oversight function whose primary objective is to provide assessment, measurement, monitoring, and control of liquidity risk across the Firm. Liquidity risk oversight is managed through a dedicated firmwide Liquidity Risk Oversight group. The CIO, Treasury and Corporate ("CTC") CRO, who reports to the CRO, as part of the independent risk management function, has responsibility for firmwide Liquidity Risk Oversight. Liquidity Risk Oversight's responsibilities include but are not limited to:

- Establishing and monitoring limits, indicators, and thresholds, including liquidity appetite tolerances;
- Defining, monitoring, and reporting internal firmwide and material legal entity liquidity stress tests, and monitoring and reporting regulatory defined liquidity stress testing;
- Monitoring and reporting liquidity positions, balance sheet variances and funding activities;
- Conducting ad hoc analysis to identify potential emerging liquidity risks.

Risk governance and measurement

Specific committees responsible for liquidity governance include firmwide ALCO as well as line of business and regional ALCOs, and the CTC Risk Committee. In addition, the DRPC reviews and recommends to the Board of Directors, for formal approval, the Firm's liquidity risk tolerances, liquidity strategy, and liquidity policy at least annually. For further discussion of ALCO and other risk-related committees, see Enterprise-wide Risk Management on pages 71–75.

Internal Stress testing

Liquidity stress tests are intended to ensure the Firm has sufficient liquidity under a variety of adverse scenarios, including scenarios analyzed as part of the Firm's resolution and recovery planning. Stress scenarios are produced for JPMorgan Chase & Co. ("Parent Company") and the Firm's material legal entities on a regular basis and ad hoc stress tests are performed, as needed, in response to specific market events or concerns. Liquidity stress tests assume all of the Firm's contractual obligations are met and take into consideration varying levels of access to unsecured and secured funding markets, estimated non-contractual and contingent outflows and potential impediments to the availability and transferability of liquidity between jurisdictions and material legal entities such as regulatory, legal or other restrictions. Liquidity outflow assumptions are modeled across a range of time horizons and contemplate both market and idiosyncratic stress.

Results of stress tests are considered in the formulation of the Firm's funding plan and assessment of its liquidity position. The Parent Company acts as a source of funding for the Firm through stock and long-term debt issuances, and the IHC provides funding support to the ongoing operations of the Parent Company and its subsidiaries, as necessary. The Firm maintains liquidity at the Parent Company and the IHC, in addition to liquidity held at the operating subsidiaries, at levels sufficient to comply with liquidity risk tolerances and minimum liquidity requirements, to manage through periods of stress where access to normal funding sources is disrupted.

Liquidity management

Treasury and CIO is responsible for liquidity management. The primary objectives of effective liquidity management are to ensure that the Firm's core businesses and material legal entities are able to operate in support of client needs, meet contractual and contingent obligations through normal economic cycles as well as during stress events, and to manage an optimal funding mix, and availability of liquidity sources. The Firm manages liquidity and funding using a centralized, global approach across its entities, taking into consideration both their current liquidity profile and any potential changes over time, in order to optimize liquidity sources and uses.

In the context of the Firm's liquidity management, Treasury and CIO is responsible for:

- Analyzing and understanding the liquidity characteristics of the Firm, lines of business and legal entities' assets and liabilities, taking into account legal, regulatory, and operational restrictions;
- Defining and monitoring firmwide and legal entity-specific liquidity strategies, policies, guidelines, and contingency funding plans;
- Managing liquidity within approved liquidity risk appetite tolerances and limits;
- Setting transfer pricing in accordance with underlying liquidity characteristics of balance sheet assets and liabilities as well as certain off-balance sheet items.

Contingency funding plan

The Firm's contingency funding plan ("CFP"), which is reviewed by ALCO and approved by the DRPC, is a compilation of procedures and action plans for managing liquidity through stress events. The CFP incorporates the limits and indicators set by the Liquidity Risk Oversight group. These limits and indicators are reviewed regularly to identify the emergence of risks or vulnerabilities in the Firm's liquidity position. The CFP identifies the alternative contingent liquidity resources available to the Firm in a stress event.

LCR and NSFR

The U.S. LCR rule requires the Firm to measure the amount of HQLA held by the Firm in relation to estimated net cash outflows within a 30-day period during an acute stress event. The LCR was required to be 90% at January 1, 2016, increased to a minimum of 100% commencing January 1, 2017. At December 31, 2016, the Firm was compliant with the Fully Phased-In U.S. LCR.

On December 19, 2016 the Federal Reserve published final U.S. LCR public disclosure requirements for certain bank holding companies and nonbank financial companies. Starting with the second quarter of 2017, the Firm will be required to disclose quarterly its consolidated LCR pursuant to the U.S. LCR rule, including the Firm's average LCR for the quarter and the key quantitative components of the average LCR in a standardized template, along with a qualitative discussion of material drivers of the ratio, changes over time, and causes of such changes.

The Basel Committee final standard for the net stable funding ratio ("Basel NSFR") is intended to measure the adequacy of "available" and "required" amounts of stable funding over a one-year horizon. Basel NSFR will become a minimum standard by January 1, 2018 and requires that this ratio be equal to at least 100% on an ongoing basis.

On April 26, 2016, the U.S. NSFR proposal was released for large banks and bank holding companies and was largely consistent with Basel NSFR. The proposed requirement would apply beginning on January 1, 2018, consistent with the Basel NSFR timeline.

The Firm estimates it was compliant with the proposed U.S. NSFR as of December 31, 2016 based on its current understanding of the proposed rule.

HQLA

HQLA is the amount of assets that qualify for inclusion in the U.S. LCR. HQLA primarily consists of cash and certain unencumbered high quality liquid assets as defined in the final rule.

As of December 31, 2016, the Firm's HQLA was \$524 billion, compared with \$496 billion as of December 31, 2015. The increase in HQLA primarily reflects the impact of sales, maturities and paydowns in non-HQLA-eligible securities, as well as deposit growth in excess of loan growth. Certain of these actions resulted in increased excess liquidity at JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A. which is excluded from the Firm's HQLA as required under the U.S. LCR rules. The Firm's HQLA may fluctuate from period to period primarily due to normal flows from client activity.

The following table presents the Firm's estimated HQLA included in the U.S. LCR broken out by HQLA-eligible cash and securities as of December 31, 2016.

December 31, (in billions)	2016
HQLA	
Eligible cash(a)	\$ 323
Eligible securities(b)	201
Total HQLA(c)	\$ 524

(a) Cash on deposit at central banks.

(b) Predominantly includes U.S. agency MBS, U.S. Treasuries, and sovereign bonds net of applicable haircuts under U.S. LCR rules.

(c) Excludes excess HQLA at JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A.

As of December 31, 2016, in addition to HQLA reported above, the Firm had approximately \$262 billion of unencumbered marketable securities, such as equity securities and fixed income debt securities, available to raise liquidity, if required. This includes HQLA-eligible securities included as part of the excess liquidity at JPMorgan Chase Bank, N.A. The Firm also maintains borrowing capacity at various Federal Home Loan Banks ("FHLBs"), the Federal Reserve Bank discount window and various other central banks as a result of collateral pledged by the Firm to such banks. Although available, the Firm does not view the borrowing capacity at the Federal Reserve Bank discount window and the various other central banks as a primary source of liquidity. As of December 31, 2016, the Firm's remaining borrowing capacity at various FHLBs and the Federal Reserve Bank discount window was approximately \$221 billion. This remaining borrowing capacity excludes the benefit of securities included in HQLA or other unencumbered securities that are currently held at the Federal Reserve Bank discount window, but for which the Firm has not drawn liquidity.

Funding

Sources of funds

Management believes that the Firm's unsecured and secured funding capacity is sufficient to meet its on- and off-balance sheet obligations.

The Firm funds its global balance sheet through diverse sources of funding including a stable deposit franchise as well as secured and unsecured funding in the capital markets. The Firm's loan portfolio (\$894.8 billion at December 31, 2016), is funded with a portion of the Firm's deposits (\$1,375.2 billion at December 31, 2016) and through securitizations and, with respect to a portion of the Firm's real estate-related loans, with secured borrowings from the FHLBs. Deposits in excess of the amount utilized to fund loans are primarily invested in the Firm's investment securities portfolio or deployed in cash or other short-term liquid investments based on their interest rate and liquidity risk characteristics. Securities borrowed or purchased under resale agreements and trading assets-

Management's discussion and analysis

debt and equity instruments are primarily funded by the Firm's securities loaned or sold under agreements to repurchase, trading liabilities—debt and equity instruments, and a portion of the Firm's long-term debt and stockholders' equity. In addition to funding securities borrowed or purchased under resale agreements and trading assets—debt and equity instruments, proceeds from

the Firm's debt and equity issuances are used to fund certain loans and other financial and non-financial assets, or may be invested in the Firm's investment securities portfolio. See the discussion below for additional information relating to Deposits, Short-term funding, and Long-term funding and issuance.

Deposits

The table below summarizes, by line of business, the period-end and average deposit balances as of and for the years ended December 31, 2016 and 2015.

Deposits As of or for the year ended December 31, (in millions)	Year ended December 31,			
			Average	
	2016	2015	2016	2015
Consumer & Community Banking	\$ 618,337	\$ 557,645	\$ 586,637	\$ 530,938
Corporate & Investment Bank	412,434	395,228	409,680	414,064
Commercial Banking	179,532	172,470	172,835	184,132
Asset & Wealth Management	161,577	146,766	153,334	149,525
Corporate	3,299	7,606	5,482	17,129
Total Firm	\$ 1,375,179	\$ 1,279,715	\$ 1,327,968	\$ 1,295,788

A key strength of the Firm is its diversified deposit franchise, through each of its lines of business, which provides a stable source of funding and limits reliance on the wholesale funding markets. A significant portion of the Firm's deposits are consumer deposits, which are considered a stable source of liquidity. Additionally, the majority of the Firm's wholesale operating deposits are also considered to be stable sources of liquidity because they are generated from customers that maintain operating service relationships with the Firm.

The Firm's loans-to-deposits ratio was 65% at both December 31, 2016 and 2015.

As of December 31, 2016, total deposits for the Firm were \$1,375.2 billion, compared with \$1,279.7 billion at December 31, 2015 (61% of total liabilities at each of December 31, 2016 and 2015). The increase was attributable to higher consumer and wholesale deposits. The increase in consumer deposits reflected continuing strong growth from existing and new customers, and the impact of low attrition rates. The wholesale increase was driven by growth in operating deposits related to client activity in CIB's Treasury Services business, and inflows in AWM primarily from business growth and the impact of new rules governing money market funds.

The Firm believes average deposit balances are generally more representative of deposit trends. The increase in average deposits for the year ended December 31, 2016 compared with the year ended December 31, 2015, was predominantly driven by an increase in consumer deposits, partially offset by a reduction in wholesale non-operating deposits, driven by the Firm's actions in 2015 to reduce such deposits. For further discussions of deposit and liability balance trends, see the discussion of the Firm's business segments results and the Consolidated Balance Sheet Analysis on pages 51–70 and pages 43–44, respectively.

The following table summarizes short-term and long-term funding, excluding deposits, as of December 31, 2016 and 2015, and average balances for the years ended December 31, 2016 and 2015. For additional information, see the Consolidated Balance Sheet Analysis on pages 43–44 and Note 21.

Sources of funds (excluding deposits)

As of or for the year ended December 31, (in millions)			Average	
	2016	2015	2016	2015
Commercial paper:				
Wholesale funding	\$ 11,738	\$ 15,562	\$ 15,001	\$ 19,340
Client cash management	—	—	—	18,800 (i)
Total commercial paper	\$ 11,738	\$ 15,562	\$ 15,001	\$ 38,140
Obligations of Firm-administered multi-seller conduits(a)	\$ 2,719	\$ 8,724	\$ 5,153	\$ 11,961
Other borrowed funds	\$ 22,705	\$ 21,105	\$ 21,139	\$ 28,816
Securities loaned or sold under agreements to repurchase:				
Securities sold under agreements to repurchase	\$ 149,826	\$ 129,598	\$ 160,458	\$ 168,163
Securities loaned(b)	12,137	16,877	13,195	18,633
Total securities loaned or sold under agreements to repurchase(b)(c)(d)(e)	\$ 161,963	\$ 146,475	\$ 173,653	\$ 186,796
Senior notes	\$ 151,042	\$ 149,964	\$ 153,768	\$ 147,498
Trust preferred securities	2,345	3,969	3,724	4,341
Subordinated debt	21,940	25,027	24,224	27,310
Structured notes	37,292	32,813	35,978	31,309
Total long-term unsecured funding	\$ 212,619	\$ 211,773	\$ 217,694	\$ 210,458
Credit card securitization(a)	31,181	27,906	29,428	30,382
Other securitizations((a)(f)	1,527	1,760	1,669	1,909
FHLB advances	79,519	71,581	73,260	70,150
Other long-term secured funding(g)	3,107	5,297	4,619	4,332
Total long-term secured funding	\$ 115,334	\$ 106,544	\$ 108,976	\$ 106,773
Preferred stock(h)	\$ 26,068	\$ 26,068	\$ 26,068	\$ 24,040
Common stockholders' equity(h)	\$ 228,122	\$ 221,505	\$ 224,631	\$ 215,690

(a) Included in beneficial interest issued by consolidated variable interest entities on the Firm's Consolidated balance sheets.

(b) Prior period amounts have been revised to conform with current period presentation.

(c) Excludes federal funds purchased.

(d) Excludes long-term structured repurchase agreements of \$1.8 billion and \$4.2 billion as of December 31, 2016 and 2015, respectively, and average balances of \$2.9 billion and \$3.9 billion for the years ended December 31, 2016 and 2015, respectively.

(e) Excludes long-term securities loaned of \$1.2 billion and \$1.3 billion as of December 31, 2016, and December 31, 2015, respectively, and average balances of \$1.3 billion and \$0.9 billion for the years ended December 31, 2016 and 2015, respectively.

(f) Other securitizations includes securitizations of student loans. The Firm's wholesale businesses also securitize loans for client-driven transactions, which are not considered to be a source of funding for the Firm and are not included in the table.

(g) Includes long-term structured notes which are secured.

(h) For additional information on preferred stock and common stockholders' equity see Capital Risk Management on pages 76–85, Consolidated statements of changes in stockholders' equity, Note 22 and Note 23.

(i) During 2015 the Firm discontinued its commercial paper customer sweep cash management program.

Management's discussion and analysis

Short-term funding

The Firm's sources of short-term secured funding primarily consist of securities loaned or sold under agreements to repurchase. Securities loaned or sold under agreements to repurchase are secured predominantly by high-quality securities collateral, including government-issued debt and agency MBS, and constitute a significant portion of the federal funds purchased and securities loaned or sold under repurchase agreements on the Consolidated balance sheets. The decrease in the average balance of securities loaned or sold under agreements to repurchase for the year ended December 31, 2016, compared with the balance at December 31, 2015, was largely due to lower secured financing of trading assets-debt and equity instruments in the CIB related to client-driven market-making activities. The balances associated with securities loaned or sold under agreements to repurchase fluctuate over time due to customers' investment and financing activities; the Firm's demand for financing; the ongoing management of the mix of the Firm's liabilities, including its secured and unsecured financing (for both the investment securities and market-making portfolios); and other market and portfolio factors.

Long-term funding and issuance

Long-term funding provides additional sources of stable funding and liquidity for the Firm. The Firm's long-term funding plan is driven by expected client activity, liquidity considerations, and regulatory requirements, including TLAC requirements. Long-term funding objectives include maintaining diversification, maximizing market access and optimizing funding costs. The Firm evaluates various funding markets, tenors and currencies in creating its optimal long-term funding plan.

The significant majority of the Firm's long-term unsecured funding is issued by the Parent Company to provide maximum flexibility in support of both bank and nonbank subsidiary funding needs. The Parent Company advances substantially all net funding proceeds to the IHC. The IHC does not issue debt to external counterparties. The following table summarizes long-term unsecured issuance and maturities or redemptions for the years ended December 31, 2016 and 2015. For additional information, see Note 21.

Long-term unsecured funding

Year ended December 31, (in millions)	2016	2015
Issuance		
Senior notes issued in the U.S. market	\$ 25,639	\$ 19,212
Senior notes issued in non-U.S. markets	7,063	10,188
Total senior notes	32,702	29,400
Subordinated debt	1,093	3,210
Structured notes	22,865	22,165
Total long-term unsecured funding – issuance	\$ 56,660	\$ 54,775
Maturities/redemptions		
Senior notes	\$ 29,989	\$ 18,454
Trust preferred securities	1,630	1,500
Subordinated debt	3,596	6,908
Structured notes	15,925	18,099
Total long-term unsecured funding – maturities/redemptions	\$ 51,140	\$ 44,961

The Firm raises secured long-term funding through securitization of consumer credit card loans and advances from the FHLBs.

The following table summarizes the securitization issuance and FHLB advances and their respective maturities or redemption for the years ended December 31, 2016 and 2015.

Long-term secured funding

Year ended December 31, (in millions)	Issuance		Maturities/Redemptions	
	2016	2015	2016	2015
Credit card securitization	\$ 8,277	\$ 6,807	\$ 5,025	\$ 10,130
Other securitizations(a)	—	—	233	248
FHLB advances	17,150	16,550	9,209	9,960
Other long-term secured funding(b)	455	1,105	2,645	383
Total long-term secured funding	\$ 25,882	\$ 24,462	\$ 17,112	\$ 20,721

(a) Other securitizations includes securitizations of student loans.

(b) Includes long-term structured notes which are secured.

The Firm's wholesale businesses also securitize loans for client-driven transactions; those client-driven loan securitizations are not considered to be a source of funding for the Firm and are not included in the table above. For further description of the client-driven loan securitizations, see Note 16.

Credit ratings

The cost and availability of financing are influenced by credit ratings. Reductions in these ratings could have an adverse effect on the Firm's access to liquidity sources, increase the cost of funds, trigger additional collateral or funding requirements and decrease the number of investors and counterparties willing to lend to the Firm. Additionally, the Firm's funding requirements for VIEs and other third-

party commitments may be adversely affected by a decline in credit ratings. For additional information on the impact of a credit ratings downgrade on the funding requirements for VIEs, and on derivatives and collateral agreements, see SPEs on page 45, and credit risk, liquidity risk and credit-related contingent features in Note 6 on page 181.

The credit ratings of the Parent Company and the Firm's principal bank and nonbank subsidiaries as of December 31, 2016, were as follows.

December 31, 2016	JPMorgan Chase & Co.			JPMorgan Chase Bank, N.A. Chase Bank USA, N.A.			J.P. Morgan Securities LLC		
	Long-term issuer	Short-term issuer	Outlook	Long-term issuer	Short-term issuer	Outlook	Long-term issuer	Short-term issuer	Outlook
Moody's Investors Service	A3	P-2	Stable	Aa3	P-1	Stable	Aa3(a)	P-1	Stable
Standard & Poor's	A-	A-2	Stable	A+	A-1	Stable	A+	A-1	Stable
Fitch Ratings	A+	F1	Stable	AA-	F1+	Stable	AA-	F1+	Stable

(a) On February 22, 2017, Moody's published its updated rating methodologies for securities firms. Subsequently, as a result of this action, J.P. Morgan Securities LLC's long-term issuer rating was downgraded by one notch from Aa3 to A1. The short-term issuer rating was unchanged and the outlook remained stable.

Downgrades of the Firm's long-term ratings by one or two notches could result in an increase in its cost of funds, and access to certain funding markets could be reduced as noted above. The nature and magnitude of the impact of ratings downgrades depends on numerous contractual and behavioral factors (which the Firm believes are incorporated in its liquidity risk and stress testing metrics). The Firm believes that it maintains sufficient liquidity to withstand a potential decrease in funding capacity due to ratings downgrades.

JPMorgan Chase's unsecured debt does not contain requirements that would call for an acceleration of payments, maturities or changes in the structure of the existing debt, provide any limitations on future borrowings or require additional collateral, based on unfavorable changes in the Firm's credit ratings, financial ratios, earnings, or stock price.

Critical factors in maintaining high credit ratings include a stable and diverse earnings stream, strong capital ratios, strong credit quality and risk management controls, diverse funding sources, and disciplined liquidity monitoring procedures. Rating agencies continue to evaluate economic and geopolitical trends, regulatory developments, future profitability, risk management practices, and litigation matters, as well as their broader ratings methodologies. Changes in any of these factors could lead to changes in the Firm's credit ratings.

Although the Firm closely monitors and endeavors to manage, to the extent it is able, factors influencing its credit ratings, there is no assurance that its credit ratings will not be changed in the future.

MARKET RISK MANAGEMENT

Market risk is the risk of loss arising from potential adverse changes in the value of the Firm's assets and liabilities resulting from changes in market variables such as interest rates, foreign exchange rates, equity prices, commodity prices, implied volatilities or credit spreads.

Market Risk Management

Market Risk Management monitors market risks throughout the Firm and defines market risk policies and procedures. The Market Risk Management function reports to the Firm's CRO.

Market Risk Management seeks to manage risk, facilitate efficient risk/return decisions, reduce volatility in operating performance and provide transparency into the Firm's market risk profile for senior management, the Board of Directors and regulators. Market Risk Management is responsible for the following functions:

- Establishment of a market risk policy framework
- Independent measurement, monitoring and control of line of business and firmwide market risk
- Definition, approval and monitoring of limits
- Performance of stress testing and qualitative risk assessments

Risk measurement

Tools used to measure risk

Because no single measure can reflect all aspects of market risk, the Firm uses various metrics, both statistical and nonstatistical, to assess risk including:

- VaR
- Economic-value stress testing
- Nonstatistical risk measures
- Loss advisories
- Profit and loss drawdowns
- Earnings-at-risk
- Other sensitivities

Risk monitoring and control

Market risk exposure is managed primarily through a series of limits set in the context of the market environment and business strategy. In setting limits, the Firm takes into consideration factors such as market volatility, product liquidity and accommodation of client business and management experience. The Firm maintains different levels of limits. Corporate level limits include VaR and stress limits. Similarly, line of business limits include VaR and stress limits and may be supplemented by loss advisories, nonstatistical measurements and profit and loss drawdowns. Limits may also be set within the lines of business, as well at the portfolio or legal entity level.

Market Risk Management sets limits and regularly reviews and updates them as appropriate, with any changes approved by line of business management and Market Risk Management. Senior management, including the Firm's CEO and CRO, are responsible for reviewing and approving certain of these risk limits on an ongoing basis. All limits that have not been reviewed within specified time periods by Market Risk Management are escalated to senior management. The lines of business are responsible for adhering to established limits against which exposures are monitored and reported.

Limit breaches are required to be reported in a timely manner to limit approvers, Market Risk Management and senior management. In the event of a breach, Market Risk Management consults with Firm senior management and the line of business senior management to determine the appropriate course of action required to return to compliance, which may include a reduction in risk in order to remedy the breach. Certain Firm or line of business-level limits that have been breached for three business days or longer, or by more than 30%, are escalated to senior management and the Firmwide Risk Committee.

The following table summarizes by line of business the predominant business activities that give rise to market risk, and the primary market risk management tools utilized to manage those risks.

Risk identification and classification by line of business

Line of Business	Predominant business activities and related market risks	Positions included in Risk Management VaR	Positions included in earnings-at-risk	Positions included in other sensitivity-based measurements
CCB	<ul style="list-style-type: none"> Services mortgage loans which give rise to complex, non-linear interest rate and basis risk Non-linear risk arises primarily from prepayment options embedded in mortgages and changes in the probability of newly originated mortgage commitments actually closing Basis risk results from differences in the relative movements of the rate indices underlying mortgage exposure and other interest rates Originates loans and takes deposits 	<ul style="list-style-type: none"> Mortgage pipeline loans, classified as derivatives Warehouse loans, classified as trading assets – debt instruments MSRs Hedges of pipeline loans, warehouse loans and MSRs, classified as derivatives Interest-only securities, classified as trading assets - debt instruments, and related hedges, classified as derivatives Marketable equity investments measured at fair value through earnings 	<ul style="list-style-type: none"> Retained loan portfolio Deposits 	
CIB	<ul style="list-style-type: none"> Makes markets and services clients across fixed income, foreign exchange, equities and commodities Market risk arises from changes in market prices (e.g., rates and credit spreads) resulting in a potential decline in net income 	<ul style="list-style-type: none"> Trading assets/liabilities – debt and marketable equity instruments, and derivatives, including hedges of the retained loan portfolio Certain securities purchased, loaned or sold under resale agreements and securities borrowed Fair value option elected liabilities Derivative CVA and associated hedges 	<ul style="list-style-type: none"> Retained loan portfolio Deposits 	<ul style="list-style-type: none"> Private-equity investments measured at fair value Derivatives DVA/FVA and fair value option elected liabilities DVA
CB	<ul style="list-style-type: none"> Engages in traditional wholesale banking activities which include extensions of loans and credit facilities and taking deposits Risk arises from changes in interest rates and prepayment risk with potential for adverse impact on net interest income and interest-rate sensitive fees 		<ul style="list-style-type: none"> Retained loan portfolio Deposits 	
AWM	<ul style="list-style-type: none"> Provides initial capital investments in products such as mutual funds, which give rise to market risk arising from changes in market prices in such products 	<ul style="list-style-type: none"> Debt securities held in advance of distribution to clients, classified as trading assets - debt and equity instruments 	<ul style="list-style-type: none"> Retained loan portfolio Deposits 	<ul style="list-style-type: none"> Initial seed capital investments and related hedges, classified as derivatives Capital invested alongside third-party investors, typically in privately distributed collective vehicles managed by AWM (i.e., co-investments)
Corporate	<ul style="list-style-type: none"> Manages the Firm's liquidity, funding, structural interest rate and foreign exchange risks arising from activities undertaken by the Firm's four major reportable business segments 	<ul style="list-style-type: none"> Derivative positions measured at fair value through noninterest revenue in earnings Marketable equity investments measured at fair value through earnings 	<ul style="list-style-type: none"> Investment securities portfolio and related interest rate hedges Deposits Long-term debt and related interest rate hedges 	<ul style="list-style-type: none"> Private equity investments measured at fair value Foreign exchange exposure related to Firm-issued non-USD long-term debt ("LTD") and related hedges

As part of the Firm's evaluation and periodic enhancement of its market risk measures, during the third quarter of 2016 the Firm refined the scope of positions included in risk management VaR. In particular, certain private equity positions in the CIB, exposure arising from non-U.S. dollar denominated funding activities in Corporate, as well as seed capital investments in AWM were removed from the VaR calculation. Commencing with the third quarter of 2016, exposure arising from these positions is captured using other sensitivity-based measures, such as a 10% decline in market value or a 1 basis point parallel shift in spreads, as appropriate. For more information, see Other sensitivity-based measures at page 123. The Firm believes this refinement to its reported VaR measures more appropriately captures the risk of its market risk sensitive instruments. This change did not impact Regulatory VaR as these positions are not included in the calculation of Regulatory VaR. Regulatory VaR is used to derive the Firm's regulatory VaR-based capital requirements under Basel III.

Management's discussion and analysis

Value-at-risk

JPMorgan Chase utilizes VaR, a statistical risk measure, to estimate the potential loss from adverse market moves in a normal market environment. The Firm has a single VaR framework used as a basis for calculating Risk Management VaR and Regulatory VaR.

The framework is employed across the Firm using historical simulation based on data for the previous 12 months. The framework's approach assumes that historical changes in market values are representative of the distribution of potential outcomes in the immediate future. The Firm believes the use of Risk Management VaR provides a stable measure of VaR that is closely aligned to the day-to-day risk management decisions made by the lines of business, and provides the appropriate information needed to respond to risk events on a daily basis.

The Firm's Risk Management VaR is calculated assuming a one-day holding period and an expected tail-loss methodology which approximates a 95% confidence level. Risk Management VaR provides a consistent framework to measure risk profiles and levels of diversification across product types and is used for aggregating risks and monitoring limits across businesses. Those VaR results are reported to senior management, the Board of Directors and regulators.

Under the Firm's Risk Management VaR methodology, assuming current changes in market values are consistent with the historical changes used in the simulation, the Firm would expect to incur VaR "back-testing exceptions," defined as losses greater than that predicted by VaR estimates, on average five times every 100 trading days. The number of VaR back-testing exceptions observed can differ from the statistically expected number of back-testing exceptions if the current level of market volatility is materially different from the level of market volatility during the 12 months of historical data used in the VaR calculation.

Underlying the overall VaR model framework are individual VaR models that simulate historical market returns for individual products and/or risk factors. To capture material market risks as part of the Firm's risk management framework, comprehensive VaR model calculations are performed daily for businesses whose activities give rise to market risk. These VaR models are granular and incorporate numerous risk factors and inputs to simulate daily changes in market values over the historical period; inputs are selected based on the risk profile of each portfolio, as sensitivities and historical time series used to generate daily market values may be different across product types or risk management systems. The VaR model results across all portfolios are aggregated at the Firm level.

Since VaR is based on historical data, it is an imperfect measure of market risk exposure and potential losses, and it is not used to estimate the impact of stressed market conditions or to manage any impact from potential stress events. In addition, based on their reliance on available historical data, limited time horizons, and other factors, VaR measures are inherently limited in their ability to measure certain risks and to predict losses, particularly those associated with market illiquidity and sudden or severe shifts in market conditions.

For certain products, specific risk parameters are not captured in VaR due to the lack of inherent liquidity and availability of appropriate historical data. The Firm uses proxies to estimate the VaR for these and other products when daily time series are not available. It is likely that using an actual price-based time series for these products, if available, would affect the VaR results presented. The Firm therefore considers other measures such as stress testing, in addition to VaR, to capture and manage its market risk positions.

The daily market data used in VaR models may be different than the independent third-party data collected for VCG price testing in its monthly valuation process. For example, in cases where market prices are not observable, or where proxies are used in VaR historical time series, the data sources may differ (see Valuation process in Note 3 for further information on the Firm's valuation process). Because VaR model calculations require daily data and a consistent source for valuation, it may not be practical to use the data collected in the VCG monthly valuation process for VaR model calculations.

The Firm's VaR model calculations are periodically evaluated and enhanced in response to changes in the composition of the Firm's portfolios, changes in market conditions, improvements in the Firm's modeling techniques and measurements, and other factors. Such changes may affect historical comparisons of VaR results. For information regarding model reviews and approvals, see Model Risk Management on page 128.

The Firm calculates separately a daily aggregated VaR in accordance with regulatory rules ("Regulatory VaR"), which is used to derive the Firm's regulatory VaR-based capital requirements under Basel III. This Regulatory VaR model framework currently assumes a ten business-day holding period and an expected tail loss methodology which approximates a 99% confidence level. Regulatory VaR is applied to "covered" positions as defined by Basel III, which may be different than the positions included in the Firm's Risk Management VaR. For example, credit derivative hedges of accrual loans are included in the Firm's Risk Management VaR, while Regulatory VaR excludes these credit derivative hedges. In addition, in contrast to the Firm's Risk Management VaR, Regulatory VaR currently excludes the diversification benefit for certain VaR models.

For additional information on Regulatory VaR and the other components of market risk regulatory capital for the Firm (e.g. VaR-based measure, stressed VaR-based measure and the respective backtesting), see JPMorgan Chase's Basel III

Pillar 3 Regulatory Capital Disclosures reports, which are available on the Firm's website at:
(<http://investor.shareholder.com/jpmorganchase/basel.cfm>).

The table below shows the results of the Firm's Risk Management VaR measure using a 95% confidence level.

Total VaR

As of or for the year ended December 31, (in millions)	2016			2015			At December 31,	
	Avg.	Min	Max	Avg.	Min	Max	2016	2015
CIB trading VaR by risk type								
Fixed income	\$ 45	\$ 33	\$ 65	\$ 42	\$ 31	\$ 60	\$ 37	\$ 37
Foreign exchange	12	7	27	9	6	16	14	6
Equities	13	5	32	18	11	26	12	21
Commodities and other	9	7	11	10	6	14	9	10
Diversification benefit to CIB trading VaR	(36) (a)	NM (b)	NM (b)	(35) (a)	NM (b)	NM (b)	(38) (a)	(28) (a)
CIB trading VaR	43	28	79	44	27	68	34	46
Credit portfolio VaR	12	10	16	14	10	20	11	10
Diversification benefit to CIB VaR	(10) (a)	NM (b)	NM (b)	(9) (a)	NM (b)	NM (b)	(7) (a)	(10) (a)
CIB VaR	45	32	81	49	34	71	38	46
Other VaR								
Consumer & Community Banking VaR	3	1	6	4	2	8	3	4
Corporate VaR	6	3	13	4	3	7	3	5
Asset & Wealth Management VaR	2	—	4	3	2	4	—	3
Diversification benefit to other VaR	(3) (a)	NM (b)	NM (b)	(3) (a)	NM (b)	NM (b)	(2) (a)	(4) (a)
Other VaR	8	4	16	8	5	12	4	8
Diversification benefit to CIB and other VaR	(8) (a)	NM (b)	NM (b)	(10) (a)	NM (b)	NM (b)	(4) (a)	(9) (a)
Total VaR	\$ 45	\$ 33	\$ 78	\$ 47	\$ 34	\$ 67	\$ 38	\$ 45

(a) Average portfolio VaR and period-end portfolio VaR were less than the sum of the VaR of the components described above, which is due to portfolio diversification. The diversification effect reflects the fact that risks are not perfectly correlated.

(b) Designated as NM, because the minimum and maximum may occur on different days for distinct risk components, and hence it is not meaningful to compute a portfolio-diversification effect.

As discussed on page 117, during the third quarter of 2016 the Firm refined the scope of positions included in Risk Management VaR. In the absence of these refinements, the average VaR, without diversification, for each of the following reported components would have been higher by the following amounts for the full year 2016: CIB Equities VaR by \$3 million; CIB trading VaR by \$2 million; CIB VaR by \$3 million; Corporate VaR by \$4 million; AWM VaR by \$2 million; Other VaR by \$4 million; and Total VaR by \$3 million. Additionally, the Total VaR at December 31, 2016 would have been higher by \$7 million in the absence of these refinements.

Average Total VaR decreased \$2 million for the full year ending December 31, 2016 as compared with the respective prior year period. The reduction in average Total VaR is due to the aforementioned scope changes as well as a lower risk profile in the Equities risk type. This was offset by changes in the risk profiles of the Foreign exchange and Fixed Income risk types. Additionally, average Credit portfolio VaR declined as a result of lower exposures arising from select positions.

The Firm's average Total VaR diversification benefit was \$8 million or 18% of the sum for 2016, compared with \$10 million or 21% of the sum for 2015.

The Firm continues to enhance its VaR model calculations and the time series inputs related to certain asset-backed products.

VaR can vary significantly as positions change, market volatility fluctuates, and diversification benefits change.

VaR back-testing

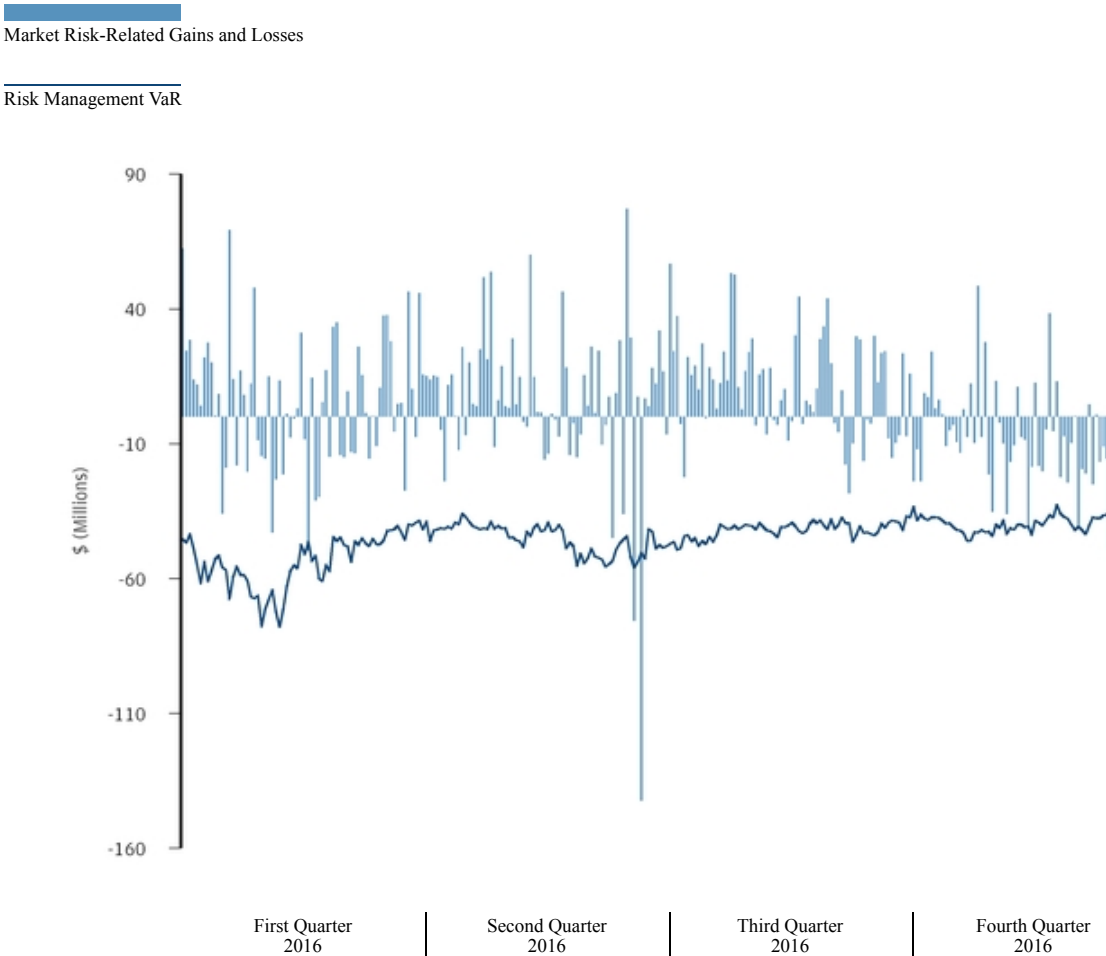
The Firm evaluates the effectiveness of its VaR methodology by back-testing, which compares the daily Risk Management VaR results with the daily gains and losses recognized on market-risk related revenue.

The Firm's definition of market risk-related gains and losses is consistent with the definition used by the banking regulators under Basel III. Under this definition market risk-related gains and losses are defined as: gains and losses on the positions included in the Firm's Risk Management VaR, excluding fees, commissions, certain valuation adjustments (e.g., liquidity and DVA), net interest income, and gains and losses arising from intraday trading.

Management’s discussion and analysis

The following chart compares the daily market risk-related gains and losses with the Firm’s Risk Management VaR for the year ended December 31, 2016. As the chart presents market risk-related gains and losses related to those positions included in the Firm’s Risk Management VaR, the results in the table below differ from the results of back-testing disclosed in the Market Risk section of the Firm’s Basel III Pillar 3 Regulatory Capital Disclosures reports, which are based on Regulatory VaR applied to covered positions. The chart shows that for the year ended December 31, 2016 the Firm observed 5 VaR back-testing exceptions and posted Market-risk related gains on 151 of the 260 days in this period.

Daily Market Risk-Related Gains and Losses
vs. Risk Management VaR (1-day, 95% Confidence level)
Year ended December 31, 2016



For the year ended December 31, 2016, there were 5 back-testing exceptions. The two exceptions that occurred towards the end of June 2016, subsequent to the U.K. referendum on membership in the European Union, reflect the elevated market volatility observed across multiple asset classes following the outcome of the vote.

Other risk measures

Economic-value stress testing

Along with VaR, stress testing is an important tool in measuring and controlling risk. While VaR reflects the risk of loss due to adverse changes in markets using recent historical market behavior as an indicator of losses, stress testing is intended to capture the Firm's exposure to unlikely but plausible events in abnormal markets. The Firm runs weekly stress tests on market-related risks across the lines of business using multiple scenarios that assume significant changes in risk factors such as credit spreads, equity prices, interest rates, currency rates and commodity prices.

The Firm uses a number of standard scenarios that capture different risk factors across asset classes including geographical factors, specific idiosyncratic factors and extreme tail events. The stress framework calculates multiple magnitudes of potential stress for both market rallies and market sell-offs for each risk factor and combines them in multiple ways to capture different market scenarios. For example, certain scenarios assess the potential loss arising from current exposures held by the Firm due to a broad sell off in bond markets or an extreme widening in corporate credit spreads. The flexibility of the stress testing framework allows risk managers to construct new, specific scenarios that can be used to form decisions about future possible stress events.

Stress testing complements VaR by allowing risk managers to shock current market prices to more extreme levels relative to those historically realized, and to stress test the relationships between market prices under extreme scenarios. Stress scenarios are defined and reviewed by Market Risk Management, and significant changes are reviewed by the relevant LOB Risk Committees and may be redefined on a periodic basis to reflect current market conditions.

Stress-test results, trends and qualitative explanations based on current market risk positions are reported to the respective LOBs and the Firm's senior management to allow them to better understand the sensitivity of positions to certain defined events and to enable them to manage their risks with more transparency. Results are also reported to the Board of Directors.

The Firm's stress testing framework is utilized in calculating results under scenarios mandated by the Federal Reserve's CCAR and ICAAP processes. In addition, the results are incorporated into the quarterly assessment of the Firm's Risk Appetite Framework and are also presented to the DRPC.

Nonstatistical risk measures

Nonstatistical risk measures include sensitivities to variables used to value positions, such as credit spread sensitivities, interest rate basis point values and market values. These measures provide granular information on the Firm's market risk exposure. They are aggregated by line of

business and by risk type, and are also used for monitoring internal market risk limits.

Loss advisories and profit and loss drawdowns

Loss advisories and profit and loss drawdowns are tools used to highlight trading losses above certain levels of risk tolerance. Profit and loss drawdowns are defined as the decline in net profit and loss since the year-to-date peak revenue level.

Earnings-at-risk

The VaR and sensitivity measures described above illustrate the economic sensitivity of the Firm's Consolidated balance sheets to changes in market variables. The effect of interest rate exposure on the Firm's reported net income is also important as interest rate risk represents one of the Firm's significant market risks. Interest rate risk arises not only from trading activities but also from the Firm's traditional banking activities, which include extension of loans and credit facilities, taking deposits and issuing debt. The Firm evaluates its structural interest rate risk exposure through earnings-at-risk, which measures the extent to which changes in interest rates will affect the Firm's net interest income and certain interest rate-sensitive fees. For a summary by line of business, identifying positions included in earnings-at-risk, see the table on page 117.

The CTC Risk Committee establishes the Firm's structural interest rate risk policies and market risk limits, which are subject to approval by the DRPC. Treasury and CIO, working in partnership with the lines of business, calculates the Firm's structural interest rate risk profile and reviews it with senior management including the CTC Risk Committee and the Firm's ALCO. In addition, oversight of structural interest rate risk is managed through a dedicated risk function reporting to the CTC CRO. This risk function is responsible for providing independent oversight and governance around assumptions and establishing and monitoring limits for structural interest rate risk. The Firm manages structural interest rate risk generally through its investment securities portfolio and interest rate derivatives.

Structural interest rate risk can occur due to a variety of factors, including:

- Differences in the timing among the maturity or repricing of assets, liabilities and off-balance sheet instruments
- Differences in the amounts of assets, liabilities and off-balance sheet instruments that are repricing at the same time
- Differences in the amounts by which short-term and long-term market interest rates change (for example, changes in the slope of the yield curve)
- The impact of changes in the maturity of various assets, liabilities or off-balance sheet instruments as interest rates change

Management's discussion and analysis

The Firm manages interest rate exposure related to its assets and liabilities on a consolidated, firmwide basis. Business units transfer their interest rate risk to Treasury and CIO through a transfer-pricing system, which takes into account the elements of interest rate exposure that can be risk-managed in financial markets. These elements include asset and liability balances and contractual rates of interest, contractual principal payment schedules, expected prepayment experience, interest rate reset dates and maturities, rate indices used for repricing, and any interest rate ceilings or floors for adjustable rate products. All transfer-pricing assumptions are dynamically reviewed.

The Firm generates a baseline for net interest income and certain interest rate sensitive fees, and then conducts simulations of changes for interest rate-sensitive assets and liabilities denominated in U.S. dollar and other currencies ("non-U.S. dollar" currencies). Earnings-at-risk scenarios estimate the potential change in this baseline, over the following 12 months utilizing multiple assumptions. These scenarios consider the impact on exposures as a result of changes in interest rates from baseline rates, as well as pricing sensitivities of deposits, optionality and changes in product mix. The scenarios include forecasted balance sheet changes, as well as modeled prepayment and reinvestment behavior, but do not include assumptions about actions that could be taken by the Firm in response to any such instantaneous rate changes. Mortgage prepayment assumptions are based on scenario interest rates compared with underlying contractual rates, the time since origination, and other factors which are updated periodically based on historical experience. The Firm's earnings-at-risk scenarios are periodically evaluated and enhanced in response to changes in the composition of the Firm's balance sheet, changes in market conditions, improvements in the Firm's simulation and other factors.

The Firm's U.S. dollar sensitivities are presented in the table below. The non-U.S. dollar sensitivity scenarios are not material to the Firm's earnings-at-risk at December 31, 2016 and 2015.

JPMorgan Chase's 12-month earnings-at-risk sensitivity profiles

U.S. dollar (in billions)	Instantaneous change in rates			
	+200 bps	+100 bps	-100 bps	-200 bps
December 31, 2016	\$ 4.0	\$ 2.4	NM (a)	NM (a)
December 31, 2015	\$ 5.2	\$ 3.1	NM (a)	NM (a)

(a) Given the current level of market interest rates, downward parallel 100 and 200 basis point earnings-at-risk scenarios are not considered to be meaningful.

The Firm's benefit to rising rates on U.S. dollar assets and liabilities is largely a result of reinvesting at higher yields and assets repricing at a faster pace than deposits.

The Firm's net U.S. dollar sensitivity to a 200 bps and 100 bps instantaneous increase in rates decreased by approximately \$1.2 billion and \$700 million, respectively, when compared to December 31, 2015. The primary driver of that decrease was the updating of the Firm's baseline to reflect higher interest rates. As higher interest rates are reflected in the Firm's baselines, the magnitude of the sensitivity to further increases in rates would be expected to be less significant. The net change in mix in the Firm's spot and forecasted balance sheet also contributed to a decrease in the net U.S. dollar sensitivity when compared to December 31, 2015.

Separately, another U.S. dollar interest rate scenario used by the Firm — involving a steeper yield curve with long-term rates rising by 100 basis points and short-term rates staying at current levels — results in a 12-month benefit to net interest income of approximately \$800 million. The increase under this scenario reflects the Firm reinvesting at the higher long-term rates, with funding costs remaining unchanged. The result of the comparable non-U.S. dollar scenario was not material to the Firm.

Non-U.S. dollar foreign exchange risk

Non-U.S. dollar FX risk is the risk that changes in foreign exchange rates affect the value of the Firm's assets or liabilities or future results. The Firm has structural non-U.S. dollar FX exposures arising from capital investments, forecasted expense and revenue, the investment securities portfolio and non-U.S. dollar-denominated debt issuance. Treasury and CIO, working in partnership with the lines of business, primarily manage these risks on behalf of the Firm. Treasury and CIO may hedge certain of these risks using derivatives within risk limits governed by the CTC Risk Committee.

Other sensitivity-based measures

The Firm quantifies the market risk of certain investment and funding activities by assessing the potential impact on net revenue and OCI due to changes in relevant market variables. For additional information on the positions captured in other sensitivity-based measures, please refer to the Risk identification and classification table on page 117.

The table below represents the potential impact to net revenue or OCI for market risk sensitive instruments that are not included in VaR or earnings-at-risk. Where appropriate, instruments used for hedging purposes are reported along with the positions being hedged. The sensitivities disclosed in the table below may not be representative of the actual gain or loss that would have been realized at December 31, 2016, as the movement in market parameters across maturities may vary and are not intended to imply management's expectation of future deterioration in these sensitivities.

(in millions) December 31, 2016			
Activity	Description	Sensitivity measure	Gain/(Loss)
Investment Activities			
Investment management activities	Consists of seed capital and related hedges; and fund co-investments	10% decline in market value	\$ (166)
Other investments	Consists of private equity and other investments held at fair value	10% decline in market value	\$ (358)
Funding Activities			
Non-USD LTD Cross-currency basis	Represents the basis risk on derivatives used to hedge the foreign exchange risk on the non-USD LTD	1 basis point parallel tightening of cross currency basis	\$ (7)
Non-USD LTD hedges FX exposure	Primarily represents the foreign exchange revaluation on the fair value of the derivative hedges	10% depreciation of currency	\$ (23)
Funding Spread Risk - Derivatives	Impact of changes in the spread related to derivatives DVA/FVA	1 basis point parallel increase in spread	\$ (4)
Funding Spread Risk - Fair value option elected liabilities ^(a)	Impact of changes in the spread related to fair value option elected liabilities DVA	1 basis point parallel increase in spread	\$ 17

(a) Impact recognized through OCI.

PRINCIPAL RISK MANAGEMENT

Principal investments are predominantly privately-held financial assets and instruments, typically representing ownership or junior capital positions, that have unique risks due to their illiquidity or for which there is less observable market or valuation data. Such positions are typically intended to be held over extended investment periods and, accordingly, the Firm has no expectation for short-term gain with respect to these investments. Principal investments cover multiple asset classes and are made either in stand-alone investing businesses or as part of a broader business platform. Asset classes include tax-oriented investments (e.g., affordable housing and alternative energy investments), private equity and various debt investments. Increasingly, new principal investment activity seeks to enhance or accelerate line of business strategic business initiatives.

The Firm's principal investments are managed under various lines of business and are reflected within the respective LOBs financial results. The Firm's approach to managing principal risk is consistent with the Firm's general risk governance structure. A Firmwide risk policy framework exists for all principal investing activities. All investments are approved by investment committees that include executives who are independent from the investing businesses. The Firm's independent control functions are responsible for reviewing the appropriateness of the carrying value of principal investments in accordance with relevant policies. Approved levels for such investments are established for each relevant business in order to manage the overall size of the portfolios. Industry, geographic and position level concentration limits are in place and are intended to ensure diversification of the portfolios. The Firm also conducts stress testing on these portfolios using specific scenarios that estimate losses based on significant market moves and/or other risk events.

COMPLIANCE RISK MANAGEMENT

Compliance risk is the risk of failure to comply with applicable laws, rules and regulations.

Overview

Each line of business is accountable for managing its compliance risk. The Firm's Compliance Organization ("Compliance"), which is independent of the lines of business, works closely with senior management to provide independent review, monitoring and oversight of business operations with a focus on compliance with the legal and regulatory obligations applicable to the offering of the Firm's products and services to clients and customers.

These compliance risks relate to a wide variety of legal and regulatory obligations, depending on the line of business and the jurisdiction, and include those related to products and services, relationships and interactions with clients and customers, and employee activities. For example, compliance risks include those associated with anti-money laundering compliance, trading activities, market conduct, and complying with the rules and regulations related to the offering of products and services across jurisdictional borders, among others.

Other Functions such as Finance (including Tax), Technology and Human Resources provide oversight of significant regulatory obligations that are specific to their respective areas of responsibility.

Compliance implements various practices designed to identify and mitigate compliance risk by establishing policies, testing, monitoring, training and providing guidance.

In recent years, the Firm has experienced heightened scrutiny by its regulators of its compliance with regulations, and with respect to its controls and operational processes. In certain instances, the Firm has entered into Consent Orders with its regulators requiring the Firm to take certain specified actions to remediate compliance with regulations and improve its controls. The Firm expects that such regulatory scrutiny will continue.

Governance and oversight

Compliance is led by the Firm's CCO who reports, effective September 2016, to the Firm's CRO.

The Firm maintains oversight and coordination of its Compliance Risk Management practices through the Firm's CCO, lines of business CCOs and regional CCOs to implement the Compliance program globally across the lines of business and regions. The Firm's CCO is a member of the FCC and the FRC. The Firm's CCO also provides regular updates to the Audit Committee and DRPC. In addition, from time to time, special committees of the Board have been established to oversee the Firm's compliance with regulatory Consent Orders.

The Firm has in place a Code of Conduct (the "Code"), and each employee is given annual training in respect of the Code and is required annually to affirm his or her compliance with the Code. The Code sets forth the Firm's core principles and fundamental values, including that no employee should ever sacrifice integrity - or give the impression that he or she has. The Code requires prompt reporting of any known or suspected violation of the Code, any internal Firm policy, or any law or regulation applicable to the Firm's business. It also requires the reporting of any illegal conduct, or conduct that violates the underlying principles of the Code, by any of the Firm's employees, customers, suppliers, contract workers, business partners, or agents. Specified employees are specially trained and designated as "code specialists" who act as a resource to employees on Code matters. In addition, concerns may be reported anonymously and the Firm prohibits retaliation against employees for the good faith reporting of any actual or suspected violations of the Code. The Code and the associated employee compliance program are focused on the regular assessment of certain key aspects of the Firm's culture and conduct initiatives.

CONDUCT RISK MANAGEMENT

Conduct risk is the risk that an employee's action or inaction causes undue harm to the Firm's clients and customers, damages market integrity, undermines the Firm's reputation, or negatively impacts the Firm's culture.

Overview

Each line of business or function is accountable for identifying and managing its conduct risk to provide appropriate engagement, ownership and sustainability of a culture consistent with the Firm's How We Do Business Principles ("Principles"). The Principles serve as a guide for how employees are expected to conduct themselves. With the Principles serving as a guide, the Firm's Code sets out the Firm's expectations for each employee and provides certain information and the resources to help employees conduct business ethically and in compliance with the law everywhere the Firm operates. For further discussion of the Code, see Compliance Risk Management on page 125.

Governance and oversight

The CMDC is the primary Board-level Committee that oversees the Firm's culture and conduct programs. The Audit Committee has responsibility to review the program established by management that monitors compliance with the Code. Additionally, the DRPC reviews, at least annually, the Firm's qualitative factors included in the Risk Appetite Framework, including conduct risk. The DRPC also meets annually with the CMDC to review and discuss aspects of the Firm's compensation practices.

Conduct risk management is incorporated into various aspects of people management practices throughout the employee life cycle, including recruiting, onboarding, training and development, performance management, promotion and compensation processes. Businesses undertake annual Risk and Control Self-Assessment ("RCSA") assessments; and, as part of these RCSA reviews, they identify their respective key inherent operational risks (including conduct risks), evaluate the design and effectiveness of their controls, identify control gaps and develop associated action plans. The Firm's Know Your Employee framework generally addresses how the Firm manages, oversees and responds to workforce conduct related matters that may otherwise expose the Firm to financial, reputational, compliance and other operating risks. The Firm also has a HR Control Forum, the primary purpose of which is to discuss conduct and accountability for more significant risk and control issues and review, when appropriate, employee actions including but not limited to promotion and compensation actions.

LEGAL RISK MANAGEMENT

Legal risk is the risk of loss or imposition of damages, fines, penalties or other liability arising from the failure to comply with a contractual obligation or to comply with laws, rules or regulations to which the Firm is subject.

Overview

In addition to providing legal services and advice to the Firm, and communicating and helping the lines of business adjust to the legal and regulatory changes they face, including the heightened scrutiny and expectations of the Firm's regulators, the global Legal function is responsible for working with the businesses and corporate functions to fully understand and assess their adherence to laws, rules and regulations. In particular, Legal assists Oversight & Control, Risk, Finance, Compliance and Internal Audit in their efforts to ensure compliance with all applicable laws and regulations and the Firm's corporate standards for doing business. The Firm's lawyers also advise the Firm on potential legal exposures on key litigation and transactional matters, and perform a significant defense and advocacy role by defending the Firm against claims and potential claims and, when needed, pursuing claims against others. In addition, they advise the Firm's Conflicts Office which reviews the Firm's wholesale transactions that may have the potential to create conflicts of interest for the Firm.

Governance and oversight

The Firm's General Counsel reports to the CEO and is a member of the Operating Committee, the Firmwide Risk Committee and the FCC. The General Counsel's leadership team includes a General Counsel for each line of business, the heads of the Litigation and Corporate & Regulatory practices, as well as the Firm's Corporate Secretary. Each region (e.g., Latin America, Asia Pacific) has a General Counsel who is responsible for managing legal risk across all lines of business and functions in the region.

Legal works with various committees (including new business initiative and reputation risk committees) and the Firm's businesses to protect the Firm's reputation beyond any particular legal requirements.

MODEL RISK MANAGEMENT

Model risk is the potential for adverse consequences from decisions based on incorrect or misused model outputs.

The Firm uses models across various businesses and functions. The models are of varying levels of sophistication and are used for many purposes including, for example, the valuation of positions and the measurement of risk, such as assessing regulatory capital requirements, conducting stress testing, and making business decisions.

Model risks are owned by the users of the models within the various businesses and functions in the Firm based on the specific purposes of such models. Users and developers of models are responsible for developing, implementing and testing their models, as well as referring models to the Model Risk function for review and approval. Once models have been approved, model users and developers are responsible for maintaining a robust operating environment, and must monitor and evaluate the performance of the models on an ongoing basis. Model users and developers may seek to enhance models in response to changes in the portfolios and in product and market developments, as well as to capture improvements in available modeling techniques and systems capabilities.

The Model Risk function reviews and approves a wide range of models, including risk management, valuation and regulatory capital models used by the Firm. The Model Risk function is independent of model users and developers. The Firmwide Model Risk Executive reports to the Firm's CRO.

Models are tiered based on an internal standard according to their complexity, the exposure associated with the model and the Firm's reliance on the model. This tiering is subject to the approval of the Model Risk function. A model review conducted by the Model Risk function considers the model's suitability for the specific uses to which it will be put. The factors considered in reviewing a model include whether the model accurately reflects the characteristics of the product and its significant risks, the selection and reliability of model inputs, consistency with models for similar products, the appropriateness of any model-related adjustments, and sensitivity to input parameters and assumptions that cannot be observed from the market. When reviewing a model, the Model Risk function analyzes and challenges the model methodology and the reasonableness of model assumptions and may perform or require additional testing, including back-testing of model outcomes. Model reviews are approved by the appropriate level of management within the Model Risk function based on the relevant model tier.

Under the Firm's Model Risk Policy, the Model Risk function reviews and approves new models, as well as material changes to existing models, prior to implementation in the operating environment. In certain circumstances, the head of the Model Risk function may grant exceptions to the Firm's model risk policy to allow a model to be used prior to review or approval. The Model Risk function may also require the user to take appropriate actions to mitigate the model risk if it is to be used in the interim. These actions will depend on the model and may include, for example, limitation of trading activity.

For a summary of valuations based on models, see Critical Accounting Estimates Used by the Firm on pages 132–134 and Note 3.

OPERATIONAL RISK MANAGEMENT

Operational risk is the risk of loss resulting from inadequate or failed processes or systems, human factors or due to external events that are neither market- nor credit-related. Operational risk is inherent in the Firm's activities and can manifest itself in various ways, including fraudulent acts, business interruptions, inappropriate employee behavior, failure to comply with applicable laws and regulations or failure of vendors to perform in accordance with their arrangements. These events could result in financial losses, litigation and regulatory fines, as well as other damages to the Firm. The goal is to keep operational risk at appropriate levels in light of the Firm's financial strength, the characteristics of its businesses, and the markets and regulatory environments in which it operates.

Operational Risk Management Framework

To monitor and control operational risk, the Firm has an Operational Risk Management Framework which is designed to enable the Firm to maintain a sound and well-controlled operational environment. The ORMF is comprised of four main components: Governance, Risk Assessment, Measurement, and Monitoring and Reporting.

Governance

The lines of business and corporate functions are responsible for owning and managing their operational risks. The Firmwide Oversight and Control Group, which consists of control officers within each line of business and corporate function, is responsible for the day-to-day execution of the ORMF.

Line of business and corporate function control committees oversee the operational risk and control environments of their respective businesses and functions. These committees escalate operational risk issues to the FCC, as appropriate. For additional information on the FCC, see Enterprise Risk Management on pages 71–75.

The Firmwide Risk Executive for Operational Risk Governance ("ORG"), a direct report to the CRO, is responsible for defining the ORMF and establishing minimum standards for its execution. Operational Risk Officers report to both the line of business CROs and to the Firmwide Risk Executive for ORG, and are independent of the respective businesses or corporate functions they oversee.

The Firm's Operational Risk Appetite Policy is approved by the DRPC. This policy establishes the Operational Risk Management Framework for the Firm. The assessments of operational risk using this framework are reviewed with the DRPC.

Risk assessment

The Firm utilizes several tools to identify, assess, mitigate and manage its operational risk. One such tool is the RCSA program which is executed by LOBs and corporate functions in accordance with the minimum standards established by ORG. As part of the RCSA program, lines of business and corporate functions identify key operational risks inherent in their activities, evaluate the effectiveness of relevant

controls in place to mitigate identified risks, and define actions to reduce residual risk. Action plans are developed for identified control issues and businesses are held accountable for tracking and resolving issues in a timely manner. Operational Risk Officers independently challenge the execution of the RCSA program and evaluate the appropriateness of the residual risk results.

In addition to the RCSA program, the Firm tracks and monitors events that have or could lead to actual operational risk losses, including litigation-related events. Responsible businesses and corporate functions analyze their losses to evaluate the efficacy of their control environment to assess where controls have failed, and to determine where targeted remediation efforts may be required. ORG provides oversight of these activities and may also perform independent assessments of significant operational risk events and areas of concentrated or emerging risk.

Measurement

In addition to the level of actual operational risk losses, operational risk measurement includes operational risk-based capital and operational risk losses under both baseline and stressed conditions.

The primary component of the operational risk capital estimate is the Loss Distribution Approach ("LDA") statistical model, which simulates the frequency and severity of future operational risk loss projections based on historical data. The LDA model is used to estimate an aggregate operational risk loss over a one-year time horizon, at a 99.9% confidence level. The LDA model incorporates actual internal operational risk losses in the quarter following the period in which those losses were realized, and the calculation generally continues to reflect such losses even after the issues or business activities giving rise to the losses have been remediated or reduced.

As required under the Basel III capital framework, the Firm's operational risk-based capital methodology, which uses the Advanced Measurement Approach, incorporates internal and external losses as well as management's view of tail risk captured through operational risk scenario analysis, and evaluation of key business environment and internal control metrics.

The Firm considers the impact of stressed economic conditions on operational risk losses and develops a forward looking view of material operational risk events that may occur in a stressed environment. The Firm's operational risk stress testing framework is utilized in calculating results for the Firm's CCAR and ICAAP processes.

For information related to operational risk RWA, CCAR or ICAAP, see Capital Risk Management section, pages 76–85.

Management's discussion and analysis

Monitoring and reporting

ORG has established standards for consistent operational risk reporting. The standards also reinforce escalation protocols to senior management and to the Board of Directors. Operational risk reports are produced on a firmwide basis as well as by line of business and corporate function.

Other operational risks

As mentioned previously, operational risk can manifest itself in various ways. Risks such as Compliance risk, Conduct risk, Legal risk and Model risk as well as other operational risks, can lead to losses which are captured through the Firm's operational risk measurement processes. More information on Compliance risk, Conduct risk, Legal risk and Model risk are discussed on pages 125, 126, 127 and 128, respectively. Details on other select operational risks are provided below.

Cybersecurity risk

The Firm devotes significant resources to protect the security of the Firm's computer systems, software, networks and other technology assets. The Firm's security efforts are intended to protect against cybersecurity attacks by unauthorized parties to obtain access to confidential information, destroy data, disrupt or degrade service, sabotage systems or cause other damage. The Firm continues to make significant investments in enhancing its cyber defense capabilities and to strengthen its partnerships with the appropriate government and law enforcement agencies and other businesses in order to understand the full spectrum of cybersecurity risks in the environment, enhance defenses and improve resiliency against cybersecurity threats. Third parties with which the Firm does business or that facilitate the Firm's business activities (e.g., vendors, exchanges, clearing houses, central depositories, and financial intermediaries) could also be sources of cybersecurity risk to the Firm. Third party cybersecurity incidents such as system breakdowns or failures, misconduct by the employees of such parties, or cyberattacks could affect their ability to deliver a product or service to the Firm or result in lost or compromised information of the Firm or its clients. Clients can also be sources of cybersecurity risk to the Firm, particularly when their activities and systems are beyond the Firm's own security and control systems. However, where cybersecurity incidents are due to client failure to maintain the security of their own systems and processes, clients will generally be responsible for losses incurred.

To protect the confidentiality, integrity and availability of the Firm's infrastructure, resources and information, the Firm leverages the ORMF to ensure risks are identified and managed within defined corporate tolerances. The Firm's Board of Directors and the Audit Committee are regularly briefed on the Firm's cybersecurity policies and practices as well as its efforts regarding significant cybersecurity events.

Payment fraud risk

Payment fraud risk is the risk of external and internal parties unlawfully obtaining personal benefit at the expense of the Firm. Over the past year, the risk of payment fraud has increased across the industry, with the number of

attempts hitting record highs. The complexities of these attacks along with perpetrators' strategies continue to evolve. A Payments Control Program has been established that includes Cybersecurity, Operations, Technology, Risk and the lines of business to manage the risk, implement controls and provide client education and awareness training. The program monitors and measures payment fraud activity, evaluates the Firm's cybersecurity defenses, limits access to sensitive data, and provides training to both employees and clients.

Third-party outsourcing risk

To identify and manage the operational risk inherent in its outsourcing activities, the Firm has a Third-Party Oversight ("TPO") framework to assist lines of business and corporate functions in selecting, documenting, onboarding, monitoring and managing their supplier relationships. The objective of the TPO framework is to hold third parties to the same high level of operational performance as is expected of the Firm's internal operations. The Third-Party Oversight group is responsible for Firmwide TPO training, monitoring, reporting and standards.

Business and technology resilience risk

Business disruptions can occur due to forces beyond the Firm's control such as severe weather, power or telecommunications loss, flooding, transit strikes, terrorist threats or infectious disease. The safety of the Firm's employees and customers is of the highest priority. The Firm's global resiliency program is intended to ensure that the Firm has the ability to recover its critical business functions and supporting assets (i.e., staff, technology and facilities) in the event of a business interruption. The program includes corporate governance, awareness and training, as well as strategic and tactical initiatives to identify, assess, and manage business interruption and public safety risks.

The strength and proficiency of the Firm's global resiliency program has played an integral role in maintaining the Firm's business operations during and quickly after various events.

Insurance

One of the ways operational loss may be mitigated is through insurance maintained by the Firm. The Firm purchases insurance to be in compliance with local laws and regulations (e.g., workers compensation), as well as to serve other needs (e.g., property loss and public liability). Insurance may also be required by third parties with whom the Firm does business. The insurance purchased is reviewed and approved by senior management.

REPUTATION RISK MANAGEMENT

Reputation risk is the risk that an action, transaction, investment or event will reduce trust in the Firm's integrity or competence by its various constituents, including clients, counterparties, investors, regulators, employees and the broader public. Maintaining the Firm's reputation is the responsibility of each individual employee of the Firm. The Firm's Reputation Risk Governance policy explicitly vests each employee with the responsibility to consider the reputation of the Firm when engaging in any activity. Since the types of events that could harm the Firm's reputation are so varied across the Firm's lines of business, each line of business has a separate reputation risk governance

infrastructure in place, which consists of three key elements: clear, documented escalation criteria appropriate to the business; a designated primary discussion forum — in most cases, one or more dedicated reputation risk committees; and a list of designated contacts, to whom questions relating to reputation risk should be referred. Line of business reputation risk governance is overseen by a Firmwide Reputation Risk Governance function which provides oversight of the governance infrastructure and process to support the consistent identification, escalation, management and monitoring of reputation risk issues firmwide.

CRITICAL ACCOUNTING ESTIMATES USED BY THE FIRM

JPMorgan Chase's accounting policies and use of estimates are integral to understanding its reported results. The Firm's most complex accounting estimates require management's judgment to ascertain the appropriate carrying value of assets and liabilities. The Firm has established policies and control procedures intended to ensure that estimation methods, including any judgments made as part of such methods, are well-controlled, independently reviewed and applied consistently from period to period. The methods used and judgments made reflect, among other factors, the nature of the assets or liabilities and the related business and risk management strategies, which may vary across the Firm's businesses and portfolios. In addition, the policies and procedures are intended to ensure that the process for changing methodologies occurs in an appropriate manner. The Firm believes its estimates for determining the carrying value of its assets and liabilities are appropriate. The following is a brief description of the Firm's critical accounting estimates involving significant judgments.

Allowance for credit losses

JPMorgan Chase's allowance for credit losses covers the retained consumer and wholesale loan portfolios, as well as the Firm's wholesale and certain consumer lending-related commitments. The allowance for loan losses is intended to adjust the carrying value of the Firm's loan assets to reflect probable credit losses inherent in the loan portfolio as of the balance sheet date. Similarly, the allowance for lending-related commitments is established to cover probable credit losses inherent in the lending-related commitments portfolio as of the balance sheet date.

The allowance for credit losses includes a formula-based component, an asset-specific component, and a component related to PCI loans. The determination of each of these components involves significant judgment on a number of matters. For further discussion of these components, areas of judgment and methodologies used in establishing the Firm's allowance for credit losses, see Note 15.

Allowance for credit losses sensitivity

The Firm's allowance for credit losses is sensitive to numerous factors, which may differ depending on the portfolio. Changes in economic conditions or in the Firm's assumptions and estimates could affect its estimate of probable credit losses inherent in the portfolio at the balance sheet date. The Firm uses its best judgment to assess these economic conditions and loss data in estimating the allowance for credit losses and these estimates are subject to periodic refinement based on changes to underlying external or Firm-specific historical data. The use of alternate estimates, data sources, adjustments to modeled loss estimates for model imprecision and other factors would result in a different estimated allowance for credit losses.

To illustrate the potential magnitude of certain alternate judgments, the Firm estimates that changes in the following inputs would have the following effects on the Firm's modeled credit loss estimates as of December 31, 2016, without consideration of any offsetting or correlated effects of other inputs in the Firm's allowance for loan losses:

- For PCI loans, a combined 5% decline in housing prices and a 100 basis point increase in unemployment rates from current levels could imply an increase to modeled credit loss estimates of approximately \$600 million.
- For the residential real estate portfolio, excluding PCI loans, a combined 5% decline in housing prices and a 100 basis point increase in unemployment rates from current levels could imply an increase to modeled annual loss estimates of approximately \$125 million.
- For credit card loans, a 100 basis point increase in unemployment rates from current levels could imply an increase to modeled annual loss estimates of approximately \$900 million.
- An increase in PD factors consistent with a one-notch downgrade in the Firm's internal risk ratings for its entire wholesale loan portfolio could imply an increase in the Firm's modeled loss estimates of approximately \$2.3 billion.
- A 100 basis point increase in estimated LGD for the Firm's entire wholesale loan portfolio could imply an increase in the Firm's modeled credit loss estimates of approximately \$175 million.

The purpose of these sensitivity analyses is to provide an indication of the isolated impacts of hypothetical alternative assumptions on modeled loss estimates. The changes in the inputs presented above are not intended to imply management's expectation of future deterioration of those risk factors. In addition, these analyses are not intended to estimate changes in the overall allowance for loan losses, which would also be influenced by the judgment management applies to the modeled loss estimates to reflect the uncertainty and imprecision of these modeled loss estimates based on then-current circumstances and conditions.

It is difficult to estimate how potential changes in specific factors might affect the overall allowance for credit losses because management considers a variety of factors and inputs in estimating the allowance for credit losses. Changes in these factors and inputs may not occur at the same rate and may not be consistent across all geographies or product types, and changes in factors may be directionally inconsistent, such that improvement in one factor may offset deterioration in other factors. In addition, it is difficult to predict how changes in specific economic conditions or assumptions could affect borrower behavior or other factors considered by management in estimating the allowance for credit losses. Given the process the Firm

follows and the judgments made in evaluating the risk factors related to its loss estimates, management believes that its current estimate of the allowance for credit losses is appropriate.

Fair value of financial instruments, MSRs and commodities inventory

JPMorgan Chase carries a portion of its assets and liabilities at fair value. The majority of such assets and liabilities are measured at fair value on a recurring basis. Certain assets and liabilities are measured at fair value on a nonrecurring basis, including certain mortgage, home equity and other loans, where the carrying value is based on the fair value of the underlying collateral.

Assets measured at fair value

The following table includes the Firm's assets measured at fair value and the portion of such assets that are classified within level 3 of the valuation hierarchy. For further information, see Note 3.

December 31, 2016 (in billions, except ratio data)	Total assets at fair value	Total level 3 assets
Trading debt and equity instruments	\$ 308.0	\$ 7.9
Derivative receivables(a)	64.1	5.8
Trading assets	372.1	13.7
AFS securities	238.9	0.7
Loans	2.2	0.6
MSRs	6.1	6.1
Private equity investments(b)	1.7	1.6
Other	26.4	0.5
Total assets measured at fair value on a recurring basis	647.4	23.2
Total assets measured at fair value on a nonrecurring basis	1.6	0.8
Total assets measured at fair value	\$ 649.0	\$ 24.0
Total Firm assets	\$ 2,491.0	
Level 3 assets as a percentage of total Firm assets(a)		1.0%
Level 3 assets as a percentage of total Firm assets at fair value(a)		3.7%

(a) For purposes of table above, the derivative receivables total reflects the impact of netting adjustments; however, the \$5.8 billion of derivative receivables classified as level 3 does not reflect the netting adjustment as such netting is not relevant to a presentation based on the transparency of inputs to the valuation of an asset. The level 3 balances would be reduced if netting were applied, including the netting benefit associated with cash collateral.

(b) Private equity instruments represent investments within Corporate.

Valuation

Details of the Firm's processes for determining fair value are set out in Note 3. Estimating fair value requires the application of judgment. The type and level of judgment required is largely dependent on the amount of observable market information available to the Firm. For instruments valued using internally developed models that use significant unobservable inputs and are therefore classified within level 3 of the valuation hierarchy, judgments used to estimate fair value are more significant than those required when estimating the fair value of instruments classified within levels 1 and 2.

In arriving at an estimate of fair value for an instrument within level 3, management must first determine the appropriate model to use. Second, the lack of observability of certain significant inputs requires management to assess all relevant empirical data in deriving valuation inputs including, for example, transaction details, yield curves, interest rates, prepayment rates, default rates, volatilities, correlations, equity or debt prices, valuations of comparable instruments, foreign exchange rates and credit curves. For further discussion of the valuation of level 3 instruments, including unobservable inputs used, see

Note 3.

For instruments classified in levels 2 and 3, management judgment must be applied to assess the appropriate level of valuation adjustments to reflect counterparty credit quality, the Firm's creditworthiness, market funding rates, liquidity considerations, unobservable parameters, and for portfolios that meet specified criteria, the size of the net open risk position. The judgments made are typically affected by the type of product and its specific contractual terms, and the level of liquidity for the product or within the market as a whole. For further discussion of valuation adjustments applied by the Firm see Note 3.

Imprecision in estimating unobservable market inputs or other factors can affect the amount of gain or loss recorded for a particular position.

Furthermore, while the Firm believes its valuation methods are appropriate and consistent with those of other market participants, the methods and assumptions used reflect management judgment and may vary across the Firm's businesses and portfolios.

The Firm uses various methodologies and assumptions in the determination of fair value. The use of methodologies or assumptions different than those used by the Firm could result in a different estimate of fair value at the reporting date. For a detailed discussion of the Firm's valuation process and hierarchy, and its determination of fair value for individual financial instruments, see Note 3.

Goodwill impairment

Under U.S. GAAP, goodwill must be allocated to reporting units and tested for impairment at least annually. The Firm's process and methodology used to conduct goodwill impairment testing is described in Note 17.

Management applies significant judgment when estimating the fair value of its reporting units. Estimates of fair value are dependent upon estimates of (a) the future earnings potential of the Firm's reporting units, including the estimated effects of regulatory and legislative changes, (b) long-term growth rates and (c) the estimated market cost of equity. Imprecision in estimating these factors can affect the estimated fair value of the reporting units.

Based upon the updated valuations for all of its reporting units, the Firm concluded that the goodwill allocated to its reporting units was not impaired at December 31, 2016. The fair values of these reporting units exceeded their carrying values by approximately 10% - 130% for all

Management's discussion and analysis

reporting units and did not indicate a significant risk of goodwill impairment based on current projections and valuations.

The projections for all of the Firm's reporting units are consistent with management's current short-term business outlook assumptions, and in the longer term, incorporate a set of macroeconomic assumptions and the Firm's best estimates of long-term growth and returns on equity of its businesses. Where possible, the Firm uses third-party and peer data to benchmark its assumptions and estimates.

Declines in business performance, increases in credit losses, increases in equity capital requirements, as well as deterioration in economic or market conditions, adverse estimates of regulatory or legislative changes or increases in the estimated market cost of equity, could cause the estimated fair values of the Firm's reporting units or their associated goodwill to decline in the future, which could result in a material impairment charge to earnings in a future period related to some portion of the associated goodwill.

For additional information on goodwill, see Note 17.

Income taxes

JPMorgan Chase is subject to the income tax laws of the various jurisdictions in which it operates, including U.S. federal, state and local, and non-U.S. jurisdictions. These laws are often complex and may be subject to different interpretations. To determine the financial statement impact of accounting for income taxes, including the provision for income tax expense and unrecognized tax benefits, JPMorgan Chase must make assumptions and judgments about how to interpret and apply these complex tax laws to numerous transactions and business events, as well as make judgments regarding the timing of when certain items may affect taxable income in the U.S. and non-U.S. tax jurisdictions.

JPMorgan Chase's interpretations of tax laws around the world are subject to review and examination by the various taxing authorities in the jurisdictions where the Firm operates, and disputes may occur regarding its view on a tax position. These disputes over interpretations with the various taxing authorities may be settled by audit, administrative appeals or adjudication in the court systems of the tax jurisdictions in which the Firm operates. JPMorgan Chase regularly reviews whether it may be assessed additional income taxes as a result of the resolution of these matters, and the Firm records additional reserves as appropriate. In addition, the Firm may revise its estimate of income taxes due to changes in income tax laws, legal interpretations, and business strategies. It is possible that revisions in the Firm's estimate of income taxes may materially affect the Firm's results of operations in any reporting period.

The Firm's provision for income taxes is composed of current and deferred taxes. Deferred taxes arise from differences between assets and liabilities measured for financial reporting versus income tax return purposes. Deferred tax assets are recognized if, in management's judgment, their realizability is determined to be more likely than not. The Firm has also recognized deferred tax assets in connection with certain NOLs and tax credits. The Firm

performs regular reviews to ascertain whether its deferred tax assets are realizable. These reviews include management's estimates and assumptions regarding future taxable income, which also incorporates various tax planning strategies, including strategies that may be available to utilize NOLs before they expire. In connection with these reviews, if it is determined that a deferred tax asset is not realizable, a valuation allowance is established. The valuation allowance may be reversed in a subsequent reporting period if the Firm determines that, based on revised estimates of future taxable income or changes in tax planning strategies, it is more likely than not that all or part of the deferred tax asset will become realizable. As of December 31, 2016, management has determined it is more likely than not that the Firm will realize its deferred tax assets, net of the existing valuation allowance.

JPMorgan Chase does not record U.S. federal income taxes on the undistributed earnings of certain non-U.S. subsidiaries, to the extent management has determined such earnings have been reinvested abroad for an indefinite period of time. Changes to the income tax rates applicable to these non-U.S. subsidiaries may have a material impact on the effective tax rate in a future period if such changes were to occur.

The Firm adjusts its unrecognized tax benefits as necessary when additional information becomes available. Uncertain tax positions that meet the more-likely-than-not recognition threshold are measured to determine the amount of benefit to recognize. An uncertain tax position is measured at the largest amount of benefit that management believes is more likely than not to be realized upon settlement. It is possible that the reassessment of JPMorgan Chase's unrecognized tax benefits may have a material impact on its effective income tax rate in the period in which the reassessment occurs.

For additional information on income taxes, see Note 26.

Litigation reserves

For a description of the significant estimates and judgments associated with establishing litigation reserves, see Note 31.

ACCOUNTING AND REPORTING DEVELOPMENTS

Financial Accounting Standards Board (“FASB”) Standards adopted during 2016

Standard	Summary of guidance	Effects on financial statements
Amendments to the consolidation analysis	<ul style="list-style-type: none"> Eliminates the deferral issued by the FASB in February 2010 of VIE-related accounting requirements for certain investment funds, including mutual funds, private equity funds and hedge funds. Amends the evaluation of fees paid to a decision-maker or a service provider, and exempts certain money market funds from consolidation. 	<ul style="list-style-type: none"> Adopted January 1, 2016. There was no material impact on the Firm’s Consolidated Financial Statements. For further information, see Note 1.
Improvements to employee share-based payment accounting	<ul style="list-style-type: none"> Requires that all excess tax benefits and tax deficiencies that pertain to employee stock-based incentive payments be recognized within income tax expense in the Consolidated statements of income, rather than within additional paid-in capital. 	<ul style="list-style-type: none"> Adopted January 1, 2016. There was no material impact on the Firm’s Consolidated Financial Statements.
Measuring the financial assets and financial liabilities of a consolidated collateralized financing entity	<ul style="list-style-type: none"> Provides an alternative for consolidated financing VIEs to elect: (1) to measure their financial assets and liabilities separately under existing U.S. GAAP for fair value measurement with any differences in such fair values reflected in earnings; or (2) to measure both their financial assets and liabilities using the more observable of the fair value of the financial assets or the fair value of the financial liabilities. 	<ul style="list-style-type: none"> Adopted January 1, 2016. There was no material impact on the Firm’s Consolidated Financial Statements as the Firm has historically measured the financial assets and liabilities using the more observable fair value.
Recognition and measurement of financial assets and financial liabilities – DVA to OCI	<ul style="list-style-type: none"> For financial liabilities where the fair value option has been elected, the portion of the total change in fair value caused by changes in the Firm’s own credit risk (i.e., DVA) is required to be presented separately in OCI. Requires a cumulative-effect adjustment to retained earnings as of the beginning of the period of adoption. 	<ul style="list-style-type: none"> Adopted January 1, 2016. There was no material impact on the Firm’s Consolidated Financial Statements. For additional information about the impact of the adoption of the new accounting guidance, see Notes 3, 4 and 25.

Management's discussion and analysis

FASB Standards issued but not yet adopted

Standard	Summary of guidance	Effects on financial statements
Revenue recognition – revenue from contracts with customers <i>Issued May 2014</i>	<ul style="list-style-type: none"> Requires that revenue from contracts with customers be recognized upon transfer of control of a good or service in the amount of consideration expected to be received. Changes the accounting for certain contract costs, including whether they may be offset against revenue in the Consolidated statements of income, and requires additional disclosures about revenue and contract costs. May be adopted using a full retrospective approach or a modified, cumulative effect approach wherein the guidance is applied only to existing contracts as of the date of initial application, and to new contracts transacted after that date. 	<ul style="list-style-type: none"> Required effective date: January 1, 2018.^(a) Because the guidance does not apply to revenue associated with financial instruments, including loans and securities that are accounted for under other U.S. GAAP, the Firm does not expect the new revenue recognition guidance to have a material impact on the elements of its Consolidated statements of income most closely associated with financial instruments, including securities gains, interest income and interest expense. The Firm plans to adopt the revenue recognition guidance in the first quarter of 2018. The Firm's implementation efforts include the identification of revenue within the scope of the guidance, as well as the evaluation of revenue contracts and related accounting policies. While the Firm has not yet identified any material changes in the timing of revenue recognition, the Firm's review is ongoing, and it continues to evaluate the presentation of certain contract costs (whether presented gross or offset against noninterest revenue).
Recognition and measurement of financial assets and financial liabilities <i>Issued January 2016</i>	<ul style="list-style-type: none"> Requires that certain equity instruments be measured at fair value, with changes in fair value recognized in earnings. Generally requires a cumulative-effect adjustment to retained earnings as of the beginning of the reporting period of adoption. 	<ul style="list-style-type: none"> Required effective date: January 1, 2018. The Firm is currently evaluating the potential impact on the Consolidated Financial Statements. The Firm's implementation efforts include the identification of securities within the scope of the guidance, the evaluation of the measurement alternative available for equity securities without a readily determinable fair value, and the related impact to accounting policies, presentation, and disclosures.
Leases <i>Issued February 2016</i>	<ul style="list-style-type: none"> Requires lessees to recognize all leases longer than twelve months on the Consolidated balance sheets as lease liabilities with corresponding right-of-use assets. Requires lessees and lessors to classify most leases using principles similar to existing lease accounting, but eliminates the "bright line" classification tests. Expands qualitative and quantitative disclosures regarding leasing arrangements. Requires adoption using a modified cumulative effect approach wherein the guidance is applied to all periods presented. 	<ul style="list-style-type: none"> Required effective date: January 1, 2019.^(a) The Firm is currently evaluating the potential impact on the Consolidated Financial Statements by reviewing its existing lease contracts and service contracts that may include embedded leases. The Firm expects to recognize lease liabilities and corresponding right-of-use assets (at their present value) related to predominantly all of the \$10 billion of future minimum payments required under operating leases as disclosed in Note 30. However, the population of contracts subject to balance sheet recognition and their initial measurement remains under evaluation. The Firm does not expect material changes to the recognition of operating lease expense in its Consolidated statements of income.

FASB Standards issued but not yet adopted (continued)

Standard	Summary of guidance	Effects on financial statements
<p>Financial instruments - credit losses</p> <p><i>Issued June 2016</i></p>	<ul style="list-style-type: none"> Replaces existing incurred loss impairment guidance and establishes a single allowance framework for financial assets carried at amortized cost (including HTM securities), which will reflect management's estimate of credit losses over the full remaining expected life of the financial assets. Eliminates existing guidance for PCI loans, and requires recognition of an allowance for expected credit losses on financial assets purchased with more than insignificant credit deterioration since origination. Amends existing impairment guidance for AFS securities to incorporate an allowance, which will allow for reversals of impairment losses in the event that the credit of an issuer improves. Requires a cumulative-effect adjustment to retained earnings as of the beginning of the reporting period of adoption. 	<ul style="list-style-type: none"> Required effective date: January 1, 2020.(b) The Firm has begun its implementation efforts by establishing a firmwide, cross-discipline governance structure. The Firm is currently identifying key interpretive issues, and is assessing existing credit loss forecasting models and processes against the new guidance to determine what modifications may be required. The Firm expects that the new guidance will result in an increase in its allowance for credit losses due to several factors, including: <ol style="list-style-type: none"> The allowance related to the Firm's loans and commitments will increase to cover credit losses over the full remaining expected life of the portfolio, and will consider expected future changes in macroeconomic conditions The nonaccretable difference on PCI loans will be recognized as an allowance, offset by an increase in the carrying value of the related loans An allowance will be established for estimated credit losses on HTM securities The extent of the increase is under evaluation, but will depend upon the nature and characteristics of the Firm's portfolio at the adoption date, and the macroeconomic conditions and forecasts at that date.
<p>Classification of certain cash receipts and cash payments in the statement of cash flows</p> <p><i>Issued August 2016</i></p>	<ul style="list-style-type: none"> Provides targeted amendments to the classification of certain cash flows, including treatment of cash payments for settlement of zero-coupon debt instruments and distributions received from equity method investments. Requires retrospective application to all periods presented. 	<ul style="list-style-type: none"> Required effective date: January 1, 2018.(a) The Firm is currently evaluating the potential impact on the Consolidated Financial Statements.
<p>Treatment of restricted cash on the statement of cash flows</p> <p><i>Issued November 2016</i></p>	<ul style="list-style-type: none"> Requires inclusion of restricted cash in the cash and cash equivalents balances in the Consolidated statements of cash flows. Requires additional disclosures to supplement the Consolidated statements of cash flows. Requires retrospective application to all periods presented. 	<ul style="list-style-type: none"> Required effective date: January 1, 2018.(a) The Firm is currently evaluating the potential impact on the Consolidated Financial Statements.
<p>Definition of a business</p> <p><i>Issued January 2017</i></p>	<ul style="list-style-type: none"> Narrows the definition of a business and clarifies that, to be considered a business, the fair value of the gross assets acquired (or disposed of) may not be substantially all concentrated in a single identifiable asset or a group of similar assets. In addition, in order to be considered a business, a set of activities and assets must include, at a minimum, an input and a substantive process that together significantly contribute to the ability to create outputs. 	<ul style="list-style-type: none"> Required effective date: January 1, 2018.(a) No material impact is expected because the guidance is to be applied prospectively, although it is anticipated that after adoption, fewer transactions will be treated as acquisitions or dispositions of a business.
<p>Goodwill</p> <p><i>Issued January 2017</i></p>	<ul style="list-style-type: none"> Requires an impairment loss to be recognized when the estimated fair value of a reporting unit falls below its carrying value. Eliminates the second condition in the current guidance that requires an impairment loss to be recognized only if the estimated implied fair value of the goodwill is below its carrying value. 	<ul style="list-style-type: none"> Required effective date: January 1, 2020.(a) Based on current impairment test results, the Firm does not expect a material effect on the Consolidated Financial Statements. After adoption, the guidance may result in more frequent goodwill impairment losses due to the removal of the second condition.

(a) Early adoption is permitted.

(b) Early adoption is permitted on January 1, 2019.

FORWARD-LOOKING STATEMENTS

From time to time, the Firm has made and will make forward-looking statements. These statements can be identified by the fact that they do not relate strictly to historical or current facts. Forward-looking statements often use words such as “anticipate,” “target,” “expect,” “estimate,” “intend,” “plan,” “goal,” “believe,” or other words of similar meaning.

Forward-looking statements provide JPMorgan Chase's current expectations or forecasts of future events, circumstances, results or aspirations. JPMorgan Chase's disclosures in this Annual Report contain forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. The Firm also may make forward-looking statements in its other documents filed or furnished with the SEC. In addition, the Firm's senior management may make forward-looking statements orally to investors, analysts, representatives of the media and others.

All forward-looking statements are, by their nature, subject to risks and uncertainties, many of which are beyond the Firm's control. JPMorgan Chase's actual future results may differ materially from those set forth in its forward-looking statements. While there is no assurance that any list of risks and uncertainties or risk factors is complete, below are certain factors which could cause actual results to differ from those in the forward-looking statements:

- Local, regional and global business, economic and political conditions and geopolitical events;
- Changes in laws and regulatory requirements, including capital and liquidity requirements affecting the Firm's businesses, and the ability of the Firm to address those requirements;
- Heightened regulatory and governmental oversight and scrutiny of JPMorgan Chase's business practices, including dealings with retail customers;
- Changes in trade, monetary and fiscal policies and laws;
- Changes in income tax laws and regulations;
- Securities and capital markets behavior, including changes in market liquidity and volatility;
- Changes in investor sentiment or consumer spending or savings behavior;
- Ability of the Firm to manage effectively its capital and liquidity, including approval of its capital plans by banking regulators;
- Changes in credit ratings assigned to the Firm or its subsidiaries;
- Damage to the Firm's reputation;
- Ability of the Firm to deal effectively with an economic slowdown or other economic or market disruption;
- Technology changes instituted by the Firm, its counterparties or competitors;
- The success of the Firm's business simplification initiatives and the effectiveness of its control agenda;

- Ability of the Firm to develop new products and services, and the extent to which products or services previously sold by the Firm (including but not limited to mortgages and asset-backed securities) require the Firm to incur liabilities or absorb losses not contemplated at their initiation or origination;
- Acceptance of the Firm's new and existing products and services by the marketplace and the ability of the Firm to innovate and to increase market share;
- Ability of the Firm to attract and retain qualified employees;
- Ability of the Firm to control expense;
- Competitive pressures;
- Changes in the credit quality of the Firm's customers and counterparties;
- Adequacy of the Firm's risk management framework, disclosure controls and procedures and internal control over financial reporting;
- Adverse judicial or regulatory proceedings;
- Changes in applicable accounting policies, including the introduction of new accounting standards;
- Ability of the Firm to determine accurate values of certain assets and liabilities;
- Occurrence of natural or man-made disasters or calamities or conflicts and the Firm's ability to deal effectively with disruptions caused by the foregoing;
- Ability of the Firm to maintain the security of its financial, accounting, technology, data processing and other operational systems and facilities;
- Ability of the Firm to effectively defend itself against cyberattacks and other attempts by unauthorized parties to access information of the Firm or its customers or to disrupt the Firm's systems; and
- The other risks and uncertainties detailed in Part I, Item 1A: Risk Factors in the Firm's Annual Report on Form 10-K for the year ended December 31, 2016.

Any forward-looking statements made by or on behalf of the Firm speak only as of the date they are made, and JPMorgan Chase does not undertake to update forward-looking statements to reflect the impact of circumstances or events that arise after the date the forward-looking statements were made. The reader should, however, consult any further disclosures of a forward-looking nature the Firm may make in any subsequent Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, or Current Reports on Form 8-K.

Management's report on internal control over financial reporting

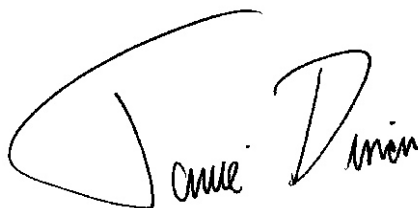
Management of JPMorgan Chase & Co. ("JPMorgan Chase" or the "Firm") is responsible for establishing and maintaining adequate internal control over financial reporting. Internal control over financial reporting is a process designed by, or under the supervision of, the Firm's principal executive and principal financial officers, or persons performing similar functions, and effected by JPMorgan Chase's Board of Directors, management and other personnel, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with accounting principles generally accepted in the United States of America.

JPMorgan Chase's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records, that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the Firm's assets; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the Firm are being made only in accordance with authorizations of JPMorgan Chase's management and directors; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of the Firm's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate. Management has completed an assessment of the effectiveness of the Firm's internal control over financial reporting as of December 31, 2016. In making the assessment, management used the "Internal Control — Integrated Framework" ("COSO 2013") promulgated by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO").

Based upon the assessment performed, management concluded that as of December 31, 2016, JPMorgan Chase's internal control over financial reporting was effective based upon the COSO 2013 framework. Additionally, based upon management's assessment, the Firm determined that there were no material weaknesses in its internal control over financial reporting as of December 31, 2016.

The effectiveness of the Firm's internal control over financial reporting as of December 31, 2016, has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their report which appears herein.



James Dimon
Chairman and Chief Executive Officer



Marianne Lake
Executive Vice President and Chief Financial Officer

February 28, 2017



To the Board of Directors and Stockholders of JPMorgan Chase & Co.:

In our opinion, the accompanying consolidated balance sheets and the related consolidated statements of income, comprehensive income, changes in stockholders' equity and cash flows present fairly, in all material respects, the financial position of JPMorgan Chase & Co. and its subsidiaries (the "Firm") at December 31, 2016 and 2015 and the results of their operations and their cash flows for each of the three years in the period ended December 31, 2016 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Firm maintained, in all material respects, effective internal control over financial reporting as of December 31, 2016 based on criteria established in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). The Firm's management is responsible for these financial statements, for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying "Management's report on internal control over financial reporting". Our responsibility is to express opinions on these financial statements and on the Firm's internal control over financial reporting based on our integrated audits. We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the financial statements are free of material misstatement and whether effective internal control over financial reporting was maintained in all material respects. Our audits of the financial statements included examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. Our audit of internal control over financial reporting included obtaining an understanding of internal

control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

PricewaterhouseCoopers LLP

February 28, 2017

Consolidated statements of income

Year ended December 31, (in millions, except per share data)	2016	2015	2014
Revenue			
Investment banking fees	\$ 6,448	\$ 6,751	\$ 6,542
Principal transactions	11,566	10,408	10,531
Lending- and deposit-related fees	5,774	5,694	5,801
Asset management, administration and commissions	14,591	15,509	15,931
Securities gains	141	202	77
Mortgage fees and related income	2,491	2,513	3,563
Card income	4,779	5,924	6,020
Other income	3,795	3,032	3,013
Noninterest revenue	49,585	50,033	51,478
Interest income	55,901	50,973	51,531
Interest expense	9,818	7,463	7,897
Net interest income	46,083	43,510	43,634
Total net revenue	95,668	93,543	95,112
Provision for credit losses	5,361	3,827	3,139
Noninterest expense			
Compensation expense	29,979	29,750	30,160
Occupancy expense	3,638	3,768	3,909
Technology, communications and equipment expense	6,846	6,193	5,804
Professional and outside services	6,655	7,002	7,705
Marketing	2,897	2,708	2,550
Other expense	5,756	9,593	11,146
Total noninterest expense	55,771	59,014	61,274
Income before income tax expense	34,536	30,702	30,699
Income tax expense	9,803	6,260	8,954
Net income	\$ 24,733	\$ 24,442	\$ 21,745
Net income applicable to common stockholders	\$ 22,583	\$ 22,406	\$ 20,077
Net income per common share data			
Basic earnings per share	\$ 6.24	\$ 6.05	\$ 5.33
Diluted earnings per share	6.19	6.00	5.29
Weighted-average basic shares	3,618.5	3,700.4	3,763.5
Weighted-average diluted shares	3,649.8	3,732.8	3,797.5
Cash dividends declared per common share	\$ 1.88	\$ 1.72	\$ 1.58

The Notes to Consolidated Financial Statements are an integral part of these statements.

Consolidated statements of comprehensive income

Year ended December 31, (in millions)		2016		2015		2014
Net income	\$	24,733	\$	24,442	\$	21,745
Other comprehensive income/(loss), after-tax						
Unrealized gains/(losses) on investment securities		(1,105)		(2,144)		1,975
Translation adjustments, net of hedges		(2)		(15)		(11)
Cash flow hedges		(56)		51		44
Defined benefit pension and OPEB plans		(28)		111		(1,018)
DVA on fair value option elected liabilities		(330)		—		—
Total other comprehensive income/(loss), after-tax		(1,521)		(1,997)		990
Comprehensive income	\$	23,212	\$	22,445	\$	22,735

The Notes to Consolidated Financial Statements are an integral part of these statements.

Consolidated balance sheets

December 31, (in millions, except share data)	2016	2015
Assets		
Cash and due from banks	\$ 23,873	\$ 20,490
Deposits with banks	365,762	340,015
Federal funds sold and securities purchased under resale agreements (included \$21,506 and \$23,141 at fair value)	229,967	212,575
Securities borrowed (included \$0 and \$395 at fair value)	96,409	98,721
Trading assets (included assets pledged of \$115,847 and \$115,284)	372,130	343,839
Securities (included \$238,891 and \$241,754 at fair value and assets pledged of \$16,115 and \$14,883)	289,059	290,827
Loans (included \$2,230 and \$2,861 at fair value)	894,765	837,299
Allowance for loan losses	(13,776)	(13,555)
Loans, net of allowance for loan losses	880,989	823,744
Accrued interest and accounts receivable	52,330	46,605
Premises and equipment	14,131	14,362
Goodwill	47,288	47,325
Mortgage servicing rights	6,096	6,608
Other intangible assets	862	1,015
Other assets (included \$7,557 and \$7,604 at fair value and assets pledged of \$1,603 and \$1,286)	112,076	105,572
Total assets(a)	\$ 2,490,972	\$ 2,351,698
Liabilities		
Deposits (included \$13,912 and \$12,516 at fair value)	\$ 1,375,179	\$ 1,279,715
Federal funds purchased and securities loaned or sold under repurchase agreements (included \$687 and \$3,526 at fair value)	165,666	152,678
Commercial paper	11,738	15,562
Other borrowed funds (included \$9,105 and \$9,911 at fair value)	22,705	21,105
Trading liabilities	136,659	126,897
Accounts payable and other liabilities (included \$9,120 and \$4,401 at fair value)	190,543	177,638
Beneficial interests issued by consolidated VIEs (included \$120 and \$787 at fair value)	39,047	41,879
Long-term debt (included \$37,686 and \$33,065 at fair value)	295,245	288,651
Total liabilities(a)	2,236,782	2,104,125
Commitments and contingencies (see Notes 29, 30 and 31)		
Stockholders' equity		
Preferred stock (\$1 par value; authorized 200,000,000 shares; issued 2,606,750 shares)	26,068	26,068
Common stock (\$1 par value; authorized 9,000,000,000 shares; issued 4,104,933,895 shares)	4,105	4,105
Additional paid-in capital	91,627	92,500
Retained earnings	162,440	146,420
Accumulated other comprehensive income	(1,175)	192
Shares held in restricted stock units ("RSU") trust, at cost (472,953 shares)	(21)	(21)
Treasury stock, at cost (543,744,003 and 441,459,392 shares)	(28,854)	(21,691)
Total stockholders' equity	254,190	247,573
Total liabilities and stockholders' equity	\$ 2,490,972	\$ 2,351,698

(a) The following table presents information on assets and liabilities related to VIEs that are consolidated by the Firm at December 31, 2016 and 2015. The difference between total VIE assets and liabilities represents the Firm's interests in those entities, which were eliminated in consolidation.

December 31, (in millions)	2016	2015
Assets		
Trading assets	\$ 3,185	\$ 3,736
Loans	75,614	75,104
All other assets	3,321	2,765
Total assets	\$ 82,120	\$ 81,605
Liabilities		
Beneficial interests issued by consolidated VIEs	\$ 39,047	\$ 41,879
All other liabilities	490	809
Total liabilities	\$ 39,537	\$ 42,688

The assets of the consolidated VIEs are used to settle the liabilities of those entities. The holders of the beneficial interests do not have recourse to the general credit of JPMorgan Chase. At December 31, 2016 and 2015, the Firm provided limited program-wide credit enhancement of \$2.4 billion and \$2.0 billion, respectively, related to its Firm-administered multi-seller conduits, which are eliminated in consolidation. For further discussion, see Note 16.

The Notes to Consolidated Financial Statements are an integral part of these statements.

Consolidated statements of changes in stockholders' equity

Year ended December 31, (in millions, except per share data)	2016	2015	2014
Preferred stock			
Balance at January 1	\$ 26,068	\$ 20,063	\$ 11,158
Issuance of preferred stock	—	6,005	8,905
Balance at December 31	26,068	26,068	20,063
Common stock			
Balance at January 1 and December 31	4,105	4,105	4,105
Additional paid-in capital			
Balance at January 1	92,500	93,270	93,828
Shares issued and commitments to issue common stock for employee stock-based compensation awards, and related tax effects	(334)	(436)	(508)
Other	(539)	(334)	(50)
Balance at December 31	91,627	92,500	93,270
Retained earnings			
Balance at January 1	146,420	129,977	115,435
Cumulative effect of change in accounting principle	(154)	—	—
Net income	24,733	24,442	21,745
Dividends declared:			
Preferred stock	(1,647)	(1,515)	(1,125)
Common stock (\$1.88, \$1.72 and \$1.58 per share for 2016, 2015 and 2014, respectively)	(6,912)	(6,484)	(6,078)
Balance at December 31	162,440	146,420	129,977
Accumulated other comprehensive income			
Balance at January 1	192	2,189	1,199
Cumulative effect of change in accounting principle	154	—	—
Other comprehensive income/(loss)	(1,521)	(1,997)	990
Balance at December 31	(1,175)	192	2,189
Shares held in RSU Trust, at cost			
Balance at January 1 and December 31	(21)	(21)	(21)
Treasury stock, at cost			
Balance at January 1	(21,691)	(17,856)	(14,847)
Purchase of treasury stock	(9,082)	(5,616)	(4,760)
Reissuance from treasury stock	1,919	1,781	1,751
Balance at December 31	(28,854)	(21,691)	(17,856)
Total stockholders' equity	\$ 254,190	\$ 247,573	\$ 231,727

The Notes to Consolidated Financial Statements are an integral part of these statements.

Consolidated statements of cash flows

Year ended December 31, (in millions)	2016	2015	2014
Operating activities			
Net income	\$ 24,733	\$ 24,442	\$ 21,745
Adjustments to reconcile net income to net cash provided by/(used in) operating activities:			
Provision for credit losses	5,361	3,827	3,139
Depreciation and amortization	5,478	4,940	4,759
Deferred tax expense	4,651	1,333	4,362
Other	1,799	1,785	2,113
Originations and purchases of loans held-for-sale	(61,107)	(48,109)	(67,525)
Proceeds from sales, securitizations and paydowns of loans held-for-sale	60,196	49,363	71,407
Net change in:			
Trading assets	(20,007)	62,212	(24,814)
Securities borrowed	2,313	12,165	1,020
Accrued interest and accounts receivable	(5,815)	22,664	(3,637)
Other assets	(4,517)	(3,701)	(9,166)
Trading liabilities	5,198	(28,972)	26,818
Accounts payable and other liabilities	3,740	(23,361)	6,058
Other operating adjustments	(1,827)	(5,122)	314
Net cash provided by operating activities	20,196	73,466	36,593
Investing activities			
Net change in:			
Deposits with banks	(25,747)	144,462	(168,426)
Federal funds sold and securities purchased under resale agreements	(17,468)	3,190	30,848
Held-to-maturity securities:			
Proceeds from paydowns and maturities	6,218	6,099	4,169
Purchases	(143)	(6,204)	(10,345)
Available-for-sale securities:			
Proceeds from paydowns and maturities	65,950	76,448	90,664
Proceeds from sales	48,592	40,444	38,411
Purchases	(123,959)	(70,804)	(121,504)
Proceeds from sales and securitizations of loans held-for-investment	15,429	18,604	20,115
Other changes in loans, net	(80,996)	(108,962)	(51,749)
All other investing activities, net	(2,825)	3,703	2,181
Net cash provided by/(used in) investing activities	(114,949)	106,980	(165,636)
Financing activities			
Net change in:			
Deposits	97,336	(88,678)	89,346
Federal funds purchased and securities loaned or sold under repurchase agreements	13,007	(39,415)	10,905
Commercial paper and other borrowed funds	(2,461)	(57,828)	9,242
Beneficial interests issued by consolidated VIEs	(5,707)	(5,632)	(834)
Proceeds from long-term borrowings	83,070	79,611	78,515
Payments of long-term borrowings	(68,949)	(67,247)	(65,275)
Proceeds from issuance of preferred stock	—	5,893	8,847
Treasury stock and warrants repurchased	(9,082)	(5,616)	(4,760)
Dividends paid	(8,476)	(7,873)	(6,990)
All other financing activities, net	(467)	(726)	(768)
Net cash provided by/(used in) financing activities	98,271	(187,511)	118,228
Effect of exchange rate changes on cash and due from banks	(135)	(276)	(1,125)
Net increase/(decrease) in cash and due from banks	3,383	(7,341)	(11,940)
Cash and due from banks at the beginning of the period	20,490	27,831	39,771
Cash and due from banks at the end of the period	\$ 23,873	\$ 20,490	\$ 27,831
Cash interest paid	\$ 9,508	\$ 7,220	\$ 8,194
Cash income taxes paid, net	2,405	9,423	1,392

The Notes to Consolidated Financial Statements are an integral part of these statements.

Note 1 – Basis of presentation

JPMorgan Chase & Co. (“JPMorgan Chase” or the “Firm”), a financial holding company incorporated under Delaware law in 1968, is a leading global financial services firm and one of the largest banking institutions in the U.S., with operations worldwide. The Firm is a leader in investment banking, financial services for consumers and small business, commercial banking, financial transaction processing and asset management. For a discussion of the Firm’s business segments, see Note 33.

The accounting and financial reporting policies of JPMorgan Chase and its subsidiaries conform to U.S. GAAP. Additionally, where applicable, the policies conform to the accounting and reporting guidelines prescribed by regulatory authorities.

Certain amounts reported in prior periods have been reclassified to conform with the current presentation.

Consolidation

The Consolidated Financial Statements include the accounts of JPMorgan Chase and other entities in which the Firm has a controlling financial interest. All material intercompany balances and transactions have been eliminated.

Assets held for clients in an agency or fiduciary capacity by the Firm are not assets of JPMorgan Chase and are not included on the Consolidated balance sheets.

The Firm determines whether it has a controlling financial interest in an entity by first evaluating whether the entity is a voting interest entity or a variable interest entity.

Effective January 1, 2016, the Firm adopted new accounting guidance related to the consolidation of legal entities such as limited partnerships, limited liability corporations, and securitization structures. The guidance eliminated the deferral issued by the FASB in February 2010 of the accounting guidance for VIEs for certain investment funds, including mutual funds, private equity funds and hedge funds. In addition, the guidance amends the evaluation of fees paid to a decision-maker or a service provider, and exempts certain money market funds from consolidation. Furthermore, asset management funds structured as limited partnerships or certain limited liability companies are now evaluated for consolidation as voting interest entities if the non-managing partners or members have the ability to remove the Firm as the general partner or managing member without cause (i.e., kick-out rights) based on a simple majority vote, or the non-affiliated partners or members have rights to participate in important decisions. Accordingly, the Firm does not consolidate these voting interest entities. However, in the limited cases where the non-managing partners or members do not have substantive kick-out or participating rights, the Firm evaluates the funds as VIEs and consolidates if it is the general partner or managing member and has a potentially significant variable interest. There was no material impact on the Firm’s Consolidated

Financial Statements upon adoption of this accounting guidance.

Voting Interest Entities

Voting interest entities are entities that have sufficient equity and provide the equity investors voting rights that enable them to make significant decisions relating to the entity’s operations. For these types of entities, the Firm’s determination of whether it has a controlling interest is primarily based on the amount of voting equity interests held. Entities in which the Firm has a controlling financial interest, through ownership of the majority of the entities’ voting equity interests, or through other contractual rights that give the Firm control, are consolidated by the Firm.

Investments in companies in which the Firm has significant influence over operating and financing decisions (but does not own a majority of the voting equity interests) are accounted for (i) in accordance with the equity method of accounting (which requires the Firm to recognize its proportionate share of the entity’s net earnings), or (ii) at fair value if the fair value option was elected. These investments are generally included in other assets, with income or loss included in other income.

Certain Firm-sponsored asset management funds are structured as limited partnerships or limited liability companies. For many of these entities, the Firm is the general partner or managing member, but the non-affiliated partners or members have the ability to remove the Firm as the general partner or managing member without cause (i.e., kick-out rights), based on a simple majority vote, or the non-affiliated partners or members have rights to participate in important decisions. Accordingly, the Firm does not consolidate these funds. In the limited cases where the nonaffiliated partners or members do not have substantive kick-out or participating rights, the Firm consolidates the funds.

The Firm’s investment companies have investments in both publicly-held and privately-held entities, including investments in buyouts, growth equity and venture opportunities. These investments are accounted for under investment company guidelines and accordingly, irrespective of the percentage of equity ownership interests held, are carried on the Consolidated balance sheets at fair value, and are recorded in other assets.

Variable Interest Entities

VIEs are entities that, by design, either (1) lack sufficient equity to permit the entity to finance its activities without additional subordinated financial support from other parties, or (2) have equity investors that do not have the ability to make significant decisions relating to the entity’s operations through voting rights, or do not have the obligation to absorb the expected losses, or do not have the right to receive the residual returns of the entity.

The most common type of VIE is an SPE. SPEs are commonly used in securitization transactions in order to isolate certain assets and distribute the cash flows from those assets to investors. The basic SPE structure involves a company selling assets to the SPE; the SPE funds the purchase of those assets by issuing securities to investors. The legal documents that govern the transaction specify how the cash earned on the assets must be allocated to the SPE's investors and other parties that have rights to those cash flows. SPEs are generally structured to insulate investors from claims on the SPE's assets by creditors of other entities, including the creditors of the seller of the assets.

The primary beneficiary of a VIE (i.e., the party that has a controlling financial interest) is required to consolidate the assets and liabilities of the VIE. The primary beneficiary is the party that has both (1) the power to direct the activities of the VIE that most significantly impact the VIE's economic performance; and (2) through its interests in the VIE, the obligation to absorb losses or the right to receive benefits from the VIE that could potentially be significant to the VIE.

To assess whether the Firm has the power to direct the activities of a VIE that most significantly impact the VIE's economic performance, the Firm considers all the facts and circumstances, including its role in establishing the VIE and its ongoing rights and responsibilities. This assessment includes, first, identifying the activities that most significantly impact the VIE's economic performance; and second, identifying which party, if any, has power over those activities. In general, the parties that make the most significant decisions affecting the VIE (such as asset managers, collateral managers, servicers, or owners of call options or liquidation rights over the VIE's assets) or have the right to unilaterally remove those decision-makers are deemed to have the power to direct the activities of a VIE.

To assess whether the Firm has the obligation to absorb losses of the VIE or the right to receive benefits from the VIE that could potentially be significant to the VIE, the Firm considers all of its economic interests, including debt and equity investments, servicing fees, and derivatives or other arrangements deemed to be variable interests in the VIE. This assessment requires that the Firm apply judgment in determining whether these interests, in the aggregate, are considered potentially significant to the VIE. Factors considered in assessing significance include: the design of the VIE, including its capitalization structure; subordination of interests; payment priority; relative share of interests held across various classes within the VIE's capital structure; and the reasons why the interests are held by the Firm.

The Firm performs on-going reassessments of: (1) whether entities previously evaluated under the majority voting-interest framework have become VIEs, based on certain events, and therefore subject to the VIE consolidation framework; and (2) whether changes in the facts and circumstances regarding the Firm's involvement with a VIE cause the Firm's consolidation conclusion to change.

Use of estimates in the preparation of consolidated financial statements

The preparation of the Consolidated Financial Statements requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, revenue and expense, and disclosures of contingent assets and liabilities. Actual results could be different from these estimates.

Foreign currency translation

JPMorgan Chase revalues assets, liabilities, revenue and expense denominated in non-U.S. currencies into U.S. dollars using applicable exchange rates.

Gains and losses relating to translating functional currency financial statements for U.S. reporting are included in OCI within stockholders' equity. Gains and losses relating to nonfunctional currency transactions, including non-U.S. operations where the functional currency is the U.S. dollar, are reported in the Consolidated statements of income.

Offsetting assets and liabilities

U.S. GAAP permits entities to present derivative receivables and derivative payables with the same counterparty and the related cash collateral receivables and payables on a net basis on the Consolidated balance sheets when a legally enforceable master netting agreement exists. U.S. GAAP also permits securities sold and purchased under repurchase agreements to be presented net when specified conditions are met, including the existence of a legally enforceable master netting agreement. The Firm has elected to net such balances when the specified conditions are met.

The Firm uses master netting agreements to mitigate counterparty credit risk in certain transactions, including derivatives transactions, repurchase and reverse repurchase agreements, and securities borrowed and loaned agreements. A master netting agreement is a single contract with a counterparty that permits multiple transactions governed by that contract to be terminated and settled through a single payment in a single currency in the event of a default (e.g., bankruptcy, failure to make a required payment or securities transfer or deliver collateral or margin when due after expiration of any grace period). Upon the exercise of termination rights by the non-defaulting party (i) all transactions are terminated, (ii) all transactions are valued and the positive value or "in the money" transactions are netted against the negative value or "out of the money" transactions and (iii) the only remaining payment obligation is of one of the parties to pay the netted termination amount. Upon exercise of repurchase agreement and securities loan default rights in general (i) all transactions are terminated and accelerated, (ii) all values of securities or cash held or to be delivered are calculated, and all such sums are netted against each other and (iii) the only remaining payment obligation is of one of the parties to pay the netted termination amount.

Notes to consolidated financial statements

Typical master netting agreements for these types of transactions also often contain a collateral/margin agreement that provides for a security interest in, or title transfer of, securities or cash collateral/margin to the party that has the right to demand margin (the “demanding party”). The collateral/margin agreement typically requires a party to transfer collateral/margin to the demanding party with a value equal to the amount of the margin deficit on a net basis across all transactions governed by the master netting agreement, less any threshold. The collateral/margin agreement grants to the demanding party, upon default by the counterparty, the right to set-off any amounts payable by the counterparty against any posted collateral or the cash equivalent of any posted collateral/margin. It also grants to the demanding party the right to liquidate collateral/margin and to apply the proceeds to an amount payable by the counterparty.

For further discussion of the Firm’s derivative instruments, see Note 6. For further discussion of the Firm’s repurchase and reverse repurchase agreements, and securities borrowing and lending agreements, see Note 13.

Statements of cash flows

For JPMorgan Chase’s Consolidated statements of cash flows, cash is defined as those amounts included in cash and due from banks.

Significant accounting policies

The following table identifies JPMorgan Chase’s other significant accounting policies and the Note and page where a detailed description of each policy can be found.

Fair value measurement	Note 3	Page 149
Fair value option	Note 4	Page 168
Derivative instruments	Note 6	Page 174
Noninterest revenue	Note 7	Page 187
Interest income and interest expense	Note 8	Page 189
Pension and other postretirement employee benefit plans	Note 9	Page 189
Employee stock-based incentives	Note 10	Page 197
Securities	Note 12	Page 199
Securities financing activities	Note 13	Page 205
Loans	Note 14	Page 208
Allowance for credit losses	Note 15	Page 227
Variable interest entities	Note 16	Page 232
Goodwill and Mortgage servicing rights	Note 17	Page 240
Premises and equipment	Note 18	Page 244
Long-term debt	Note 21	Page 245
Income taxes	Note 26	Page 250
Off-balance sheet lending-related financial instruments, guarantees and other commitments	Note 29	Page 255
Litigation	Note 31	Page 262

Note 2 – Business changes and developments

None

Note 3 – Fair value measurement

JPMorgan Chase carries a portion of its assets and liabilities at fair value. These assets and liabilities are predominantly carried at fair value on a recurring basis (i.e., assets and liabilities that are measured and reported at fair value on the Firm's Consolidated balance sheets). Certain assets (e.g., certain mortgage, home equity and other loans where the carrying value is based on the fair value of the underlying collateral), liabilities and unfunded lending-related commitments are measured at fair value on a nonrecurring basis; that is, they are not measured at fair value on an ongoing basis but are subject to fair value adjustments only in certain circumstances (for example, when there is evidence of impairment).

Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. Fair value is based on quoted market prices or inputs, where available. If prices or quotes are not available, fair value is based on models that consider relevant transaction characteristics (such as maturity) and use as inputs observable or unobservable market parameters, including but not limited to yield curves, interest rates, volatilities, equity or debt prices, foreign exchange rates and credit curves. Valuation adjustments may be made to ensure that financial instruments are recorded at fair value, as described below.

The level of precision in estimating unobservable market inputs or other factors can affect the amount of gain or loss recorded for a particular position. Furthermore, while the Firm believes its valuation methods are appropriate and consistent with those of other market participants, the methods and assumptions used reflect management judgment and may vary across the Firm's businesses and portfolios.

The Firm uses various methodologies and assumptions in the determination of fair value. The use of different methodologies or assumptions by other market participants compared with those used by the Firm could result in a different estimate of fair value at the reporting date.

Valuation process

Risk-taking functions are responsible for providing fair value estimates for assets and liabilities carried on the Consolidated balance sheets at fair value. The Firm's VCG, which is part of the Firm's Finance function and independent of the risk-taking functions, is responsible for verifying these estimates and determining any fair value adjustments that may be required to ensure that the Firm's positions are recorded at fair value. The VGF is composed of senior finance and risk executives and is responsible for overseeing the management of risks arising from valuation activities conducted across the Firm. The VGF is chaired by the Firmwide head of the VCG (under the direction of the Firm's Controller), and includes subforums covering the CIB, CCB, CB, AWM and certain corporate functions including Treasury and CIO.

Price verification process

The VCG verifies fair value estimates provided by the risk-taking functions by leveraging independently derived prices, valuation inputs and other market data, where available. Where independent prices or inputs are not available, the VCG performs additional review to ensure the reasonableness of the estimates. The additional review may include evaluating the limited market activity including client unwinds, benchmarking valuation inputs to those used for similar instruments, decomposing the valuation of structured instruments into individual components, comparing expected to actual cash flows, reviewing profit and loss trends, and reviewing trends in collateral valuation. There are also additional levels of management review for more significant or complex positions.

The VCG determines any valuation adjustments that may be required to the estimates provided by the risk-taking functions. No adjustments are applied for instruments classified within level 1 of the fair value hierarchy (see below for further information on the fair value hierarchy). For other positions, judgment is required to assess the need for valuation adjustments to appropriately reflect liquidity considerations, unobservable parameters, and, for certain portfolios that meet specified criteria, the size of the net open risk position. The determination of such adjustments follows a consistent framework across the Firm:

- Liquidity valuation adjustments are considered where an observable external price or valuation parameter exists but is of lower reliability, potentially due to lower market activity. Liquidity valuation adjustments are applied and determined based on current market conditions. Factors that may be considered in determining the liquidity adjustment include analysis of: (1) the estimated bid-offer spread for the instrument being traded; (2) alternative pricing points for similar instruments in active markets; and (3) the range of reasonable values that the price or parameter could take.
- The Firm manages certain portfolios of financial instruments on the basis of net open risk exposure and, as permitted by U.S. GAAP, has elected to estimate the fair value of such portfolios on the basis of a transfer of the entire net open risk position in an orderly transaction. Where this is the case, valuation adjustments may be necessary to reflect the cost of exiting a larger-than-normal market-size net open risk position. Where applied, such adjustments are based on factors that a relevant market participant would consider in the transfer of the net open risk position, including the size of the adverse market move that is likely to occur during the period required to reduce the net open risk position to a normal market-size.
- Unobservable parameter valuation adjustments may be made when positions are valued using prices or input parameters to valuation models that are unobservable due to a lack of market activity or because they cannot

be implied from observable market data. Such prices or parameters must be estimated and are, therefore, subject to management judgment. Unobservable parameter valuation adjustments are applied to reflect the uncertainty inherent in the resulting valuation estimate.

- Where appropriate, the Firm also applies adjustments to its estimates of fair value in order to appropriately reflect counterparty credit quality (CVA), the Firm's own creditworthiness (DVA) and the impact of funding (FVA), using a consistent framework across the Firm. For more information on such adjustments see Credit and funding adjustments on page 164 of this Note.

Valuation model review and approval

If prices or quotes are not available for an instrument or a similar instrument, fair value is generally determined using valuation models that consider relevant transaction data such as maturity and use as inputs market-based or independently sourced parameters. Where this is the case the price verification process described above is applied to the inputs to those models.

The Model Risk function reviews and approves a wide range of models, including risk management, valuation, and regulatory capital models used by the Firm. The Model Risk function is independent of model users and developers. The Firmwide Model Risk Executive reports to the Firm's CRO. When reviewing a model, the Model Risk function analyzes and challenges the model methodology, and the reasonableness of model assumptions and may perform or require additional testing, including back-testing of model outcomes.

The Model Risk function reviews and approves new models, as well as material changes to existing models, prior to implementation in the operating environment. In certain circumstances, the head of the Model Risk function may grant exceptions to the Firm's model risk policy to allow a model to be used prior to review or approval. The Model Risk function may also require the user to take appropriate actions to mitigate the model risk if it is to be used in the interim.

Valuation hierarchy

A three-level valuation hierarchy has been established under U.S. GAAP for disclosure of fair value measurements. The valuation hierarchy is based on the transparency of inputs to the valuation of an asset or liability as of the measurement date. The three levels are defined as follows.

- Level 1 – inputs to the valuation methodology are quoted prices (unadjusted) for identical assets or liabilities in active markets.
- Level 2 – inputs to the valuation methodology include quoted prices for similar assets and liabilities in active markets, and inputs that are observable for the asset or liability, either directly or indirectly, for substantially the full term of the financial instrument.
- Level 3 – one or more inputs to the valuation methodology are unobservable and significant to the fair value measurement.

A financial instrument's categorization within the valuation hierarchy is based on the lowest level of input that is significant to the fair value measurement.

The following table describes the valuation methodologies generally used by the Firm to measure its significant products/instruments at fair value, including the general classification of such instruments pursuant to the valuation hierarchy.

Product/instrument	Valuation methodology	Classifications in the valuation hierarchy
Securities financing agreements	Valuations are based on discounted cash flows, which consider: <ul style="list-style-type: none"> • Derivative features: for further information refer to the discussion of derivatives below. • Market rates for the respective maturity • Collateral 	Predominantly level 2
Loans and lending-related commitments — wholesale		
Loans carried at fair value (e.g. trading loans and non-trading loans)	Where observable market data is available, valuations are based on: <ul style="list-style-type: none"> • Observed market prices (circumstances are infrequent) • Relevant broker quotes • Observed market prices for similar instruments Where observable market data is unavailable or limited, valuations are based on discounted cash flows, which consider the following: <ul style="list-style-type: none"> • Credit spreads derived from the cost of CDS; or benchmark credit curves developed by the Firm, by industry and credit rating • Prepayment speed 	Level 2 or 3
Loans held for investment and associated lending-related commitments	Valuations are based on discounted cash flows, which consider: <ul style="list-style-type: none"> • Credit spreads, derived from the cost of CDS; or benchmark credit curves developed by the Firm, by industry and credit rating • Prepayment speed Lending-related commitments are valued similar to loans and reflect the portion of an unused commitment expected, based on the Firm's average portfolio historical experience, to become funded prior to an obligor default <p>For information regarding the valuation of loans measured at collateral value, see Note 14.</p>	Predominantly level 3
Loans — consumer		
Held for investment consumer loans, excluding credit card	Valuations are based on discounted cash flows, which consider: <ul style="list-style-type: none"> • Credit losses – which consider expected and current default rates, and loss severity • Prepayment speed • Discount rates • Servicing costs <p>For information regarding the valuation of loans measured at collateral value, see Note 14.</p>	Predominantly level 3
Held for investment credit card receivables	Valuations are based on discounted cash flows, which consider: <ul style="list-style-type: none"> • Credit costs - the allowance for loan losses is considered a reasonable proxy for the credit cost • Projected interest income, late-fee revenue and loan repayment rates • Discount rates • Servicing costs 	Level 3
Trading loans — conforming residential mortgage loans expected to be sold	Fair value is based on observable prices for mortgage-backed securities with similar collateral and incorporates adjustments to these prices to account for differences between the securities and the value of the underlying loans, which include credit characteristics, portfolio composition, and liquidity.	Predominantly level 2

Notes to consolidated financial statements

Product/instrument	Valuation methodology, inputs and assumptions	Classifications in the valuation hierarchy
Investment and trading securities	Quoted market prices are used where available.	Level 1
	<p>In the absence of quoted market prices, securities are valued based on:</p> <ul style="list-style-type: none"> • Observable market prices for similar securities • Relevant broker quotes • Discounted cash flows <p>In addition, the following inputs to discounted cash flows are used for the following products:</p> <p><i>Mortgage- and asset-backed securities specific inputs:</i></p> <ul style="list-style-type: none"> • Collateral characteristics • Deal-specific payment and loss allocations • Current market assumptions related to yield, prepayment speed, conditional default rates and loss severity <p><i>Collateralized loan obligations ("CLOs") specific inputs:</i></p> <ul style="list-style-type: none"> • Collateral characteristics • Deal-specific payment and loss allocations • Expected prepayment speed, conditional default rates, loss severity • Credit spreads • Credit rating data 	Level 2 or 3
Physical commodities	Valued using observable market prices or data	Predominantly level 1 and 2
Derivatives	Exchange-traded derivatives that are actively traded and valued using the exchange price.	Level 1
	<p>Derivatives that are valued using models such as the Black-Scholes option pricing model, simulation models, or a combination of models, that use observable or unobservable valuation inputs (e.g., plain vanilla options and interest rate and CDS). Inputs include:</p> <ul style="list-style-type: none"> • Contractual terms including the period to maturity • Readily observable parameters including interest rates and volatility • Credit quality of the counterparty and of the Firm • Market funding levels • Correlation levels <p>In addition, specific inputs used for derivatives that are valued based on models with significant unobservable inputs are as follows:</p> <p><i>Structured credit derivatives specific inputs include:</i></p> <ul style="list-style-type: none"> • CDS spreads and recovery rates • Credit correlation between the underlying debt instruments (levels are modeled on a transaction basis and calibrated to liquid benchmark tranche indices) • Actual transactions, where available, are used to regularly recalculate unobservable parameters <p><i>Certain long-dated equity option specific inputs include:</i></p> <ul style="list-style-type: none"> • Long-dated equity volatilities <p><i>Certain interest rate and FX exotic options specific inputs include:</i></p> <ul style="list-style-type: none"> • Interest rate correlation • Interest rate spread volatility • Foreign exchange correlation • Correlation between interest rates and foreign exchange rates • Parameters describing the evolution of underlying interest rates <p><i>Certain commodity derivatives specific inputs include:</i></p> <ul style="list-style-type: none"> • Commodity volatility • Forward commodity price <p>Additionally, adjustments are made to reflect counterparty credit quality (CVA), the Firm's own creditworthiness (DVA), and the impact of funding (FVA). See pages 164-165 of this Note.</p>	Level 2 or 3

Product/instrument	Valuation methodology, inputs and assumptions	Classification in the valuation hierarchy
Mortgage servicing rights	See Mortgage servicing rights in Note 17.	Level 3
Private equity direct investments	<p><i>Private equity direct investments</i></p> <p>Fair value is estimated using all available information; the range of potential inputs include:</p> <ul style="list-style-type: none"> • Transaction prices • Trading multiples of comparable public companies • Operating performance of the underlying portfolio company • Adjustments as required, since comparable public companies are not identical to the company being valued, and for company-specific issues and lack of liquidity • Additional available inputs relevant to the investment 	Level 2 or 3
Fund investments (e.g. mutual/collective investment funds, private equity funds, hedge funds, and real estate funds)	<p>Net asset value</p> <ul style="list-style-type: none"> • NAV is supported by the ability to redeem and purchase at the NAV level. • Adjustments to the NAV as required, for restrictions on redemption (e.g., lock-up periods or withdrawal limitations) or where observable activity is limited 	<p>Level 1</p> <p>Level 2 or 3(a)</p>
Beneficial interests issued by consolidated VIEs	<p>Valued using observable market information, where available</p> <p>In the absence of observable market information, valuations are based on the fair value of the underlying assets held by the VIE</p>	Level 2 or 3
Long-term debt, not carried at fair value	<p>Valuations are based on discounted cash flows, which consider:</p> <ul style="list-style-type: none"> • Market rates for respective maturity 	Predominantly level 2
Structured notes (included in deposits, other borrowed funds and long-term debt)	<ul style="list-style-type: none"> • Valuations are based on discounted cash flow analyses that consider the embedded derivative and the terms and payment structure of the note. • The embedded derivative features are considered using models such as the Black-Scholes option pricing model, simulation models, or a combination of models that use observable or unobservable valuation inputs, depending on the embedded derivative. The specific inputs used vary according to the nature of the embedded derivative features, as described in the discussion above regarding derivatives valuation. Adjustments are then made to this base valuation to reflect the Firm's own creditworthiness (DVA) and to incorporate the impact of funding (FVA). See pages 164-165 of this Note. 	Level 2 or 3

(a) Excludes certain investments that are measured at fair value using the net asset value per share (or its equivalent) as a practical expedient.

Notes to consolidated financial statements

The following table presents the assets and liabilities reported at fair value as of December 31, 2016 and 2015, by major product category and fair value hierarchy.

Assets and liabilities measured at fair value on a recurring basis

December 31, 2016 (in millions)	Fair value hierarchy			Derivative netting adjustments	Total fair value
	Level 1	Level 2	Level 3		
Federal funds sold and securities purchased under resale agreements	\$ —	\$ 21,506	\$ —	\$ —	\$ 21,506
Securities borrowed	—	—	—	—	—
Trading assets:					
Debt instruments:					
Mortgage-backed securities:					
U.S. government agencies(a)	13	40,586	392	—	40,991
Residential – nonagency	—	1,552	83	—	1,635
Commercial – nonagency	—	1,321	17	—	1,338
Total mortgage-backed securities	13	43,459	492	—	43,964
U.S. Treasury and government agencies(a)	19,554	5,201	—	—	24,755
Obligations of U.S. states and municipalities	—	8,403	649	—	9,052
Certificates of deposit, bankers' acceptances and commercial paper	—	1,649	—	—	1,649
Non-U.S. government debt securities	28,443	23,076	46	—	51,565
Corporate debt securities	—	22,751	576	—	23,327
Loans(b)	—	28,965	4,837	—	33,802
Asset-backed securities	—	5,250	302	—	5,552
Total debt instruments	48,010	138,754	6,902	—	193,666
Equity securities	96,759	281	231	—	97,271
Physical commodities(c)	5,341	1,620	—	—	6,961
Other	—	9,341	761	—	10,102
Total debt and equity instruments(d)	150,110	149,996	7,894	—	308,000
Derivative receivables:					
Interest rate	715	602,747	2,501	(577,661)	28,302
Credit	—	28,256	1,389	(28,351)	1,294
Foreign exchange	812	231,743	870	(210,154)	23,271
Equity	—	34,032	908	(30,001)	4,939
Commodity	158	18,360	125	(12,371)	6,272
Total derivative receivables(e)	1,685	915,138	5,793	(858,538)	64,078
Total trading assets(f)	151,795	1,065,134	13,687	(858,538)	372,078
Available-for-sale securities:					
Mortgage-backed securities:					
U.S. government agencies(a)	—	64,005	—	—	64,005
Residential – nonagency	—	14,442	1	—	14,443
Commercial – nonagency	—	9,104	—	—	9,104
Total mortgage-backed securities	—	87,551	1	—	87,552
U.S. Treasury and government agencies(a)	44,072	29	—	—	44,101
Obligations of U.S. states and municipalities	—	31,592	—	—	31,592
Certificates of deposit	—	106	—	—	106
Non-U.S. government debt securities	22,793	12,495	—	—	35,288
Corporate debt securities	—	4,958	—	—	4,958
Asset-backed securities:					
Collateralized loan obligations	—	26,738	663	—	27,401
Other	—	6,967	—	—	6,967
Equity securities	926	—	—	—	926
Total available-for-sale securities	67,791	170,436	664	—	238,891
Loans	—	1,660	570	—	2,230
Mortgage servicing rights	—	—	6,096	—	6,096
Other assets:					
Private equity investments(g)	68	—	1,606	—	1,674
All other	4,289	—	617	—	4,906
Total other assets(h)	4,357	—	2,223	—	6,580
Total assets measured at fair value on a recurring basis	\$ 223,943	\$ 1,258,736	(g) \$ 23,240	(g) \$ (858,538)	\$ 647,381
Deposits	\$ —	\$ 11,795	\$ 2,117	\$ —	\$ 13,912

Federal funds purchased and securities loaned or sold under repurchase agreements	—	687	—	—	687
Other borrowed funds	—	7,971	1,134	—	9,105
Trading liabilities:					
Debt and equity instruments(d)	68,304	19,081	43	—	87,428
Derivative payables:					
Interest rate	539	569,001	1,238	(559,963)	10,815
Credit	—	27,375	1,291	(27,255)	1,411
Foreign exchange	902	231,815	2,254	(214,463)	20,508
Equity	—	35,202	3,160	(30,222)	8,140
Commodity	173	20,079	210	(12,105)	8,357
Total derivative payables(e)	1,614	883,472	8,153	(844,008)	49,231
Total trading liabilities	69,918	902,553	8,196	(844,008)	136,659
Accounts payable and other liabilities	9,107	—	13	—	9,120
Beneficial interests issued by consolidated VIEs	—	72	48	—	120
Long-term debt	—	23,792	13,894	—	37,686
Total liabilities measured at fair value on a recurring basis	\$ 79,025	\$ 946,870	\$ 25,402	\$ (844,008)	\$ 207,289

December 31, 2015 (in millions)	Fair value hierarchy			Derivative netting adjustments	Total fair value
	Level 1	Level 2	Level 3		
Federal funds sold and securities purchased under resale agreements	\$ —	\$ 23,141	\$ —	\$ —	\$ 23,141
Securities borrowed	—	395	—	—	395
Trading assets:					
Debt instruments:					
Mortgage-backed securities:					
U.S. government agencies(a)	6	31,815	715	—	32,536
Residential – nonagency	—	1,299	194	—	1,493
Commercial – nonagency	—	1,080	115	—	1,195
Total mortgage-backed securities	6	34,194	1,024	—	35,224
U.S. Treasury and government agencies(a)	12,036	6,985	—	—	19,021
Obligations of U.S. states and municipalities	—	6,986	651	—	7,637
Certificates of deposit, bankers' acceptances and commercial paper	—	1,042	—	—	1,042
Non-U.S. government debt securities	27,974	25,064	74	—	53,112
Corporate debt securities	—	22,807	736	—	23,543
Loans(b)	—	22,211	6,604	—	28,815
Asset-backed securities	—	2,392	1,832	—	4,224
Total debt instruments	40,016	121,681	10,921	—	172,618
Equity securities	94,059	606	265	—	94,930
Physical commodities(c)	3,593	1,064	—	—	4,657
Other	—	11,152	744	—	11,896
Total debt and equity instruments(d)	137,668	134,503	11,930	—	284,101
Derivative receivables:					
Interest rate	354	666,491	2,766	(643,248)	26,363
Credit	—	48,850	2,618	(50,045)	1,423
Foreign exchange	734	177,525	1,616	(162,698)	17,177
Equity	—	35,150	709	(30,330)	5,529
Commodity	108	24,720	237	(15,880)	9,185
Total derivative receivables(e)	1,196	952,736	7,946	(902,201)	59,677
Total trading assets(f)	138,864	1,087,239	19,876	(902,201)	343,778
Available-for-sale securities:					
Mortgage-backed securities:					
U.S. government agencies(a)	—	55,066	—	—	55,066
Residential – nonagency	—	27,618	1	—	27,619
Commercial – nonagency	—	22,897	—	—	22,897
Total mortgage-backed securities	—	105,581	1	—	105,582
U.S. Treasury and government agencies(a)	10,998	38	—	—	11,036
Obligations of U.S. states and municipalities	—	33,550	—	—	33,550
Certificates of deposit	—	283	—	—	283
Non-U.S. government debt securities	23,199	13,477	—	—	36,676
Corporate debt securities	—	12,436	—	—	12,436
Asset-backed securities:					
Collateralized loan obligations	—	30,248	759	—	31,007
Other	—	9,033	64	—	9,097
Equity securities	2,087	—	—	—	2,087
Total available-for-sale securities	36,284	204,646	824	—	241,754
Loans	—	1,343	1,518	—	2,861
Mortgage servicing rights	—	—	6,608	—	6,608
Other assets:					
Private equity investments(g)	102	101	1,657	—	1,860
All other	3,815	28	744	—	4,587
Total other assets(f)	3,917	129	2,401	—	6,447
Total assets measured at fair value on a recurring basis	\$ 179,065	\$ 1,316,893	\$ 31,227	\$ (902,201)	\$ 624,984
Deposits	\$ —	\$ 9,566	\$ 2,950	\$ —	\$ 12,516
Federal funds purchased and securities loaned or sold under repurchase agreements	—	3,526	—	—	3,526

Other borrowed funds	—	9,272	639	—	9,911
Trading liabilities:					
Debt and equity instruments(d)	53,845	20,199	63	—	74,107
Derivative payables:					
Interest rate	216	633,060	1,890	(624,945)	10,221
Credit	—	48,460	2,069	(48,988)	1,541
Foreign exchange	669	187,890	2,341	(171,131)	19,769
Equity	—	36,440	2,223	(29,480)	9,183
Commodity	52	26,430	1,172	(15,578)	12,076
Total derivative payables(e)	937	932,280	9,695	(890,122)	52,790
Total trading liabilities	54,782	952,479	9,758	(890,122)	126,897
Accounts payable and other liabilities	4,382	—	19	—	4,401
Beneficial interests issued by consolidated VIEs	—	238	549	—	787
Long-term debt	—	21,452	11,613	—	33,065
Total liabilities measured at fair value on a recurring basis	\$ 59,164	\$ 996,533	\$ 25,528	\$ (890,122)	\$ 191,103

Notes to consolidated financial statements

- (a) At December 31, 2016 and 2015, included total U.S. government-sponsored enterprise obligations of \$80.6 billion and \$67.0 billion, respectively, which were predominantly mortgage-related.
- (b) At December 31, 2016 and 2015, included within trading loans were \$16.5 billion and \$11.8 billion, respectively, of residential first-lien mortgages, and \$3.3 billion and \$4.3 billion, respectively, of commercial first-lien mortgages. Residential mortgage loans include conforming mortgage loans originated with the intent to sell to U.S. government agencies of \$11.0 billion and \$5.3 billion, respectively, and reverse mortgages of \$2.0 billion and \$2.5 billion, respectively.
- (c) Physical commodities inventories are generally accounted for at the lower of cost or market. "Market" is a term defined in U.S. GAAP as not exceeding fair value less costs to sell ("transaction costs"). Transaction costs for the Firm's physical commodities inventories are either not applicable or immaterial to the value of the inventory. Therefore, market approximates fair value for the Firm's physical commodities inventories. When fair value hedging has been applied (or when market is below cost), the carrying value of physical commodities approximates fair value, because under fair value hedge accounting, the cost basis is adjusted for changes in fair value. For a further discussion of the Firm's hedge accounting relationships, see Note 6. To provide consistent fair value disclosure information, all physical commodities inventories have been included in each period presented.
- (d) Balances reflect the reduction of securities owned (long positions) by the amount of identical securities sold but not yet purchased (short positions).
- (e) As permitted under U.S. GAAP, the Firm has elected to net derivative receivables and derivative payables and the related cash collateral received and paid when a legally enforceable master netting agreement exists. For purposes of the tables above, the Firm does not reduce derivative receivables and derivative payables balances for this netting adjustment, either within or across the levels of the fair value hierarchy, as such netting is not relevant to a presentation based on the transparency of inputs to the valuation of an asset or liability. The level 3 balances would be reduced if netting were applied, including the netting benefit associated with cash collateral.
- (f) Certain investments that are measured at fair value using the net asset value per share (or its equivalent) as a practical expedient are not required to be classified in the fair value hierarchy. At December 31, 2016 and 2015, the fair values of these investments, which include certain hedge funds, private equity funds, real estate and other funds, were \$1.0 billion and \$1.2 billion, respectively. Included in the balances at December 31, 2016 and 2015, were trading assets of \$52 million and \$61 million, respectively, and other assets of \$1.0 billion and \$1.2 billion, respectively.
- (g) Private equity instruments represent investments within Corporate. The portion of the private equity investment portfolio carried at fair value on a recurring basis had a cost basis of \$2.5 billion and \$3.5 billion at December 31, 2016 and 2015, respectively.

Transfers between levels for instruments carried at fair value on a recurring basis

For the years ended December 31, 2016 and 2015, there were no significant transfers between levels 1 and 2.

During the year ended December 31, 2016, transfers from level 3 to level 2 included the following:

- \$1.4 billion of long-term debt driven by an increase in observability and a reduction of the significance in the unobservable inputs for certain structured notes.

During the year ended December 31, 2016, transfers from level 2 to level 3 included the following:

- \$1.1 billion of gross equity derivative receivables and \$1.0 billion of gross equity derivative payables as a result of a decrease in observability and an increase in the significance in unobservable inputs.
- \$1.0 billion of trading loans driven by a decrease in observability.

During the year ended December 31, 2015, transfers from level 3 to level 2 included the following:

- \$3.1 billion of long-term debt and \$1.0 billion of deposits driven by an increase in observability on certain structured notes with embedded interest rate and FX derivatives and a reduction of the significance in the unobservable inputs for certain structured notes with embedded equity derivatives.
- \$2.1 billion of gross equity derivatives for both receivables and payables as a result of an increase in observability and a decrease in the significance in unobservable inputs; partially offset by transfers into level 3 resulting in net transfers of approximately \$1.2 billion for both receivables and payables.
- \$2.8 billion of trading loans driven by an increase in observability of certain collateralized financing transactions.

During the year ended December 31, 2015, transfers from level 2 to level 3 included the following:

- \$2.4 billion of corporate debt driven by a decrease in the significance in the unobservable inputs and an increase in observability for certain structured products

During the year ended December 31, 2014, transfers from level 3 to level 2 included the following:

- \$4.3 billion and \$4.4 billion of gross equity derivative receivables and payables, respectively, due to increased observability of certain equity option valuation inputs
- \$2.7 billion of trading loans, \$2.6 billion of margin loans, \$2.3 billion of private equity investments, \$2.0 billion of corporate debt, and \$1.3 billion of long-term debt, based on increased liquidity and price transparency
- Transfers from level 2 into level 3 included \$1.1 billion of other borrowed funds, \$1.1 billion of trading loans and \$1.0 billion of long-term debt, based on a decrease in observability of valuation inputs and price transparency.

All transfers are assumed to occur at the beginning of the quarterly reporting period in which they occur.

Level 3 valuations

The Firm has established well-structured processes for determining fair value, including for instruments where fair value is estimated using significant unobservable inputs (level 3). For further information on the Firm's valuation process and a detailed discussion of the determination of fair value for individual financial instruments, see pages 150–153 of this Note.

Estimating fair value requires the application of judgment. The type and level of judgment required is largely dependent on the amount of observable market information available to the Firm. For instruments valued using internally developed models that use significant unobservable inputs and are therefore classified within level 3 of the fair value hierarchy, judgments used to estimate fair value are more significant than those required when estimating the fair value of instruments classified within levels 1 and 2.

In arriving at an estimate of fair value for an instrument within level 3, management must first determine the appropriate model to use. Second, due to the lack of observability of significant inputs, management must assess all relevant empirical data in deriving valuation inputs including, but not limited to, transaction details, yield curves, interest rates, prepayment speed, default rates, volatilities, correlations, equity or debt prices, valuations of comparable instruments, foreign exchange rates and credit curves.

The following table presents the Firm's primary level 3 financial instruments, the valuation techniques used to measure the fair value of those financial instruments, the significant unobservable inputs, the range of values for those inputs and, for certain instruments, the weighted averages of such inputs. While the determination to classify an instrument within level 3 is based on the significance of the unobservable inputs to the overall fair value measurement, level 3 financial instruments typically include observable components (that is, components that are actively quoted and can be validated to external sources) in addition to the unobservable components. The level 1 and/or level 2 inputs are not included in the table. In addition, the Firm manages the risk of the observable components of level 3 financial instruments using securities and derivative positions that are classified within levels 1 or 2 of the fair value hierarchy.

The range of values presented in the table is representative of the highest and lowest level input used to value the significant groups of instruments within a product/instrument classification. Where provided, the weighted averages of the input values presented in the table are calculated based on the fair value of the instruments that the input is being used to value.

In the Firm's view, the input range and the weighted average value do not reflect the degree of input uncertainty or an assessment of the reasonableness of the Firm's estimates and assumptions. Rather, they reflect the characteristics of the various instruments held by the Firm and the relative distribution of instruments within the range of characteristics. For example, two option contracts may have similar levels of market risk exposure and valuation uncertainty, but may have significantly different implied volatility levels because the option contracts have different underlyings, tenors, or strike prices. The input range and weighted average values will therefore vary from period-to-period and parameter-to-parameter based on the characteristics of the instruments held by the Firm at each balance sheet date.

For the Firm's derivatives and structured notes positions classified within level 3 at December 31, 2016, interest rate correlation inputs used in estimating fair value were concentrated towards the upper end of the range presented; equity correlation inputs were concentrated at the upper end of the range; the credit correlation inputs were distributed across the range presented; and the foreign exchange correlation inputs were concentrated at the upper end of the range presented. In addition, the interest rate volatility inputs used in estimating fair value were distributed across the range presented; equity volatilities were concentrated in the lower half end of the range; and forward commodity prices used in estimating the fair value of commodity derivatives were concentrated in the middle of the range presented.

Notes to consolidated financial statements

Level 3 inputs(a)

December 31, 2016 (in millions, except for ratios and basis points)

Product/Instrument	Fair value	Principal valuation technique	Unobservable inputs	Range of input values			Weighted average
Residential mortgage-backed securities and loans	\$ 2,861	Discounted cash flows	Yield	4%	-	18%	5%
			Prepayment speed	0%	-	20%	8%
			Conditional default rate	0%	-	34%	15%
			Loss severity	0%	-	90%	37%
Commercial mortgage-backed securities and loans(b)	1,555	Discounted cash flows	Yield	1%	-	32%	8%
			Conditional default rate	0%	-	100%	69%
			Loss severity		40%		40%
Corporate debt securities, obligations of U.S. states and municipalities, and other(c)	764	Discounted cash flows	Credit spread	40bps	-	375bps	96bps
			Yield	1%	-	17%	9%
	3,744	Market comparables	Price	\$ 0	-	\$121	\$91
Net interest rate derivatives	1,263	Option pricing	Interest rate correlation	(30)%	-	100%	
			Interest rate spread volatility	3%	-	38%	
Net credit derivatives(b)(c)	98	Discounted cash flows	Credit correlation	30%	-	85%	
Net foreign exchange derivatives	(1,384)	Option pricing	Foreign exchange correlation	(30)%	-	65%	
Net equity derivatives	(2,252)	Option pricing	Equity volatility	20%	-	60%	
Net commodity derivatives	(85)	Discounted cash flows	Forward commodity price	\$ 46	-	\$59 per barrel	
Collateralized loan obligations	663	Discounted cash flows	Credit spread	303bps	-	475bps	339bps
			Prepayment speed		20%		20%
			Conditional default rate		2%		2%
			Loss severity		30%		30%
	158	Market comparables	Price	\$ 0	-	\$111	\$73
MSRs	6,096	Discounted cash flows	Refer to Note 17				
Private equity investments	1,606	Market comparables	EBITDA multiple	6.4x	-	11.5x	7.9x
Long-term debt, other borrowed funds, and deposits(d)	16,669	Option pricing	Interest rate correlation	(30)%	-	100%	
			Interest rate spread volatility	3%	-	38%	
			Foreign exchange correlation	(30)%	-	65%	
			Equity correlation	(50)%	-	80%	
	476	Discounted cash flows	Credit correlation	30%	-	85%	

- (a) The categories presented in the table have been aggregated based upon the product type, which may differ from their classification on the Consolidated balance sheets. Furthermore, the inputs presented for each valuation technique in the table are, in some cases, not applicable to every instrument valued using the technique as the characteristics of the instruments can differ.
- (b) The unobservable inputs and associated input ranges for approximately \$394 million of credit derivative receivables and \$226 million of credit derivative payables with underlying commercial mortgage risk have been included in the inputs and ranges provided for commercial mortgage-backed securities and loans.
- (c) The unobservable inputs and associated input ranges for approximately \$362 million of credit derivative receivables and \$333 million of credit derivative payables with underlying ABS risk have been included in the inputs and ranges provided for corporate debt securities, obligations of U.S. states and municipalities and other.
- (d) Long-term debt, other borrowed funds and deposits include structured notes issued by the Firm that are predominantly financial instruments containing embedded derivatives. The estimation of the fair value of structured notes includes the derivative features embedded within the instrument. The significant unobservable inputs are broadly consistent with those presented for derivative receivables.

Changes in and ranges of unobservable inputs

The following discussion provides a description of the impact on a fair value measurement of a change in each unobservable input in isolation, and the interrelationship between unobservable inputs, where relevant and significant. The impact of changes in inputs may not be independent, as a change in one unobservable input may give rise to a change in another unobservable input. Where relationships do exist between two unobservable inputs, those relationships are discussed below. Relationships may also exist between observable and unobservable inputs (for example, as observable interest rates rise, unobservable prepayment rates decline); such relationships have not been included in the discussion below. In addition, for each of the individual relationships described below, the inverse relationship would also generally apply.

The following discussion also provides a description of attributes of the underlying instruments and external market factors that affect the range of inputs used in the valuation of the Firm's positions.

Yield – The yield of an asset is the interest rate used to discount future cash flows in a discounted cash flow calculation. An increase in the yield, in isolation, would result in a decrease in a fair value measurement.

Credit spread – The credit spread is the amount of additional annualized return over the market interest rate that a market participant would demand for taking exposure to the credit risk of an instrument. The credit spread for an instrument forms part of the discount rate used in a discounted cash flow calculation. Generally, an increase in the credit spread would result in a decrease in a fair value measurement.

The yield and the credit spread of a particular mortgage-backed security primarily reflect the risk inherent in the instrument. The yield is also impacted by the absolute level of the coupon paid by the instrument (which may not correspond directly to the level of inherent risk). Therefore, the range of yield and credit spreads reflects the range of risk inherent in various instruments owned by the Firm. The risk inherent in mortgage-backed securities is driven by the subordination of the security being valued and the characteristics of the underlying mortgages within the collateralized pool, including borrower FICO scores, LTV ratios for residential mortgages and the nature of the property and/or any tenants for commercial mortgages. For corporate debt securities, obligations of U.S. states and municipalities and other similar instruments, credit spreads reflect the credit quality of the obligor and the tenor of the obligation.

Prepayment speed – The prepayment speed is a measure of the voluntary unscheduled principal repayments of a prepayable obligation in a collateralized pool. Prepayment speeds generally decline as borrower delinquencies rise. An increase in prepayment speeds, in isolation, would result in a decrease in a fair value measurement of assets valued at a premium to par and an increase in a fair value measurement of assets valued at a discount to par.

Prepayment speeds may vary from collateral pool to collateral pool, and are driven by the type and location of the underlying borrower, and the remaining tenor of the obligation as well as the level and type (e.g., fixed or floating) of interest rate being paid by the borrower. Typically collateral pools with higher borrower credit quality have a higher prepayment rate than those with lower borrower credit quality, all other factors being equal.

Conditional default rate – The conditional default rate is a measure of the reduction in the outstanding collateral balance underlying a collateralized obligation as a result of defaults. While there is typically no direct relationship between conditional default rates and prepayment speeds, collateralized obligations for which the underlying collateral has high prepayment speeds will tend to have lower conditional default rates. An increase in conditional default rates would generally be accompanied by an increase in loss severity and an increase in credit spreads. An increase in the conditional default rate, in isolation, would result in a decrease in a fair value measurement. Conditional default rates reflect the quality of the collateral underlying a securitization and the structure of the securitization itself. Based on the types of securities owned in the Firm's market-making portfolios, conditional default rates are most typically at the lower end of the range presented.

Loss severity – The loss severity (the inverse concept is the recovery rate) is the expected amount of future realized losses resulting from the ultimate liquidation of a particular loan, expressed as the net amount of loss relative to the outstanding loan balance. An increase in loss severity is generally accompanied by an increase in conditional default rates. An increase in the loss severity, in isolation, would result in a decrease in a fair value measurement.

The loss severity applied in valuing a mortgage-backed security investment depends on factors relating to the underlying mortgages, including the LTV ratio, the nature of the lender's lien on the property and other instrument-specific factors.

Correlation – Correlation is a measure of the relationship between the movements of two variables (e.g., how the change in one variable influences the change in the other). Correlation is a pricing input for a derivative product where the payoff is driven by one or more underlying risks. Correlation inputs are related to the type of derivative (e.g., interest rate, credit, equity and foreign exchange) due to the nature of the underlying risks. When parameters are positively correlated, an increase in one parameter will result in an increase in the other parameter. When parameters are negatively correlated, an increase in one parameter will result in a decrease in the other parameter. An increase in correlation can result in an increase or a decrease in a fair value measurement. Given a short correlation position, an increase in correlation, in isolation, would generally result in a decrease in a fair value measurement. The range of correlation inputs between risks within the same asset class are generally narrower than those between underlying risks across asset classes. In addition, the ranges of credit correlation inputs tend to be narrower than those affecting other asset classes.

The level of correlation used in the valuation of derivatives with multiple underlying risks depends on a number of factors including the nature of those risks. For example, the correlation between two credit risk exposures would be different than that between two interest rate risk exposures. Similarly, the tenor of the transaction may also impact the correlation input, as the relationship between the underlying risks may be different over different time periods. Furthermore, correlation levels are very much dependent on market conditions and could have a relatively wide range of levels within or across asset classes over time, particularly in volatile market conditions.

Volatility – Volatility is a measure of the variability in possible returns for an instrument, parameter or market index given how much the particular instrument, parameter or index changes in value over time. Volatility is a pricing input for options, including equity options, commodity options, and interest rate options. Generally, the higher the volatility of the underlying, the riskier the instrument. Given a long position in an option, an increase in volatility, in isolation, would generally result in an increase in a fair value measurement.

The level of volatility used in the valuation of a particular option-based derivative depends on a number of factors, including the nature of the risk underlying the option (e.g., the volatility of a particular equity security may be significantly different from that of a particular commodity index), the tenor of the derivative as well as the strike price of the option.

EBITDA multiple – EBITDA multiples refer to the input (often derived from the value of a comparable company) that is multiplied by the historic and/or expected earnings before interest, taxes, depreciation and amortization (“EBITDA”) of a company in order to estimate the company’s value. An increase in the EBITDA multiple, in isolation, net of adjustments, would result in an increase in a fair value measurement.

Changes in level 3 recurring fair value measurements

The following tables include a rollforward of the Consolidated balance sheets amounts (including changes in fair value) for financial instruments classified by the Firm within level 3 of the fair value hierarchy for the years ended December 31, 2016, 2015 and 2014. When a determination is made to classify a financial instrument within level 3, the determination is based on the significance of the unobservable parameters to the overall fair value measurement. However, level 3 financial instruments typically include, in addition to the unobservable or level 3 components, observable components (that is, components that are actively quoted and can be validated to external sources); accordingly, the gains and losses in the table below include changes in fair value due in part to observable factors that are part of the valuation methodology. Also, the Firm risk-manages the observable components of level 3 financial instruments using securities and derivative positions that are classified within level 1 or 2 of the fair value hierarchy; as these level 1 and level 2 risk management instruments are not included below, the gains or losses in the following tables do not reflect the effect of the Firm’s risk management activities related to such level 3 instruments.

Year ended December 31, 2016 (in millions)	Fair value measurements using significant unobservable inputs							Change in unrealized gains/(losses) related to financial instruments held at Dec. 31, 2016	
	Fair value at January 1, 2016	Total realized/unrealized gains/(losses)	Purchases(g)	Sales	Settlements(h)	Transfers into and/or out of level 3(i)	Fair value at Dec. 31, 2016		
Assets:									
Trading assets:									
Debt instruments:									
Mortgage-backed securities:									
U.S. government agencies	\$ 715	\$ (20)	\$ 135	\$ (295)	\$ (115)	\$ (28)	\$ 392	\$ (36)	
Residential – nonagency	194	4	252	(319)	(20)	(28)	83	5	
Commercial – nonagency	115	(11)	69	(29)	(3)	(124)	17	3	
Total mortgage-backed securities	1,024	(27)	456	(643)	(138)	(180)	492	(28)	
Obligations of U.S. states and municipalities	651	19	149	(132)	(38)	—	649	—	
Non-U.S. government debt securities	74	(4)	91	(97)	(7)	(11)	46	(7)	
Corporate debt securities	736	2	445	(359)	(189)	(59)	576	(22)	
Loans	6,604	(343)	2,228	(2,598)	(1,311)	257	4,837	(169)	
Asset-backed securities	1,832	39	655	(712)	(968)	(544)	302	19	
Total debt instruments	10,921	(314)	4,024	(4,541)	(2,651)	(537)	6,902	(207)	
Equity securities	265	—	90	(108)	(40)	24	231	7	
Other	744	79	649	(287)	(360)	(64)	761	28	
Total trading assets – debt and equity instruments	11,930	(235) (c)	4,763	(4,936)	(3,051)	(577)	7,894	(172) (c)	
Net derivative receivables:(a)									
Interest rate	876	756	193	(57)	(713)	208	1,263	(144)	
Credit	549	(742)	10	(2)	211	72	98	(622)	
Foreign exchange	(725)	67	64	(124)	(649)	(17)	(1,384)	(350)	
Equity	(1,514)	(145)	277	(852)	213	(231)	(2,252)	(86)	
Commodity	(935)	194	1	10	645	—	(85)	(36)	
Total net derivative receivables	(1,749)	130 (c)	545	(1,025)	(293)	32	(2,360)	(1,238) (c)	
Available-for-sale securities:									
Asset-backed securities	823	1	—	—	(119)	(42)	663	1	
Other	1	—	—	—	—	—	1	—	
Total available-for-sale securities	824	1 (d)	—	—	(119)	(42)	664	1 (d)	
Loans	1,518	(49) (c)	259	(7)	(838)	(313)	570	— (c)	
Mortgage servicing rights	6,608	(163) (c)	679	(109)	(919)	—	6,096	(163) (c)	
Other assets:									
Private equity investments	1,657	80 (c)	457	(485)	(103)	—	1,606	1 (c)	
All other	744	50 (f)	30	(11)	(196)	—	617	47 (f)	

Year ended December 31, 2016 (in millions)	Fair value measurements using significant unobservable inputs								Change in unrealized (gains)/losses related to financial instruments held at Dec. 31, 2016
	Fair value at January 1, 2016	Total realized/unrealized (gains)/losses	Purchases(g)	Sales	Issuances	Settlements(h)	Transfers into and/or out of level 3(i)	Fair value at Dec. 31, 2016	
Liabilities:(b)									
Deposits	\$ 2,950	\$ (56) (c)	\$ —	\$ —	\$ 1,375	\$ (1,283)	\$ (869)	\$ 2,117	\$ 23 (c)
Federal funds purchased and securities loaned or sold under repurchase agreements	—	—	—	—	—	(2)	2	—	—
Other borrowed funds	639	(230) (c)	—	—	1,876	(1,210)	59	1,134	(70) (c)
Trading liabilities – debt and equity instruments	63	(12) (c)	(15)	23	—	(22)	6	43	(18) (c)
Accounts payable and other liabilities	19	—	—	—	—	(6)	—	13	—
Beneficial interests issued by consolidated VIEs	549	(31) (c)	—	—	143	(613)	—	48	6 (c)
Long-term debt	11,613	216 (c)	—	—	8,949	(5,810)	(1,074)	13,894	540 (c)

Notes to consolidated financial statements

Year ended December 31, 2015 (in millions)	Fair value measurements using significant unobservable inputs								Change in unrealized gains/(losses) related to financial instruments held at Dec. 31, 2015
	Fair value at January 1, 2015	Total realized/unrealized gains/(losses)	Purchases(g)	Sales	Settlements(h)	Transfers into and/or out of level 3(i)	Fair value at Dec. 31, 2015		
Assets:									
Trading assets:									
Debt instruments:									
Mortgage-backed securities:									
U.S. government agencies	\$ 922	\$ (28)	\$ 327	\$ (303)	\$ (132)	\$ (71)	\$ 715	\$ (27)	
Residential – nonagency	663	130	253	(611)	(23)	(218)	194	4	
Commercial – nonagency	306	(14)	246	(262)	(22)	(139)	115	(5)	
Total mortgage-backed securities	1,891	88	826	(1,176)	(177)	(428)	1,024	(28)	
Obligations of U.S. states and municipalities	1,273	14	352	(133)	(27)	(828)	651	(1)	
Non-U.S. government debt securities	302	9	205	(123)	(64)	(255)	74	(16)	
Corporate debt securities	2,989	(77)	1,171	(1,038)	(125)	(2,184)	736	2	
Loans	13,287	(174)	3,532	(4,661)	(3,112)	(2,268)	6,604	(181)	
Asset-backed securities	1,264	(41)	1,920	(1,229)	(35)	(47)	1,832	(32)	
Total debt instruments	21,006	(181)	8,006	(8,360)	(3,540)	(6,010)	10,921	(256)	
Equity securities	431	96	89	(193)	(26)	(132)	265	82	
Physical commodities	2	(2)	—	—	—	—	—	—	
Other	1,050	119	1,581	(1,313)	192	(885)	744	85	
Total trading assets – debt and equity instruments	22,489	32 (c)	9,676	(9,866)	(3,374)	(7,027)	11,930	(89) (c)	
Net derivative receivables:(a)									
Interest rate	626	962	513	(173)	(732)	(320)	876	263	
Credit	189	118	129	(136)	165	84	549	260	
Foreign exchange	(526)	657	19	(149)	(296)	(430)	(725)	49	
Equity	(1,785)	731	890	(1,262)	(158)	70	(1,514)	5	
Commodity	(565)	(856)	1	(24)	512	(3)	(935)	(41)	
Total net derivative receivables	(2,061)	1,612 (c)	1,552	(1,744)	(509)	(599)	(1,749)	536 (c)	
Available-for-sale securities:									
Asset-backed securities	908	(32)	51	(43)	(61)	—	823	(28)	
Other	129	—	—	—	(29)	(99)	1	—	
Total available-for-sale securities	1,037	(32) (d)	51	(43)	(90)	(99)	824	(28) (d)	
Loans	2,541	(133) (c)	1,290	(92)	(1,241)	(847)	1,518	(32) (c)	
Mortgage servicing rights	7,436	(405) (e)	985	(486)	(922)	—	6,608	(405) (e)	
Other assets:									
Private equity investments	2,225	(120) (c)	281	(362)	(187)	(180)	1,657	(304) (c)	
All other	959	91 (f)	65	(147)	(224)	—	744	15 (f)	

Year ended December 31, 2015 (in millions)	Fair value measurements using significant unobservable inputs								Change in unrealized (gains)/losses related to financial instruments held at Dec. 31, 2015
	Fair value at January 1, 2015	Total realized/unrealized (gains)/losses	Purchases(g)	Sales	Issuances	Settlements(h)	Transfers into and/or out of level 3(i)	Fair value at Dec. 31, 2015	
Liabilities:(b)									
Deposits	\$ 2,859	\$ (39) (c)	\$ —	\$ —	\$ 1,993	\$ (850)	\$ (1,013)	\$ 2,950	\$ (29) (c)
Other borrowed funds	1,453	(697) (c)	—	—	3,334	(2,963)	(488)	639	(57) (c)
Trading liabilities – debt and equity instruments	72	15 (c)	(163)	160	—	(17)	(4)	63	(4) (c)
Accounts payable and other liabilities	26	—	—	—	—	(7)	—	19	—
Beneficial interests issued by consolidated VIEs	1,146	(82) (c)	—	—	286	(574)	(227)	549	(63) (c)
Long-term debt	11,877	(480) (c)	(58)	—	9,359	(6,299)	(2,786)	11,613	385 (c)

Year ended December 31, 2014 (in millions)	Fair value measurements using significant unobservable inputs							Change in unrealized gains/(losses) related to financial instruments held at Dec. 31, 2014										
	Fair value at January 1, 2014	Total realized/unrealized gains/(losses)		Purchases(g)	Sales	Settlements(h)	Transfers into and/or out of level 3(i)			Fair value at Dec. 31, 2014								
Assets:																		
Trading assets:																		
Debt instruments:																		
Mortgage-backed securities:																		
U.S. government agencies	\$	1,005	\$	(97)	\$	351	\$	(186)	\$	(121)	\$	(30)	\$	922	\$	(92)		
Residential – nonagency		726		66		827		(761)		(41)		(154)		663		(15)		
Commercial – nonagency		432		17		980		(914)		(60)		(149)		306		(12)		
Total mortgage-backed securities											2,163	(14)	2,158	(1,861)	(222)	(333)	1,891	(119)
Obligations of U.S. states and municipalities		1,382		90		298		(358)		(139)		—		1,273		(27)		
Non-U.S. government debt securities		143		24		719		(617)		(3)		36		302		10		
Corporate debt securities		5,920		210		5,854		(3,372)		(4,531)		(1,092)		2,989		379		
Loans		13,455		387		13,551		(7,917)		(4,623)		(1,566)		13,287		123		
Asset-backed securities		1,272		19		2,240		(2,126)		(283)		142		1,264		(30)		
Total debt instruments											24,335	716	24,820	(16,251)	(9,801)	(2,813)	21,006	336
Equity securities		867		113		248		(259)		(286)		(252)		431		46		
Physical commodities		4		(1)		—		—		(1)		—		2		—		
Other		2,000		239		1,426		(276)		(201)		(2,138)		1,050		329		
Total trading assets – debt and equity instruments											27,206	1,067 (c)	26,494	(16,786)	(10,289)	(5,203)	22,489	711 (c)
Net derivative receivables:(a)																		
Interest rate		2,379		184		198		(256)		(1,771)		(108)		626		(853)		
Credit		95		(149)		272		(47)		92		(74)		189		(107)		
Foreign exchange		(1,200)		(137)		139		(27)		668		31		(526)		(62)		
Equity		(1,063)		154		2,044		(2,863)		10		(67)		(1,785)		583		
Commodity		115		(465)		1		(113)		(109)		6		(565)		(186)		
Total net derivative receivables											326	(413) (c)	2,654	(3,306)	(1,110)	(212)	(2,061)	(625) (c)
Available-for-sale securities:																		
Asset-backed securities		1,088		(41)		275		(2)		(101)		(311)		908		(40)		
Other		1,234		(19)		122		—		(223)		(985)		129		(2)		
Total available-for-sale securities											2,322	(60) (d)	397	(2)	(324)	(1,296)	1,037	(42) (d)
Loans		1,931		(254) (c)		3,258		(845)		(1,549)		—		2,541		(234) (c)		
Mortgage servicing rights		9,614		(1,826) (e)		768		(209)		(911)		—		7,436		(1,826) (e)		
Other assets:																		
Private equity investments		5,816		400 (c)		145		(1,967)		(197)		(1,972)		2,225		33 (c)		
All other		1,382		83 (f)		10		(357)		(159)		—		959		59 (f)		

	Fair value measurements using significant unobservable inputs										Change in unrealized (gains)/losses related to financial instruments held at Dec. 31, 2014
Year ended December 31, 2014 (in millions)	Fair value at January 1, 2014		Total realized/unrealized (gains)/losses	Purchases(g)	Sales	Issuances	Settlements(h)	Transfers into and/or out of level 3(i)	Fair value at Dec. 31, 2014		
Liabilities:(b)											
Deposits	\$	2,255	\$ 149 (c)	\$ —	\$ —	\$ 1,578	\$ (197)	\$ (926)	\$ 2,859	\$ 130 (c)	
Other borrowed funds		2,074	(596) (c)	—	—	5,377	(6,127)	725	1,453	(415) (c)	
Trading liabilities – debt and equity instruments		113	(5) (c)	(305)	323	—	(5)	(49)	72	2 (c)	
Accounts payable and other liabilities		—	27 (c)	—	—	—	(1)	—	26	—	
Beneficial interests issued by consolidated VIEs		1,240	(4) (c)	—	—	775	(763)	(102)	1,146	(22) (c)	
Long-term debt		10,008	(40) (c)	—	—	7,421	(5,231)	(281)	11,877	(9) (c)	

(a) All level 3 derivatives are presented on a net basis, irrespective of underlying counterparty.

(b) Level 3 liabilities as a percentage of total Firm liabilities accounted for at fair value (including liabilities measured at fair value on a nonrecurring basis) were 12%, 13% and 15% at December 31, 2016, 2015 and 2014, respectively.

Notes to consolidated financial statements

- (c) Predominantly reported in principal transactions revenue, except for changes in fair value for CCB mortgage loans, and lending-related commitments originated with the intent to sell, and mortgage loan purchase commitments, which are reported in mortgage fees and related income.
- (d) Realized gains/(losses) on AFS securities, as well as other-than-temporary impairment (“OTTI”) losses that are recorded in earnings, are reported in securities gains. Unrealized gains/(losses) are reported in OCI. Realized gains/(losses) and foreign exchange hedge accounting adjustments recorded in income on AFS securities were zero, \$(7) million, and \$(43) million for the years ended December 31, 2016, 2015 and 2014, respectively. Unrealized gains/(losses) recorded on AFS securities in OCI were \$1 million, \$(25) million and \$(16) million for the years ended December 31, 2016, 2015 and 2014, respectively.
- (e) Changes in fair value for CCB MSRs are reported in mortgage fees and related income.
- (f) Predominantly reported in other income.
- (g) Loan originations are included in purchases.
- (h) Includes financial assets and liabilities that have matured, been partially or fully repaid, impacts of modifications, and deconsolidation associated with beneficial interests in VIEs.
- (i) All transfers into and/or out of level 3 are assumed to occur at the beginning of the quarterly reporting period in which they occur.

Level 3 analysis

Consolidated balance sheets changes

Level 3 assets (including assets measured at fair value on a nonrecurring basis) were 1.0% of total Firm assets at December 31, 2016. The following describes significant changes to level 3 assets since December 31, 2015, for those items measured at fair value on a recurring basis. For further information on changes impacting items measured at fair value on a nonrecurring basis, see Assets and liabilities measured at fair value on a nonrecurring basis on page 165.

For the year ended December 31, 2016

Level 3 assets were \$23.2 billion at December 31, 2016, reflecting a decrease of \$8.0 billion from December 31, 2015. This decrease was driven by settlements (including repayments and restructurings) and transfers to Level 2 due to an increase in observability and a decrease in the significance of unobservable inputs. In particular:

- \$4.0 billion decrease in trading assets — debt and equity instruments was predominantly driven by a decrease of \$1.8 billion in trading loans largely due to settlements, and a \$1.5 billion decrease in asset-backed securities due to settlements and transfers from level 3 to level 2 as a result of increased observability of certain valuation inputs
- \$2.1 billion decrease in gross derivative receivables was driven by a decrease in credit and foreign exchange derivative receivables due to market movements and transfers from level 3 to level 2 as a result of increased observability of certain valuation inputs

Gains and losses

The following describes significant components of total realized/unrealized gains/(losses) for instruments measured at fair value on a recurring basis for the years ended December 31, 2016, 2015 and 2014. For further information on these instruments, see Changes in level 3 recurring fair value measurements rollforward tables on pages 160–164.

2016

- There were no individually significant movements for the year ended December 31, 2016.

2015

- \$1.6 billion of net gains in interest rate, foreign exchange and equity derivative receivables largely due to market movements; partially offset by losses on commodity derivatives due to market movements
- \$1.3 billion of net gains in liabilities due to market movements

2014

- \$1.8 billion of losses on MSRs. For further discussion of the change, refer to Note 17
- \$1.1 billion of net gains on trading assets — debt and equity instruments, largely driven by market movements and client-driven financing transactions

Credit and funding adjustments – derivatives

Derivatives are generally valued using models that use as their basis observable market parameters. These market parameters generally do not consider factors such as counterparty nonperformance risk, the Firm’s own credit quality, and funding costs. Therefore, it is generally necessary to make adjustments to the base estimate of fair value to reflect these factors.

CVA represents the adjustment, relative to the relevant benchmark interest rate, necessary to reflect counterparty nonperformance risk. The Firm estimates CVA using a scenario analysis to estimate the expected credit exposure across all of the Firm’s positions with each counterparty, and then estimates losses as a result of a counterparty credit event. The key inputs to this methodology are (i) the expected positive exposure to each counterparty based on a simulation that assumes the current population of existing derivatives with each counterparty remains unchanged and considers contractual factors designed to mitigate the Firm’s credit exposure, such as collateral and legal rights of offset; (ii) the probability of a default event occurring for each counterparty, as derived from observed or estimated CDS spreads; and (iii) estimated recovery rates implied by CDS spreads, adjusted to consider the differences in recovery rates as a derivative creditor relative to those reflected in CDS spreads, which generally reflect senior unsecured creditor risk.

DVA represents the adjustment, relative to the relevant benchmark interest rate, necessary to reflect the credit quality of the Firm. The derivative DVA calculation methodology is generally consistent with the CVA methodology described above and incorporates JPMorgan Chase’s credit spread as observed through the CDS market to estimate the PD and LGD as a result of a systemic event affecting the Firm.

FVA represents the adjustment to reflect the impact of funding and is recognized where there is evidence that a market participant in the principal market would incorporate it in a transfer of the instrument. The Firm’s FVA framework, applied to uncollateralized (including partially collateralized) OTC derivatives, leverages its existing CVA and DVA calculation methodologies, and considers the fact that the Firm’s own credit risk is a significant component of funding costs.

The key inputs to FVA are: (i) the expected funding requirements arising from the Firm's positions with each counterparty and collateral arrangements; (ii) for assets, the estimated market funding cost in the principal market; and (iii) for liabilities, the hypothetical market funding cost for a transfer to a market participant with a similar credit standing as the Firm. For collateralized derivatives, the fair value is estimated by discounting expected future cash flows at the relevant overnight indexed swap rate given the underlying collateral agreement with the counterparty, and therefore a separate FVA is not necessary.

The following table provides the impact of credit and funding adjustments on principal transactions revenue in the respective periods, excluding the effect of any associated hedging activities. The DVA and FVA reported below include the impact of the Firm's own credit quality on the inception value of liabilities as well as the impact of changes in the Firm's own credit quality over time.

Year ended December 31, (in millions)	2016	2015	2014
Credit adjustments:			
Derivatives CVA	\$ (84)	\$ 620	\$ (322)
Derivatives DVA and FVA	7	73	(58)

Valuation adjustments on fair value option elected liabilities

The valuation of the Firm's liabilities for which the fair value option has been elected requires consideration of the Firm's own credit risk. DVA on fair value option elected liabilities is measured using (i) the current fair value of the liability and (ii) changes (subsequent to the issuance of the liability) in the Firm's probability of default and LGD, which are estimated based on changes in the Firm's credit spread observed in the bond market. Effective January 1, 2016, the effect of DVA on fair value option elected liabilities is recognized in OCI. See Note 25 for further information.

Assets and liabilities measured at fair value on a nonrecurring basis

At December 31, 2016 and 2015, assets measured at fair value on a nonrecurring basis were \$1.6 billion and \$1.7 billion, respectively, consisting predominantly of loans that had fair value adjustments for the years ended December 31, 2016 and 2015. At December 31, 2016, \$735 million and \$822 million of these assets were classified in levels 2 and 3 of the fair value hierarchy, respectively. At December 31, 2015, \$696 million and \$959 million of these assets were classified in levels 2 and 3 of the fair value hierarchy, respectively. Liabilities measured at fair value on a nonrecurring basis were not significant at December 31, 2016 and 2015. For the years ended December 31, 2016, 2015 and 2014, there were no significant transfers between levels 1, 2 and 3 related to assets held at the balance sheet date.

Of the \$822 million in level 3 assets measured at fair value on a nonrecurring basis as of December 31, 2016:

- \$462 million related to residential real estate loans carried at the net realizable value of the underlying collateral (i.e., collateral-dependent loans and other loans charged off in accordance with regulatory

guidance). These amounts are classified as level 3, as they are valued using a broker's price opinion and discounted based upon the Firm's experience with actual liquidation values. These discounts to the broker price opinions ranged from 12% to 47%, with a weighted average of 25%.

The total change in the recorded value of assets and liabilities for which a fair value adjustment has been included in the Consolidated statements of income for the years ended December 31, 2016, 2015 and 2014, related to financial instruments held at those dates, were losses of \$172 million, \$294 million and \$992 million respectively; these reductions were predominantly associated with loans.

For further information about the measurement of impaired collateral-dependent loans, and other loans where the carrying value is based on the fair value of the underlying collateral (e.g., residential mortgage loans charged off in accordance with regulatory guidance), see Note 14.

Additional disclosures about the fair value of financial instruments that are not carried on the Consolidated balance sheets at fair value

U.S. GAAP requires disclosure of the estimated fair value of certain financial instruments, and the methods and significant assumptions used to estimate their fair value. Financial instruments within the scope of these disclosure requirements are included in the following table. However, certain financial instruments and all nonfinancial instruments are excluded from the scope of these disclosure requirements. Accordingly, the fair value disclosures provided in the following table include only a partial estimate of the fair value of JPMorgan Chase's assets and liabilities. For example, the Firm has developed long-term relationships with its customers through its deposit base and credit card accounts, commonly referred to as core deposit intangibles and credit card relationships. In the opinion of management, these items, in the aggregate, add significant value to JPMorgan Chase, but their fair value is not disclosed in this Note.

Financial instruments for which carrying value approximates fair value

Certain financial instruments that are not carried at fair value on the Consolidated balance sheets are carried at amounts that approximate fair value, due to their short-term nature and generally negligible credit risk. These instruments include cash and due from banks, deposits with banks, federal funds sold, securities purchased under resale agreements and securities borrowed, short-term receivables and accrued interest receivable, commercial paper, federal funds purchased, securities loaned and sold under repurchase agreements, other borrowed funds, accounts payable, and accrued liabilities. In addition, U.S. GAAP requires that the fair value of deposit liabilities with no stated maturity (i.e., demand, savings and certain money market deposits) be equal to their carrying value; recognition of the inherent funding value of these instruments is not permitted.

Notes to consolidated financial statements

The following table presents by fair value hierarchy classification the carrying values and estimated fair values at December 31, 2016 and 2015, of financial assets and liabilities, excluding financial instruments that are carried at fair value on a recurring basis, and their classification within the fair value hierarchy. For additional information regarding the financial instruments within the scope of this disclosure, and the methods and significant assumptions used to estimate their fair value, see pages 150–153 of this Note.

(in billions)	December 31, 2016					December 31, 2015				
	Carrying value	Estimated fair value hierarchy			Total estimated fair value	Carrying value	Estimated fair value hierarchy			Total estimated fair value
		Level 1	Level 2	Level 3			Level 1	Level 2	Level 3	
Financial assets										
Cash and due from banks	\$ 23.9	\$ 23.9	\$ —	\$ —	\$ 23.9	\$ 20.5	\$ 20.5	\$ —	\$ —	\$ 20.5
Deposits with banks	365.8	362.0	3.8	—	365.8	340.0	335.9	4.1	—	340.0
Accrued interest and accounts receivable	52.3	—	52.2	0.1	52.3	46.6	—	46.4	0.2	46.6
Federal funds sold and securities purchased under resale agreements	208.5	—	208.3	0.2	208.5	189.5	—	189.5	—	189.5
Securities borrowed	96.4	—	96.4	—	96.4	98.3	—	98.3	—	98.3
Securities, held-to-maturity	50.2	—	50.9	—	50.9	49.1	—	50.6	—	50.6
Loans, net of allowance for loan losses(a)	878.8	—	24.1	851.0	875.1	820.8	—	25.4	802.7	828.1
Other	71.4	0.1	60.8	14.3	75.2	66.0	0.1	56.3	14.3	70.7
Financial liabilities										
Deposits	\$ 1,361.3	\$ —	\$ 1,361.3	\$ —	\$ 1,361.3	\$ 1,267.2	\$ —	\$ 1,266.1	\$ 1.2	\$ 1,267.3
Federal funds purchased and securities loaned or sold under repurchase agreements	165.0	—	165.0	—	165.0	149.2	—	149.2	—	149.2
Commercial paper	11.7	—	11.7	—	11.7	15.6	—	15.6	—	15.6
Other borrowed funds	13.6	—	13.6	—	13.6	11.2	—	11.2	—	11.2
Accounts payable and other liabilities	148.0	—	144.8	3.4	148.2	144.6	—	141.7	2.8	144.5
Beneficial interests issued by consolidated VIEs	38.9	—	38.9	—	38.9	41.1	—	40.2	0.9	41.1
Long-term debt and junior subordinated deferrable interest debentures	257.5	—	260.0	2.0	262.0	255.6	—	257.4	4.3	261.7

(a) Fair value is typically estimated using a discounted cash flow model that incorporates the characteristics of the underlying loans (including principal, contractual interest rate and contractual fees) and other key inputs, including expected lifetime credit losses, interest rates, prepayment rates, and primary origination or secondary market spreads. For certain loans, the fair value is measured based on the value of the underlying collateral. The difference between the estimated fair value and carrying value of a financial asset or liability is the result of the different methodologies used to determine fair value as compared with carrying value. For example, credit losses are estimated for a financial asset's remaining life in a fair value calculation but are estimated for a loss emergence period in the allowance for loan loss calculation; future loan income (interest and fees) is incorporated in a fair value calculation but is generally not considered in the allowance for loan losses. For a further discussion of the Firm's methodologies for estimating the fair value of loans and lending-related commitments, see Valuation hierarchy on pages 150–153.

The majority of the Firm's lending-related commitments are not carried at fair value on a recurring basis on the Consolidated balance sheets, nor are they actively traded. The carrying value of the wholesale allowance for lending-related commitments and the estimated fair value of these wholesale lending-related commitments were as follows for the periods indicated.

(in billions)	December 31, 2016					December 31, 2015				
	Carrying value(a)	Estimated fair value hierarchy			Total estimated fair value	Carrying value(a)	Estimated fair value hierarchy			Total estimated fair value
		Level 1	Level 2	Level 3			Level 1	Level 2	Level 3	
Wholesale lending-related commitments	\$ 1.1	\$ —	\$ —	\$ 2.1	\$ 2.1	\$ 0.8	\$ —	\$ —	\$ 3.0	\$ 3.0

(a) Excludes the current carrying values of the guarantee liability and the offsetting asset, each of which is recognized at fair value at the inception of the guarantees.

The Firm does not estimate the fair value of consumer lending-related commitments. In many cases, the Firm can reduce or cancel these commitments by providing the borrower notice or, in some cases as permitted by law, without notice. For a further discussion of the valuation of lending-related commitments, see page 151 of this Note.

Note 4 – Fair value option

The fair value option provides an option to elect fair value as an alternative measurement for selected financial assets, financial liabilities, unrecognized firm commitments, and written loan commitments.

The Firm has elected to measure certain instruments at fair value for several reasons including to mitigate income statement volatility caused by the differences between the measurement basis of elected instruments (e.g. certain instruments elected were previously accounted for on an accrual basis) and the associated risk management arrangements that are accounted for on a fair value basis, as well as to better reflect those instruments that are managed on a fair value basis.

The Firm's election of fair value includes the following instruments:

- Loans purchased or originated as part of securitization warehousing activity, subject to bifurcation accounting, or managed on a fair value basis
- Certain securities financing arrangements with an embedded derivative and/or a maturity of greater than one year
- Owned beneficial interests in securitized financial assets that contain embedded credit derivatives, which would otherwise be required to be separately accounted for as a derivative instrument
- Structured notes, which are predominantly financial instruments that contain embedded derivatives, that are issued as part of CIB's client-driven activities
- Certain long-term beneficial interests issued by CIB's consolidated securitization trusts where the underlying assets are carried at fair value

Changes in fair value under the fair value option election

The following table presents the changes in fair value included in the Consolidated statements of income for the years ended December 31, 2016, 2015 and 2014, for items for which the fair value option was elected. The profit and loss information presented below only includes the financial instruments that were elected to be measured at fair value; related risk management instruments, which are required to be measured at fair value, are not included in the table.

December 31, (in millions)	2016			2015			2014		
	Principal transactions	All other income	Total changes in fair value recorded	Principal transactions	All other income	Total changes in fair value recorded	Principal transactions	All other income	Total changes in fair value recorded
Federal funds sold and securities purchased under resale agreements	\$ (76)	\$ —	\$ (76)	\$ (38)	\$ —	\$ (38)	\$ (15)	\$ —	\$ (15)
Securities borrowed	1	—	1	(6)	—	(6)	(10)	—	(10)
Trading assets:									
Debt and equity instruments, excluding loans	120	(1) (c)	119	756	(10) (c)	746	639	—	639
Loans reported as trading assets:									
Changes in instrument-specific credit risk	461	43 (c)	504	138	41 (c)	179	885	29 (c)	914
Other changes in fair value	79	684 (c)	763	232	818 (c)	1,050	352	1,353 (c)	1,705
Loans:									
Changes in instrument-specific credit risk	13	—	13	35	—	35	40	—	40
Other changes in fair value	(7)	—	(7)	4	—	4	34	—	34
Other assets	20	62 (d)	82	79	(1) (d)	78	24	6 (d)	30
Deposits(a)	(134)	—	(134)	93	—	93	(287)	—	(287)
Federal funds purchased and securities loaned or sold under repurchase agreements(a)	19	—	19	8	—	8	(33)	—	(33)
Other borrowed funds(a)	(236)	—	(236)	1,996	—	1,996	(891)	—	(891)
Trading liabilities	6	—	6	(20)	—	(20)	(17)	—	(17)
Beneficial interests issued by consolidated VIEs	23	—	23	49	—	49	(233)	—	(233)
Other liabilities	—	—	—	—	—	—	(27)	—	(27)
Long-term debt:									
DVA on fair value option elected liabilities (a)	—	—	—	300	—	300	101	—	101
Other changes in fair value(b)	(773)	—	(773)	1,088	—	1,088	(615)	—	(615)

(a) Effective January 1, 2016, unrealized gains/(losses) due to instrument-specific credit risk (DVA) for liabilities for which the fair value option has been elected is recorded in OCI, while realized gains/(losses) are recorded in principal transactions revenue. DVA for 2015 and 2014 was included in principal transactions revenue, and includes the impact of the Firm's own credit quality on the inception value of liabilities as well as the impact of changes in the Firm's own credit quality subsequent to issuance. See Notes 3 and 25 for further information.

(b) Long-term debt measured at fair value predominantly relates to structured notes containing embedded derivatives. Although the risk associated with the structured notes is actively managed, the gains/(losses) reported in this table do not include the income statement impact of the risk management instruments used to manage such risk.

(c) Reported in mortgage fees and related income.

(d) Reported in other income.

Notes to consolidated financial statements

Determination of instrument-specific credit risk for items for which a fair value election was made

The following describes how the gains and losses that are attributable to changes in instrument-specific credit risk, were determined.

- Loans and lending-related commitments: For floating-rate instruments, all changes in value are attributed to instrument-specific credit risk. For fixed-rate instruments, an allocation of the changes in value for the period is made between those changes in value that are interest rate-related and changes in value that are credit-related. Allocations are generally based on an analysis of borrower-specific credit spread and recovery information, where available, or benchmarking to similar entities or industries.

- Long-term debt: Changes in value attributable to instrument-specific credit risk were derived principally from observable changes in the Firm's credit spread.
- Resale and repurchase agreements, securities borrowed agreements and securities lending agreements: Generally, for these types of agreements, there is a requirement that collateral be maintained with a market value equal to or in excess of the principal amount loaned; as a result, there would be no adjustment or an immaterial adjustment for instrument-specific credit risk related to these agreements.

Difference between aggregate fair value and aggregate remaining contractual principal balance outstanding

The following table reflects the difference between the aggregate fair value and the aggregate remaining contractual principal balance outstanding as of December 31, 2016 and 2015, for loans, long-term debt and long-term beneficial interests for which the fair value option has been elected.

December 31, (in millions)	2016			2015		
	Contractual principal outstanding	Fair value	Fair value over/(under) contractual principal outstanding	Contractual principal outstanding	Fair value	Fair value over/(under) contractual principal outstanding
Loans(a)						
Nonaccrual loans						
Loans reported as trading assets	\$ 3,338	\$ 748	\$ (2,590)	\$ 3,484	\$ 631	\$ (2,853)
Loans	—	—	—	7	7	—
Subtotal	3,338	748	(2,590)	3,491	638	(2,853)
All other performing loans						
Loans reported as trading assets	35,477	33,054	(2,423)	30,780	28,184	(2,596)
Loans	2,259	2,228	(31)	2,771	2,752	(19)
Total loans	\$ 41,074	\$ 36,030	\$ (5,044)	\$ 37,042	\$ 31,574	\$ (5,468)
Long-term debt						
Principal-protected debt	\$ 21,602 (c)	\$ 19,195	\$ (2,407)	\$ 17,910 (c)	\$ 16,611	\$ (1,299)
Nonprincipal-protected debt(b)	NA	18,491	NA	NA	16,454	NA
Total long-term debt	NA	\$ 37,686	NA	NA	\$ 33,065	NA
Long-term beneficial interests						
Nonprincipal-protected debt	NA	\$ 120	NA	NA	\$ 787	NA
Total long-term beneficial interests	NA	\$ 120	NA	NA	\$ 787	NA

(a) There were no performing loans that were ninety days or more past due as of December 31, 2016 and 2015, respectively.

(b) Remaining contractual principal is not applicable to nonprincipal-protected notes. Unlike principal-protected structured notes, for which the Firm is obligated to return a stated amount of principal at the maturity of the note, nonprincipal-protected structured notes do not obligate the Firm to return a stated amount of principal at maturity, but to return an amount based on the performance of an underlying variable or derivative feature embedded in the note. However, investors are exposed to the credit risk of the Firm as issuer for both nonprincipal-protected and principal protected notes.

(c) Where the Firm issues principal-protected zero-coupon or discount notes, the balance reflects the contractual principal payment at maturity or, if applicable, the contractual principal payment at the Firm's next call date.

At December 31, 2016 and 2015, the contractual amount of lending-related commitments for which the fair value option was elected was \$4.6 billion for both years, with a corresponding fair value of \$(118) million and \$(94) million, respectively. For further information regarding off-balance sheet lending-related financial instruments, see Note 29.

Structured note products by balance sheet classification and risk component

The table below presents the fair value of the structured notes issued by the Firm, by balance sheet classification and the primary risk type.

(in millions)	December 31, 2016				December 31, 2015			
	Long-term debt	Other borrowed funds	Deposits	Total	Long-term debt	Other borrowed funds	Deposits	Total
Risk exposure								
Interest rate	\$ 16,296	\$ 184	\$ 4,296	\$ 20,776	\$ 12,531	\$ 58	\$ 3,340	\$ 15,929
Credit	3,267	225	—	3,492	3,195	547	—	3,742
Foreign exchange	2,365	135	6	2,506	1,765	77	11	1,853
Equity	14,831	8,234	5,481	28,546	14,293	8,447	4,993	27,733
Commodity	488	37	1,811	2,336	640	50	1,981	2,671
Total structured notes	\$ 37,247	\$ 8,815	\$ 11,594	\$ 57,656	\$ 32,424	\$ 9,179	\$ 10,325	\$ 51,928

Note 5 – Credit risk concentrations

Concentrations of credit risk arise when a number of customers are engaged in similar business activities or activities in the same geographic region, or when they have similar economic features that would cause their ability to meet contractual obligations to be similarly affected by changes in economic conditions.

JPMorgan Chase regularly monitors various segments of its credit portfolios to assess potential credit risk concentrations and to obtain collateral when deemed necessary. Senior management is significantly involved in the credit approval and review process, and risk levels are adjusted as needed to reflect the Firm's risk appetite.

In the Firm's consumer portfolio, concentrations are evaluated primarily by product and by U.S. geographic region, with a key focus on trends and concentrations at the portfolio level, where potential credit risk concentrations can be remedied through changes in underwriting policies and portfolio guidelines. In the wholesale portfolio, credit risk concentrations are evaluated primarily by industry and monitored regularly on both an aggregate portfolio level and on an individual customer basis. The Firm's wholesale exposure is managed through loan syndications and participations, loan sales, securitizations, credit derivatives, master netting agreements, and collateral and other risk-reduction techniques. For additional information on loans, see Note 14.

The Firm does not believe that its exposure to any particular loan product (e.g., option ARMs), or industry segment (e.g., commercial real estate), or its exposure to residential real estate loans with high LTV ratios, results in a significant concentration of credit risk.

Terms of loan products and collateral coverage are included in the Firm's assessment when extending credit and establishing its allowance for loan losses.

The table below presents both on-balance sheet and off-balance sheet consumer and wholesale-related credit exposure by the Firm's three credit portfolio segments as of December 31, 2016 and 2015.

December 31, (in millions)	2016				2015			
	Credit exposure	On-balance sheet		Off-balance sheet ^(g)	Credit exposure	On-balance sheet		Off-balance sheet ^(g)
		Loans	Derivatives			Loans	Derivatives	
Consumer, excluding credit card	\$ 419,441	\$ 364,644	\$ —	\$ 54,797	\$ 403,299	\$ 344,821	\$ —	\$ 58,478
Receivables from customers ^(a)	120	—	—	—	125	—	—	—
Total Consumer, excluding credit card	419,561	364,644	—	54,797	403,424	344,821	—	58,478
Credit Card	695,707	141,816	—	553,891	646,981	131,463	—	515,518
Total consumer-related	1,115,268	506,460	—	608,688	1,050,405	476,284	—	573,996
Wholesale-related^(b)								
Real Estate	135,041	106,315	222	28,504	116,857	92,820	312	23,725
Consumer & Retail	85,435	29,842	1,082	54,511	85,460	27,175	1,573	56,712
Technology, Media & Telecommunications	62,950	13,845	1,227	47,878	57,382	11,079	1,032	45,271
Industrials	55,449	17,150	1,615	36,684	54,386	16,791	1,428	36,167
Healthcare	47,866	15,120	2,277	30,469	46,053	16,965	2,751	26,337
Banks & Finance Cos	44,614	19,460	12,232	12,922	43,398	20,401	10,218	12,779
Oil & Gas	40,099	13,079	1,878	25,142	42,077	13,343	1,902	26,832
Asset Managers	31,886	10,539	10,819	10,528	23,815	6,703	7,733	9,379
Utilities	29,622	7,183	883	21,556	30,853	5,294	1,689	23,870
State & Municipal Govt ^(c)	28,263	12,416	2,096	13,751	29,114	9,626	3,287	16,201
Central Govt	20,408	3,964	14,235	2,209	17,968	2,000	13,240	2,728
Transportation	19,029	8,942	751	9,336	19,227	9,157	1,575	8,495
Automotive	16,635	4,943	1,190	10,502	13,864	4,473	1,350	8,041
Chemicals & Plastics	14,988	5,287	271	9,430	15,232	4,033	369	10,830
Metals & Mining	13,419	4,350	439	8,630	14,049	4,622	607	8,820
Insurance	13,151	947	3,382	8,822	11,889	1,094	1,992	8,803
Financial Markets Infrastructure	8,732	347	3,884	4,501	7,973	724	2,602	4,647
Securities Firms	3,867	794	1,913	1,160	4,412	861	1,424	2,127
All other ^(d)	144,428	109,267	3,682	31,479	149,117	109,889	4,593	34,635
Subtotal	815,882	383,790	64,078	368,014	783,126	357,050	59,677	366,399
Loans held-for-sale and loans at fair value	4,515	4,515	—	—	3,965	3,965	—	—
Receivables from customers and other ^(a)	17,440	—	—	—	13,372	—	—	—
Total wholesale-related	837,837	388,305	64,078	368,014	800,463	361,015	59,677	366,399
Total exposure^{(e)(f)}	\$ 1,953,105	\$ 894,765	\$ 64,078	\$ 976,702	\$ 1,850,868	\$ 837,299	\$ 59,677	\$ 940,395

(a) Receivables from customers primarily represent margin loans to brokerage customers that are collateralized through assets maintained in the clients' brokerage accounts, as such no allowance is held against these receivables. These receivables are reported within accrued interest and accounts receivable on the Firm's Consolidated balance sheets.

(b) The industry rankings presented in the table as of December 31, 2015, are based on the industry rankings of the corresponding exposures at December 31, 2016, not actual rankings of such exposures at December 31, 2015.

(c) In addition to the credit risk exposure to states and municipal governments (both U.S. and non-U.S.) at December 31, 2016 and 2015, noted above, the Firm held: \$9.1 billion and 7.6 billion, respectively, of trading securities; \$31.6 billion and \$33.6 billion, respectively, of AFS securities; and \$14.5 billion and \$12.8 billion, respectively, of HTM securities, issued by U.S. state and municipal governments. For further information, see Note 3 and Note 12.

(d) All other includes: individuals; SPEs; holding companies; and private education and civic organizations. For more information on exposures to SPEs, see Note 16.

(e) For further information regarding on-balance sheet credit concentrations by major product and/or geography, see Note 6 and Note 14. For information regarding concentrations of off-balance sheet lending-related financial instruments by major product, see Note 29.

(f) Excludes cash placed with banks of \$380.2 billion and \$351.0 billion, at December 31, 2016 and 2015, respectively, which is predominantly placed with various central banks, primarily Federal Reserve Banks.

(g) Represents lending-related financial instruments.

Note 6 – Derivative instruments

Derivative contracts derive their value from underlying asset prices, indices, reference rates, other inputs or a combination of these factors and may expose counterparties to risks and rewards of an underlying asset or liability without having to initially invest in, own or exchange the asset or liability. JPMorgan Chase makes markets in derivatives for clients and also uses derivatives to hedge or manage its own risk exposures. Predominantly all of the Firm's derivatives are entered into for market-making or risk management purposes.

Market-making derivatives

The majority of the Firm's derivatives are entered into for market-making purposes. Clients use derivatives to mitigate or modify interest rate, credit, foreign exchange, equity and commodity risks. The Firm actively manages the risks from its exposure to these derivatives by entering into other derivative transactions or by purchasing or selling other financial instruments that partially or fully offset the exposure from client derivatives.

Risk management derivatives

The Firm manages certain market and credit risk exposures using derivative instruments, including derivatives in hedge accounting relationships and other derivatives that are used to manage risks associated with specified assets and liabilities.

Interest rate contracts are used to minimize fluctuations in earnings that are caused by changes in interest rates. Fixed-rate assets and liabilities appreciate or depreciate in market value as interest rates change. Similarly, interest income and expense increases or decreases as a result of variable-rate assets and liabilities resetting to current market rates, and as a result of the repayment and subsequent origination or issuance of fixed-rate assets and liabilities at current market rates. Gains or losses on the derivative instruments that are related to such assets and liabilities are expected to substantially offset this variability in earnings. The Firm generally uses interest rate swaps, forwards and futures to manage the impact of interest rate fluctuations on earnings.

Foreign currency forward contracts are used to manage the foreign exchange risk associated with certain foreign currency-denominated (i.e., non-U.S. dollar) assets and liabilities and forecasted transactions, as well as the Firm's net investments in certain non-U.S. subsidiaries or branches whose functional currencies are not the U.S. dollar. As a result of fluctuations in foreign currencies, the U.S. dollar-equivalent values of the foreign currency-denominated assets and liabilities or the forecasted revenues or expenses increase or decrease. Gains or losses on the derivative instruments related to these foreign currency-denominated assets or liabilities, or forecasted transactions, are expected to substantially offset this variability.

Commodities contracts are used to manage the price risk of certain commodities inventories. Gains or losses on these derivative instruments are expected to substantially offset the depreciation or appreciation of the related inventory.

Credit derivatives are used to manage the counterparty credit risk associated with loans and lending-related commitments. Credit derivatives compensate the purchaser when the entity referenced in the contract experiences a credit event, such as bankruptcy or a failure to pay an obligation when due. Credit derivatives primarily consist of CDS. For a further discussion of credit derivatives, see the discussion in the Credit derivatives section on pages 184–186 of this Note.

For more information about risk management derivatives, see the risk management derivatives gains and losses table on page 184 of this Note, and the hedge accounting gains and losses tables on pages 182–184 of this Note.

Derivative counterparties and settlement types

The Firm enters into OTC derivatives, which are negotiated and settled bilaterally with the derivative counterparty. The Firm also enters into, as principal, certain ETD such as futures and options, and OTC-cleared derivative contracts with CCPs. ETD contracts are generally standardized contracts traded on an exchange and cleared by the CCP, which is the Firm's counterparty from the inception of the transactions. OTC-cleared derivatives are traded on a bilateral basis and then novated to the CCP for clearing.

Derivative clearing services

The Firm provides clearing services for clients where the Firm acts as a clearing member with respect to certain derivative exchanges and clearing houses. The Firm does not reflect the clients' derivative contracts in its Consolidated Financial Statements. For further information on the Firm's clearing services, see Note 29.

Accounting for derivatives

All free-standing derivatives that the Firm executes for its own account are required to be recorded on the Consolidated balance sheets at fair value.

As permitted under U.S. GAAP, the Firm nets derivative assets and liabilities, and the related cash collateral receivables and payables, when a legally enforceable master netting agreement exists between the Firm and the derivative counterparty. For further discussion of the offsetting of assets and liabilities, see Note 1. The accounting for changes in value of a derivative depends on whether or not the transaction has been designated and qualifies for hedge accounting. Derivatives that are not designated as hedges are reported and measured at fair value through earnings. The tabular disclosures on pages 178–184 of this Note provide additional information on the amount of, and reporting for, derivative assets, liabilities, gains and losses. For further discussion of derivatives embedded in structured notes, see Notes 3 and 4.

Derivatives designated as hedges

The Firm applies hedge accounting to certain derivatives executed for risk management purposes – generally interest rate, foreign exchange and commodity derivatives. However, JPMorgan Chase does not seek to apply hedge accounting to all of the derivatives involved in the Firm’s risk management activities. For example, the Firm does not apply hedge accounting to purchased CDS used to manage the credit risk of loans and lending-related commitments, because of the difficulties in qualifying such contracts as hedges. For the same reason, the Firm does not apply hedge accounting to certain interest rate, foreign exchange, and commodity derivatives used for risk management purposes.

To qualify for hedge accounting, a derivative must be highly effective at reducing the risk associated with the exposure being hedged. In addition, for a derivative to be designated as a hedge, the risk management objective and strategy must be documented. Hedge documentation must identify the derivative hedging instrument, the asset or liability or forecasted transaction and type of risk to be hedged, and how the effectiveness of the derivative is assessed prospectively and retrospectively. To assess effectiveness, the Firm uses statistical methods such as regression analysis, as well as nonstatistical methods including dollar-value comparisons of the change in the fair value of the derivative to the change in the fair value or cash flows of the hedged item. The extent to which a derivative has been, and is expected to continue to be, effective at offsetting changes in the fair value or cash flows of the hedged item must be assessed and documented at least quarterly. Any hedge ineffectiveness (i.e., the amount by which the gain or loss on the designated derivative instrument does not exactly offset the change in the hedged item attributable to the hedged risk) must be reported in current-period earnings. If it is determined that a derivative is not highly effective at hedging the designated exposure, hedge accounting is discontinued.

There are three types of hedge accounting designations: fair value hedges, cash flow hedges and net investment hedges. JPMorgan Chase uses fair value hedges primarily to hedge fixed-rate long-term debt, AFS securities and certain commodities inventories. For qualifying fair value hedges, the changes in the fair value of the derivative, and in the value of the hedged item for the risk being hedged, are recognized in earnings. If the hedge relationship is terminated, then the adjustment to the hedged item continues to be reported as part of the basis of the hedged item, and for benchmark interest rate hedges, is amortized to earnings as a yield adjustment. Derivative amounts affecting earnings are recognized consistent with the classification of the hedged item – primarily net interest income and principal transactions revenue.

JPMorgan Chase uses cash flow hedges primarily to hedge the exposure to variability in forecasted cash flows from floating-rate assets and liabilities and foreign currency–denominated revenue and expense. For qualifying cash flow hedges, the effective portion of the change in the fair value of the derivative is recorded in OCI and recognized in the Consolidated statements of income when the hedged cash flows affect earnings. Derivative amounts affecting earnings are recognized consistent with the classification of the hedged item – primarily interest income, interest expense, noninterest revenue and compensation expense. The ineffective portions of cash flow hedges are immediately recognized in earnings. If the hedge relationship is terminated, then the value of the derivative recorded in AOCI is recognized in earnings when the cash flows that were hedged affect earnings. For hedge relationships that are discontinued because a forecasted transaction is not expected to occur according to the original hedge forecast, any related derivative values recorded in AOCI are immediately recognized in earnings.

JPMorgan Chase uses net investment hedges to protect the value of the Firm’s net investments in certain non-U.S. subsidiaries or branches whose functional currencies are not the U.S. dollar. For foreign currency qualifying net investment hedges, changes in the fair value of the derivatives are recorded in the translation adjustments account within AOCI.

Notes to consolidated financial statements

The following table outlines the Firm's primary uses of derivatives and the related hedge accounting designation or disclosure category.

Type of Derivative	Use of Derivative	Designation and disclosure	Affected segment or unit	Page reference
Manage specifically identified risk exposures in qualifying hedge accounting relationships:				
◦ Interest rate	Hedge fixed rate assets and liabilities	Fair value hedge	Corporate	182
◦ Interest rate	Hedge floating-rate assets and liabilities	Cash flow hedge	Corporate	183
◦ Foreign exchange	Hedge foreign currency-denominated assets and liabilities	Fair value hedge	Corporate	182
◦ Foreign exchange	Hedge forecasted revenue and expense	Cash flow hedge	Corporate	183
◦ Foreign exchange	Hedge the value of the Firm's investments in non-U.S. dollar functional currency entities	Net investment hedge	Corporate	184
◦ Commodity	Hedge commodity inventory	Fair value hedge	CIB	182
Manage specifically identified risk exposures not designated in qualifying hedge accounting relationships:				
◦ Interest rate	Manage the risk of the mortgage pipeline, warehouse loans and MSRs	Specified risk management	CCB	184
◦ Credit	Manage the credit risk of wholesale lending exposures	Specified risk management	CIB	184
◦ Commodity	Manage the risk of certain commodities-related contracts and investments	Specified risk management	CIB	184
◦ Interest rate and foreign exchange	Manage the risk of certain other specified assets and liabilities	Specified risk management	Corporate	184
Market-making derivatives and other activities:				
◦ Various	Market-making and related risk management	Market-making and other	CIB	184
◦ Various	Other derivatives	Market-making and other	CIB, Corporate	184

Notional amount of derivative contracts

The following table summarizes the notional amount of derivative contracts outstanding as of December 31, 2016 and 2015.

December 31, (in billions)	Notional amounts(b)	
	2016	2015
Interest rate contracts		
Swaps	\$ 22,000	\$ 24,162
Futures and forwards	5,289	5,167
Written options	3,091	3,506
Purchased options	3,482	3,896
Total interest rate contracts	33,862	36,731
Credit derivatives(a)	2,032	2,900
Foreign exchange contracts		
Cross-currency swaps	3,359	3,199
Spot, futures and forwards	5,341	5,028
Written options	734	690
Purchased options	721	706
Total foreign exchange contracts	10,155	9,623
Equity contracts		
Swaps	258	232
Futures and forwards	59	43
Written options	417	395
Purchased options	345	326
Total equity contracts	1,079	996
Commodity contracts		
Swaps	102	83
Spot, futures and forwards	130	99
Written options	83	115
Purchased options	94	112
Total commodity contracts	409	409
Total derivative notional amounts	\$ 47,537	\$ 50,659

(a) For more information on volumes and types of credit derivative contracts, see the Credit derivatives discussion on pages 184–186.

(b) Represents the sum of gross long and gross short third-party notional derivative contracts.

While the notional amounts disclosed above give an indication of the volume of the Firm's derivatives activity, the notional amounts significantly exceed, in the Firm's view, the possible losses that could arise from such transactions. For most derivative transactions, the notional amount is not exchanged; it is used simply as a reference to calculate payments.

Notes to consolidated financial statements

Impact of derivatives on the Consolidated balance sheets

The following table summarizes information on derivative receivables and payables (before and after netting adjustments) that are reflected on the Firm's Consolidated balance sheets as of December 31, 2016 and 2015, by accounting designation (e.g., whether the derivatives were designated in qualifying hedge accounting relationships or not) and contract type.

Free-standing derivative receivables and payables^(a)

December 31, 2016 (in millions)	Gross derivative receivables				Net derivative receivables(b)	Gross derivative payables				Net derivative payables(b)						
	Not designated as hedges	Designated as hedges	Total derivative receivables	Not designated as hedges		Designated as hedges	Total derivative payables									
Trading assets and liabilities																
Interest rate	\$	601,557	\$	4,406	\$	605,963	\$	28,302	\$	567,894	\$	2,884	\$	570,778	\$	10,815
Credit		29,645		—		29,645		1,294		28,666		—		28,666		1,411
Foreign exchange		232,137		1,289		233,426		23,271		233,823		1,148		234,971		20,508
Equity		34,940		—		34,940		4,939		38,362		—		38,362		8,140
Commodity		18,505		137		18,642		6,272		20,283		179		20,462		8,357
Total fair value of trading assets and liabilities	\$	916,784	\$	5,832	\$	922,616	\$	64,078	\$	889,028	\$	4,211	\$	893,239	\$	49,231

December 31, 2015 (in millions)	Gross derivative receivables			Net derivative receivables(b)	Gross derivative payables			Net derivative payables(b)	
	Not designated as hedges	Designated as hedges	Total derivative receivables		Not designated as hedges	Designated as hedges	Total derivative payables		
Trading assets and liabilities									
Interest rate	\$ 665,531	\$ 4,080	\$ 669,611	\$ 26,363	\$ 632,928	\$ 2,238	\$ 635,166	\$ 10,221	
Credit	51,468	—	51,468	1,423	50,529	—	50,529	1,541	
Foreign exchange	179,072	803	179,875	17,177	189,397	1,503	190,900	19,769	
Equity	35,859	—	35,859	5,529	38,663	—	38,663	9,183	
Commodity	23,713	1,352	25,065	9,185	27,653	1	27,654	12,076	
Total fair value of trading assets and liabilities	\$ 955,643	\$ 6,235	\$ 961,878	\$ 59,677	\$ 939,170	\$ 3,742	\$ 942,912	\$ 52,790	

(a) Balances exclude structured notes for which the fair value option has been elected. See Note 4 for further information.

(b) As permitted under U.S. GAAP, the Firm has elected to net derivative receivables and derivative payables and the related cash collateral receivables and payables when a legally enforceable master netting agreement exists.

Derivatives netting

The following tables present, as of December 31, 2016 and 2015, gross and net derivative receivables and payables by contract and settlement type. Derivative receivables and payables, as well as the related cash collateral from the same counterparty, have been netted on the Consolidated balance sheets where the Firm has obtained an appropriate legal opinion with respect to the master netting agreement. Where such a legal opinion has not been either sought or obtained, amounts are not eligible for netting on the Consolidated balance sheets, and those derivative receivables and payables are shown separately in the tables below.

In addition to the cash collateral received and transferred that is presented on a net basis with derivative receivables and payables, the Firm receives and transfers additional collateral (financial instruments and cash). These amounts mitigate counterparty credit risk associated with the Firm's derivative instruments, but are not eligible for net presentation:

- collateral that consists of non-cash financial instruments (generally U.S. government and agency securities and other G7 government bonds) and cash collateral held at third party custodians, which are shown separately as "Collateral not nettable on the Consolidated balance sheets" in the tables below, up to the fair value exposure amount.
- the amount of collateral held or transferred that exceeds the fair value exposure at the individual counterparty level, as of the date presented, which is excluded from the tables below; and
- collateral held or transferred that relates to derivative receivables or payables where an appropriate legal opinion has not been either sought or obtained with respect to the master netting agreement, which is excluded from the tables below.

December 31, (in millions)	2016			2015		
	Gross derivative receivables	Amounts netted on the Consolidated balance sheets	Net derivative receivables	Gross derivative receivables	Amounts netted on the Consolidated balance sheets	Net derivative receivables
U.S. GAAP nettable derivative receivables						
Interest rate contracts:						
OTC	\$ 365,227	\$ (342,173)	\$ 23,054	\$ 417,386	\$ (396,506)	\$ 20,880
OTC-cleared	235,399	(235,261)	138	246,750	(246,742)	8
Exchange-traded(a)	241	(227)	14	—	—	—
Total interest rate contracts	600,867	(577,661)	23,206	664,136	(643,248)	20,888
Credit contracts:						
OTC	23,130	(22,612)	518	44,082	(43,182)	900
OTC-cleared	5,746	(5,739)	7	6,866	(6,863)	3
Total credit contracts	28,876	(28,351)	525	50,948	(50,045)	903
Foreign exchange contracts:						
OTC	226,271	(208,962)	17,309	175,060	(162,377)	12,683
OTC-cleared	1,238	(1,165)	73	323	(321)	2
Exchange-traded(a)	104	(27)	77	—	—	—
Total foreign exchange contracts	227,613	(210,154)	17,459	175,383	(162,698)	12,685
Equity contracts:						
OTC	20,868	(20,570)	298	20,690	(20,439)	251
OTC-cleared	—	—	—	—	—	—
Exchange-traded(a)	11,439	(9,431)	2,008	12,285	(9,891)	2,394
Total equity contracts	32,307	(30,001)	2,306	32,975	(30,330)	2,645
Commodity contracts:						
OTC	11,571	(5,605)	5,966	15,001	(6,772)	8,229
OTC-cleared	—	—	—	—	—	—
Exchange-traded(a)	6,794	(6,766)	28	9,199	(9,108)	91
Total commodity contracts	18,365	(12,371)	5,994	24,200	(15,880)	8,320
Derivative receivables with appropriate legal opinions	908,028	(858,538) (b)	49,490	947,642	(902,201) (b)	45,441
Derivative receivables where an appropriate legal opinion has not been either sought or obtained	14,588		14,588	14,236		14,236
Total derivative receivables recognized on the Consolidated balance sheets	\$ 922,616		\$ 64,078	\$ 961,878		\$ 59,677
Collateral not nettable on the Consolidated balance sheets(c)(d)			(18,638)			(13,543)
Net amounts			\$ 45,440			\$ 46,134

Notes to consolidated financial statements

December 31, (in millions)	2016			2015		
	Gross derivative payables	Amounts netted on the Consolidated balance sheets	Net derivative payables	Gross derivative payables	Amounts netted on the Consolidated balance sheets	Net derivative payables
U.S. GAAP nettable derivative payables						
Interest rate contracts:						
OTC	\$ 338,502	\$ (329,325)	\$ 9,177	\$ 393,709	\$ (384,576)	\$ 9,133
OTC-cleared	230,464	(230,463)	1	240,398	(240,369)	29
Exchange-traded(a)	196	(175)	21	—	—	—
Total interest rate contracts	569,162	(559,963)	9,199	634,107	(624,945)	9,162
Credit contracts:						
OTC	22,366	(21,614)	752	44,379	(43,019)	1,360
OTC-cleared	5,641	(5,641)	—	5,969	(5,969)	—
Total credit contracts	28,007	(27,255)	752	50,348	(48,988)	1,360
Foreign exchange contracts:						
OTC	228,300	(213,296)	15,004	185,178	(170,830)	14,348
OTC-cleared	1,158	(1,158)	—	301	(301)	—
Exchange-traded(a)	328	(9)	319	—	—	—
Total foreign exchange contracts	229,786	(214,463)	15,323	185,479	(171,131)	14,348
Equity contracts:						
OTC	24,688	(20,808)	3,880	23,458	(19,589)	3,869
OTC-cleared	—	—	—	—	—	—
Exchange-traded(a)	10,004	(9,414)	590	10,998	(9,891)	1,107
Total equity contracts	34,692	(30,222)	4,470	34,456	(29,480)	4,976
Commodity contracts:						
OTC	12,885	(5,252)	7,633	16,953	(6,256)	10,697
OTC-cleared	—	—	—	—	—	—
Exchange-traded(a)	7,099	(6,853)	246	9,374	(9,322)	52
Total commodity contracts	19,984	(12,105)	7,879	26,327	(15,578)	10,749
Derivative payables with appropriate legal opinions	881,631	(844,008) (b)	37,623	930,717	(890,122) (b)	40,595
Derivative payables where an appropriate legal opinion has not been either sought or obtained	11,608		11,608	12,195		12,195
Total derivative payables recognized on the Consolidated balance sheets	\$ 893,239		\$ 49,231	\$ 942,912		\$ 52,790
Collateral not nettable on the Consolidated balance sheets(c)(d)			(8,925)			(7,957)
Net amounts			\$ 40,306			\$ 44,833

(a) Exchange-traded derivative balances that relate to futures contracts are settled daily.

(b) Net derivatives receivable included cash collateral netted of \$71.9 billion and \$73.7 billion at December 31, 2016 and 2015, respectively. Net derivatives payable included cash collateral netted of \$57.3 billion and \$61.6 billion related to OTC and OTC-cleared derivatives at December 31, 2016 and 2015, respectively.

(c) Excludes all collateral related to derivative instruments where an appropriate legal opinion has not been either sought or obtained.

(d) Represents liquid security collateral as well as cash collateral held at third-party custodians related to derivative instruments where an appropriate legal opinion has been obtained. For some counterparties, the collateral amounts of financial instruments may exceed the derivative receivables and derivative payables balances. Where this is the case, the total amount reported is limited to the net derivative receivables and net derivative payables balances with that counterparty.

(e) Derivative payables collateral relates only to OTC and OTC-cleared derivative instruments. Amounts exclude collateral transferred related to exchange-traded derivative instruments.

Liquidity risk and credit-related contingent features

In addition to the specific market risks introduced by each derivative contract type, derivatives expose JPMorgan Chase to credit risk — the risk that derivative counterparties may fail to meet their payment obligations under the derivative contracts and the collateral, if any, held by the Firm proves to be of insufficient value to cover the payment obligation. It is the policy of JPMorgan Chase to actively pursue, where possible, the use of legally enforceable master netting arrangements and collateral agreements to mitigate derivative counterparty credit risk. The amount of derivative receivables reported on the Consolidated balance sheets is the fair value of the derivative contracts after giving effect to legally enforceable master netting agreements and cash collateral held by the Firm.

While derivative receivables expose the Firm to credit risk, derivative payables expose the Firm to liquidity risk, as the derivative contracts typically require the Firm to post cash or securities collateral with counterparties as the fair value

of the contracts moves in the counterparties' favor or upon specified downgrades in the Firm's and its subsidiaries' respective credit ratings. Certain derivative contracts also provide for termination of the contract, generally upon a downgrade of either the Firm or the counterparty, at the fair value of the derivative contracts. The following table shows the aggregate fair value of net derivative payables related to OTC and OTC-cleared derivatives that contain contingent collateral or termination features that may be triggered upon a ratings downgrade, and the associated collateral the Firm has posted in the normal course of business, at December 31, 2016 and 2015.

OTC and OTC-cleared derivative payables containing downgrade triggers

December 31, (in millions)	2016	2015
Aggregate fair value of net derivative payables	\$ 21,550	\$ 22,328
Collateral posted	19,383	18,942

The following table shows the impact of a single-notch and two-notch downgrade of the long-term issuer ratings of JPMorgan Chase & Co. and its subsidiaries, predominantly JPMorgan Chase Bank, National Association ("JPMorgan Chase Bank, N.A."), at December 31, 2016 and 2015, related to OTC and OTC-cleared derivative contracts with contingent collateral or termination features that may be triggered upon a ratings downgrade. Derivatives contracts generally require additional collateral to be posted or terminations to be triggered when the predefined threshold rating is breached. A downgrade by a single rating agency that does not result in a rating lower than a preexisting corresponding rating provided by another major rating agency will generally not result in additional collateral (except in certain instances in which additional initial margin may be required upon a ratings downgrade), nor in termination payments requirements. The liquidity impact in the table is calculated based upon a downgrade below the lowest current rating of the rating agencies referred to in the derivative contract.

Liquidity impact of downgrade triggers on OTC and OTC-cleared derivatives

December 31, (in millions)	2016		2015	
	Single-notch downgrade	Two-notch downgrade	Single-notch downgrade	Two-notch downgrade
Amount of additional collateral to be posted upon downgrade(a)	\$ 560	\$ 2,497	\$ 807	\$ 3,028
Amount required to settle contracts with termination triggers upon downgrade(b)	606	1,049	271	1,093

(a) Includes the additional collateral to be posted for initial margin.

(b) Amounts represent fair values of derivative payables, and do not reflect collateral posted.

Derivatives executed in contemplation of a sale of the underlying financial asset

In certain instances the Firm enters into transactions in which it transfers financial assets but maintains the economic exposure to the transferred assets by entering into a derivative with the same counterparty in contemplation of the initial transfer. The Firm generally accounts for such transfers as collateralized financing transactions as described in Note 13, but in limited circumstances they may qualify to be accounted for as a sale and a derivative under U.S. GAAP. The amount of such transfers accounted for as a sale where the associated derivative was outstanding at December 31, 2016 was not material.

Notes to consolidated financial statements

Impact of derivatives on the Consolidated statements of income

The following tables provide information related to gains and losses recorded on derivatives based on their hedge accounting designation or purpose.

Fair value hedge gains and losses

The following tables present derivative instruments, by contract type, used in fair value hedge accounting relationships, as well as pre-tax gains/(losses) recorded on such derivatives and the related hedged items for the years ended December 31, 2016, 2015 and 2014, respectively. The Firm includes gains/(losses) on the hedging derivative and the related hedged item in the same line item in the Consolidated statements of income.

Year ended December 31, 2016 (in millions)	Gains/(losses) recorded in income			Income statement impact due to:	
	Derivatives	Hedged items	Total income statement impact	Hedge ineffectiveness(e)	Excluded components(f)
Contract type					
Interest rate(a)(b)	\$ (482)	\$ 1,338	\$ 856	\$ 6	\$ 850
Foreign exchange(c)	2,435	(2,261)	174	—	174
Commodity(d)	(536)	586	50	(9)	59
Total	\$ 1,417	\$ (337)	\$ 1,080	\$ (3)	\$ 1,083

Year ended December 31, 2015 (in millions)	Gains/(losses) recorded in income			Income statement impact due to:	
	Derivatives	Hedged items	Total income statement impact	Hedge ineffectiveness(e)	Excluded components(f)
Contract type					
Interest rate(a)(b)	\$ 38	\$ 911	\$ 949	\$ 3	\$ 946
Foreign exchange(c)	6,030	(6,006)	24	—	24
Commodity(d)	1,153	(1,142)	11	(13)	24
Total	\$ 7,221	\$ (6,237)	\$ 984	\$ (10)	\$ 994

Year ended December 31, 2014 (in millions)	Gains/(losses) recorded in income			Income statement impact due to:	
	Derivatives	Hedged items	Total income statement impact	Hedge ineffectiveness(e)	Excluded components(f)
Contract type					
Interest rate(a)(b)	\$ 2,106	\$ (801)	\$ 1,305	\$ 131	\$ 1,174
Foreign exchange(c)	8,279	(8,532)	(253)	—	(253)
Commodity(d)	49	145	194	42	152
Total	\$ 10,434	\$ (9,188)	\$ 1,246	\$ 173	\$ 1,073

(a) Primarily consists of hedges of the benchmark (e.g., London Interbank Offered Rate ("LIBOR")) interest rate risk of fixed-rate long-term debt and AFS securities. Gains and losses were recorded in net interest income.

(b) Excludes the amortization expense associated with the inception hedge accounting adjustment applied to the hedged item. This expense is recorded in net interest income and substantially offsets the income statement impact of the excluded components.

(c) Primarily consists of hedges of the foreign currency risk of long-term debt and AFS securities for changes in spot foreign currency rates. Gains and losses related to the derivatives and the hedged items, due to changes in foreign currency rates, were recorded primarily in principal transactions revenue and net interest income.

(d) Consists of overall fair value hedges of physical commodities inventories that are generally carried at the lower of cost or market (market approximates fair value). Gains and losses were recorded in principal transactions revenue.

(e) Hedge ineffectiveness is the amount by which the gain or loss on the designated derivative instrument does not exactly offset the gain or loss on the hedged item attributable to the hedged risk.

(f) The assessment of hedge effectiveness excludes certain components of the changes in fair values of the derivatives and hedged items such as forward points on foreign exchange forward contracts and time values.

Cash flow hedge gains and losses

The following tables present derivative instruments, by contract type, used in cash flow hedge accounting relationships, and the pre-tax gains/(losses) recorded on such derivatives, for the years ended December 31, 2016, 2015 and 2014, respectively. The Firm includes the gain/(loss) on the hedging derivative and the change in cash flows on the hedged item in the same line item in the Consolidated statements of income.

Year ended December 31, 2016 (in millions)	Gains/(losses) recorded in income and other comprehensive income/(loss)				
	Derivatives – effective portion reclassified from AOCI to income	Hedge ineffectiveness recorded directly in income(c)	Total income statement impact	Derivatives – effective portion recorded in OCI	Total change in OCI for period
Contract type					
Interest rate(a)	\$ (74)	\$ —	\$ (74)	\$ (55)	\$ 19
Foreign exchange(b)	(286)	—	(286)	(395)	(109)
Total	\$ (360)	\$ —	\$ (360)	\$ (450)	\$ (90)

Year ended December 31, 2015 (in millions)	Gains/(losses) recorded in income and other comprehensive income/(loss)				
	Derivatives – effective portion reclassified from AOCI to income	Hedge ineffectiveness recorded directly in income(c)	Total income statement impact	Derivatives – effective portion recorded in OCI	Total change in OCI for period
Contract type					
Interest rate(a)	\$ (99)	\$ —	\$ (99)	\$ (44)	\$ 55
Foreign exchange(b)	(81)	—	(81)	(53)	28
Total	\$ (180)	\$ —	\$ (180)	\$ (97)	\$ 83

Year ended December 31, 2014 (in millions)	Gains/(losses) recorded in income and other comprehensive income/(loss)				
	Derivatives – effective portion reclassified from AOCI to income	Hedge ineffectiveness recorded directly in income(c)	Total income statement impact	Derivatives – effective portion recorded in OCI	Total change in OCI for period
Contract type					
Interest rate(a)	\$ (54)	\$ —	\$ (54)	\$ 189	\$ 243
Foreign exchange(b)	78	—	78	(91)	(169)
Total	\$ 24	\$ —	\$ 24	\$ 98	\$ 74

- (a) Primarily consists of benchmark interest rate hedges of LIBOR-indexed floating-rate assets and floating-rate liabilities. Gains and losses were recorded in net interest income, and for the forecasted transactions that the Firm determined during the year ended December 31, 2015, were probable of not occurring, in other income.
- (b) Primarily consists of hedges of the foreign currency risk of non-U.S. dollar-denominated revenue and expense. The income statement classification of gains and losses follows the hedged item – primarily noninterest revenue and compensation expense.
- (c) Hedge ineffectiveness is the amount by which the cumulative gain or loss on the designated derivative instrument exceeds the present value of the cumulative expected change in cash flows on the hedged item attributable to the hedged risk.

The Firm did not experience any forecasted transactions that failed to occur for the years ended 2016 and 2014. In 2015, the Firm reclassified approximately \$150 million of net losses from AOCI to other income because the Firm determined that it was probable that the forecasted interest payment cash flows would not occur as a result of the planned reduction in wholesale non-operating deposits.

Over the next 12 months, the Firm expects that approximately \$151 million (after-tax) of net losses recorded in AOCI at December 31, 2016, related to cash flow hedges will be recognized in income. For terminated cash flow hedges, the maximum length of time over which forecasted transactions are remaining is approximately six years. For open cash flow hedges, the maximum length of time over which forecasted transactions are hedged is approximately one year. The Firm's longer-dated forecasted transactions relate to core lending and borrowing activities.

Notes to consolidated financial statements

Net investment hedge gains and losses

The following table presents hedging instruments, by contract type, that were used in net investment hedge accounting relationships, and the pre-tax gains/(losses) recorded on such instruments for the years ended December 31, 2016, 2015 and 2014.

Year ended December 31, (in millions)	Gains/(losses) recorded in income and other comprehensive income/(loss)					
	2016		2015		2014	
	Excluded components recorded directly in income(a)	Effective portion recorded in OCI	Excluded components recorded directly in income(a)	Effective portion recorded in OCI	Excluded components recorded directly in income(a)	Effective portion recorded in OCI
Foreign exchange derivatives	\$(282)	\$262	\$(379)	\$1,885	\$(448)	\$1,698

(a) Certain components of hedging derivatives are permitted to be excluded from the assessment of hedge effectiveness, such as forward points on foreign exchange forward contracts. Amounts related to excluded components are recorded in other income. The Firm measures the ineffectiveness of net investment hedge accounting relationships based on changes in spot foreign currency rates and, therefore, there was no significant ineffectiveness for net investment hedge accounting relationships during 2016, 2015 and 2014.

Gains and losses on derivatives used for specified risk management purposes

The following table presents pre-tax gains/(losses) recorded on a limited number of derivatives, not designated in hedge accounting relationships, that are used to manage risks associated with certain specified assets and liabilities, including certain risks arising from the mortgage pipeline, warehouse loans, MSRs, wholesale lending exposures, foreign currency denominated assets and liabilities, and commodities-related contracts and investments.

Year ended December 31, (in millions)	Derivatives gains/(losses) recorded in income		
	2016	2015	2014
Contract type			
Interest rate(a)	\$ 1,174	\$ 853	\$ 2,308
Credit(b)	(282)	70	(58)
Foreign exchange(c)	27	25	(7)
Commodity(d)	—	(12)	156
Total	\$ 919	\$ 936	\$ 2,399

(a) Primarily represents interest rate derivatives used to hedge the interest rate risk inherent in the mortgage pipeline, warehouse loans and MSRs, as well as written commitments to originate warehouse loans. Gains and losses were recorded predominantly in mortgage fees and related income.

(b) Relates to credit derivatives used to mitigate credit risk associated with lending exposures in the Firm's wholesale businesses. These derivatives do not include credit derivatives used to mitigate counterparty credit risk arising from derivative receivables, which is included in gains and losses on derivatives related to market-making activities and other derivatives. Gains and losses were recorded in principal transactions revenue.

(c) Primarily relates to derivatives used to mitigate foreign exchange risk of specified foreign currency-denominated assets and liabilities. Gains and losses were recorded in principal transactions revenue.

(d) Primarily relates to commodity derivatives used to mitigate energy price risk associated with energy-related contracts and investments. Gains and losses were recorded in principal transactions revenue.

Gains and losses on derivatives related to market-making activities and other derivatives

The Firm makes markets in derivatives in order to meet the needs of customers and uses derivatives to manage certain risks associated with net open risk positions from its market-making activities, including the counterparty credit risk arising from derivative receivables. All derivatives not included in the hedge accounting or specified risk management categories above are included in this category. Gains and losses on these derivatives are primarily recorded in principal transactions revenue. See Note 7 for information on principal transactions revenue.

Credit derivatives

Credit derivatives are financial instruments whose value is derived from the credit risk associated with the debt of a third-party issuer (the reference entity) and which allow one party (the protection purchaser) to transfer that risk to another party (the protection seller). Credit derivatives expose the protection purchaser to the creditworthiness of the protection seller, as the protection seller is required to make payments under the contract when the reference entity experiences a credit event, such as a bankruptcy, a failure to pay its obligation or a restructuring. The seller of credit protection receives a premium for providing protection but has the risk that the underlying instrument referenced in the contract will be subject to a credit event.

The Firm is both a purchaser and seller of protection in the credit derivatives market and uses these derivatives for two primary purposes. First, in its capacity as a market-maker, the Firm actively manages a portfolio of credit derivatives by purchasing and selling credit protection, predominantly on corporate debt obligations, to meet the needs of customers. Second, as an end-user, the Firm uses credit derivatives to manage credit risk associated with lending exposures (loans and unfunded commitments) and derivatives counterparty exposures in the Firm's wholesale businesses, and to manage the credit risk arising from certain financial instruments in the Firm's market-making businesses. Following is a summary of various types of credit derivatives.

Credit default swaps

Credit derivatives may reference the credit of either a single reference entity (“single-name”) or a broad-based index. The Firm purchases and sells protection on both single- name and index-reference obligations. Single-name CDS and index CDS contracts are either OTC or OTC-cleared derivative contracts. Single-name CDS are used to manage the default risk of a single reference entity, while index CDS contracts are used to manage the credit risk associated with the broader credit markets or credit market segments. Like the S&P 500 and other market indices, a CDS index consists of a portfolio of CDS across many reference entities. New series of CDS indices are periodically established with a new underlying portfolio of reference entities to reflect changes in the credit markets. If one of the reference entities in the index experiences a credit event, then the reference entity that defaulted is removed from the index. CDS can also be referenced against specific portfolios of reference names or against customized exposure levels based on specific client demands: for example, to provide protection against the first \$1 million of realized credit losses in a \$10 million portfolio of exposure. Such structures are commonly known as tranche CDS.

For both single-name CDS contracts and index CDS contracts, upon the occurrence of a credit event, under the terms of a CDS contract neither party to the CDS contract has recourse to the reference entity. The protection purchaser has recourse to the protection seller for the difference between the face value of the CDS contract and the fair value of the reference obligation at settlement of the credit derivative contract, also known as the recovery value. The protection purchaser does not need to hold the debt instrument of the underlying reference entity in order to receive amounts due under the CDS contract when a credit event occurs.

Credit-related notes

A credit-related note is a funded credit derivative where the issuer of the credit-related note purchases from the note investor credit protection on a reference entity or an index. Under the contract, the investor pays the issuer the par value of the note at the inception of the transaction, and in return, the issuer pays periodic payments to the investor, based on the credit risk of the referenced entity. The issuer also repays the investor the par value of the note at maturity unless the reference entity (or one of the entities that makes up a reference index) experiences a specified credit event. If a credit event occurs, the issuer is not obligated to repay the par value of the note, but rather, the issuer pays the investor the difference between the par value of the note and the fair value of the defaulted reference obligation at the time of settlement. Neither party to the credit-related note has recourse to the defaulting reference entity.

The following tables present a summary of the notional amounts of credit derivatives and credit-related notes the Firm sold and purchased as of December 31, 2016 and 2015. Upon a credit event, the Firm as a seller of protection would typically pay out only a percentage of the full notional amount of net protection sold, as the amount actually required to be paid on the contracts takes into account the recovery value of the reference obligation at the time of settlement. The Firm manages the credit risk on contracts to sell protection by purchasing protection with identical or similar underlying reference entities. Other purchased protection referenced in the following tables includes credit derivatives bought on related, but not identical, reference positions (including indices, portfolio coverage and other reference points) as well as protection purchased through credit-related notes.

Notes to consolidated financial statements

The Firm does not use notional amounts of credit derivatives as the primary measure of risk management for such derivatives, because the notional amount does not take into account the probability of the occurrence of a credit event, the recovery value of the reference obligation, or related cash instruments and economic hedges, each of which reduces, in the Firm's view, the risks associated with such derivatives.

Total credit derivatives and credit-related notes

December 31, 2016 (in millions)	Maximum payout/Notional amount			
	Protection sold	Protection purchased with identical underlyings(b)	Net protection (sold)/purchased(c)	Other protection purchased(d)
Credit derivatives				
Credit default swaps	\$ (961,003)	\$ 974,252	\$ 13,249	\$ 7,935
Other credit derivatives(a)	(36,829)	31,859	(4,970)	19,991
Total credit derivatives	(997,832)	1,006,111	8,279	27,926
Credit-related notes	(41)	—	(41)	4,505
Total	\$ (997,873)	\$ 1,006,111	\$ 8,238	\$ 32,431

December 31, 2015 (in millions)	Maximum payout/Notional amount			
	Protection sold	Protection purchased with identical underlyings(b)	Net protection (sold)/purchased(c)	Other protection purchased(d)
Credit derivatives				
Credit default swaps	\$ (1,386,071)	\$ 1,402,201	\$ 16,130	\$ 12,011
Other credit derivatives(a)	(42,738)	38,158	(4,580)	18,792
Total credit derivatives	(1,428,809)	1,440,359	11,550	30,803
Credit-related notes	(30)	—	(30)	4,715
Total	\$ (1,428,839)	\$ 1,440,359	\$ 11,520	\$ 35,518

(a) Other credit derivatives largely consists of credit swap options.

(b) Represents the total notional amount of protection purchased where the underlying reference instrument is identical to the reference instrument on protection sold; the notional amount of protection purchased for each individual identical underlying reference instrument may be greater or lower than the notional amount of protection sold.

(c) Does not take into account the fair value of the reference obligation at the time of settlement, which would generally reduce the amount the seller of protection pays to the buyer of protection in determining settlement value.

(d) Represents protection purchased by the Firm on referenced instruments (single-name, portfolio or index) where the Firm has not sold any protection on the identical reference instrument.

The following tables summarize the notional amounts by the ratings, maturity profile, and total fair value, of credit derivatives and credit-related notes as of December 31, 2016 and 2015, where JPMorgan Chase is the seller of protection. The maturity profile is based on the remaining contractual maturity of the credit derivative contracts. The ratings profile is based on the rating of the reference entity on which the credit derivative contract is based. The ratings and maturity profile of credit derivatives and credit-related notes where JPMorgan Chase is the purchaser of protection are comparable to the profile reflected below.

Protection sold – credit derivatives and credit-related notes ratings(a)/maturity profile

December 31, 2016 (in millions)	<1 year	1–5 years	>5 years	Total notional amount	Fair value of receivables(b)	Fair value of payables(b)	Net fair value
Risk rating of reference entity							
Investment-grade	\$ (273,688)	\$ (383,586)	\$ (39,281)	\$ (696,555)	\$ 7,841	\$ (3,055)	\$ 4,786
Noninvestment-grade	(107,955)	(170,046)	(23,317)	(301,318)	8,184	(8,570)	(386)
Total	\$ (381,643)	\$ (553,632)	\$ (62,598)	\$ (997,873)	\$ 16,025	\$ (11,625)	\$ 4,400

December 31, 2015 (in millions)	<1 year	1–5 years	>5 years	Total notional amount	Fair value of receivables(b)	Fair value of payables(b)	Net fair value
Risk rating of reference entity							
Investment-grade	\$ (307,211)	\$ (699,227)	\$ (46,970)	\$ (1,053,408)	\$ 13,539	\$ (6,836)	\$ 6,703
Noninvestment-grade	(109,195)	(245,151)	(21,085)	(375,431)	10,823	(18,891)	(8,068)
Total	\$ (416,406)	\$ (944,378)	\$ (68,055)	\$ (1,428,839)	\$ 24,362	\$ (25,727)	\$ (1,365)

(a) The ratings scale is primarily based on external credit ratings defined by S&P and Moody's.

(b) Amounts are shown on a gross basis, before the benefit of legally enforceable master netting agreements and cash collateral received by the Firm.

Note 7 – Noninterest revenue

Investment banking fees

The following table presents the components of investment banking fees.

Year ended December 31, (in millions)	2016	2015	2014
Underwriting			
Equity	\$ 1,146	\$ 1,408	\$ 1,571
Debt	3,207	3,232	3,340
Total underwriting	4,353	4,640	4,911
Advisory	2,095	2,111	1,631
Total investment banking fees	\$ 6,448	\$ 6,751	\$ 6,542

Underwriting fees are recognized as revenue when the Firm has rendered all services to, and is entitled to collect the fee from, the issuer, and there are no other contingencies associated with the fee. Underwriting fees are net of syndicate expense; the Firm recognizes credit arrangement and syndication fees as revenue after satisfying certain retention, timing and yield criteria. Advisory fees are recognized as revenue when the related services have been performed and the fee has been earned.

Principal transactions

Principal transactions revenue is driven by many factors, including the bid-offer spread, which is the difference between the price at which the Firm is willing to buy a financial or other instrument and the price at which the Firm is willing to sell that instrument. It also consists of the realized (as a result of closing out or termination of transactions, or interim cash payments) and unrealized (as a result of changes in valuation) gains and losses on financial and other instruments (including those accounted for under the fair value option) primarily used in client-driven market-making activities and on private equity investments. In connection with its client-driven market-making activities, the Firm transacts in debt and equity instruments, derivatives and commodities (including physical commodities inventories and financial instruments that reference commodities).

Principal transactions revenue also includes certain realized and unrealized gains and losses related to hedge accounting and specified risk-management activities, including: (a) certain derivatives designated in qualifying hedge accounting relationships (primarily fair value hedges of commodity and foreign exchange risk), (b) certain derivatives used for specific risk management purposes, primarily to mitigate credit risk, foreign exchange risk and commodity risk, and (c) other derivatives. For further information on the income statement classification of gains and losses from derivatives activities, see Note 6.

In the financial commodity markets, the Firm transacts in OTC derivatives (e.g., swaps, forwards, options) and ETD that reference a wide range of underlying commodities. In the physical commodity markets, the Firm primarily purchases and sells precious and base metals and may hold other commodities inventories under financing and other arrangements with clients.

The following table presents all realized and unrealized gains and losses recorded in principal transactions revenue. This table excludes interest income and interest expense on trading assets and liabilities, which are an integral part of the overall performance of the Firm's client-driven market-making activities. See Note 8 for further information on interest income and interest expense. Trading revenue is presented primarily by instrument type. The Firm's client-driven market-making businesses generally utilize a variety of instrument types in connection with their market-making and related risk-management activities; accordingly, the trading revenue presented in the table below is not representative of the total revenue of any individual line of business.

Year ended December 31, (in millions)	2016	2015	2014
Trading revenue by instrument type			
Interest rate	\$ 2,325	\$ 1,933	\$ 1,362
Credit	2,096	1,735	1,880
Foreign exchange	2,827	2,557	1,556
Equity	2,994	2,990	2,563
Commodity	1,067	842	1,663
Total trading revenue	11,309	10,057	9,024
Private equity gains(a)	257	351	1,507
Principal transactions	\$ 11,566	\$ 10,408	\$ 10,531

(a) Includes revenue on private equity investments held in the Private Equity business within Corporate, as well as those held in other business segments.

Lending- and deposit-related fees

The following table presents the components of lending- and deposit-related fees.

Year ended December 31, (in millions)	2016	2015	2014
Lending-related fees	\$ 1,114	\$ 1,148	\$ 1,307
Deposit-related fees	4,660	4,546	4,494
Total lending- and deposit-related fees	\$ 5,774	\$ 5,694	\$ 5,801

Lending-related fees include fees earned from loan commitments, standby letters of credit, financial guarantees, and other loan-servicing activities. Deposit-related fees include fees earned in lieu of compensating balances, and fees earned from performing cash management activities and other deposit account services. Lending- and deposit-related fees in this revenue category are recognized over the period in which the related service is provided.

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Asset management, administration and commissions

The following table presents Firmwide asset management, administration and commissions income:

Year ended December 31, (in millions)	2016	2015	2014
Asset management fees			
Investment management fees(a)	\$ 8,865	\$ 9,403	\$ 9,169
All other asset management fees(b)	336	352	477
Total asset management fees	9,201	9,755	9,646
Total administration fees(c)	1,915	2,015	2,179
Commissions and other fees			
Brokerage commissions	2,151	2,304	2,270
All other commissions and fees	1,324	1,435	1,836
Total commissions and fees	3,475	3,739	4,106
Total asset management, administration and commissions	\$ 14,591	\$ 15,509	\$ 15,931

(a) Represents fees earned from managing assets on behalf of the Firm's clients, including investors in Firm-sponsored funds and owners of separately managed investment accounts.

(b) Represents fees for services that are ancillary to investment management services, such as commissions earned on the sales or distribution of mutual funds to clients.

(c) Predominantly includes fees for custody, securities lending, funds services and securities clearance.

This revenue category includes fees from investment management and related services, custody and brokerage services, insurance premiums and commissions, and fees from other products and services. These fees are recognized over the period in which the related product or service is provided. Performance-based fees, which are earned based on exceeding certain benchmarks or other performance targets, are accrued and recognized at the end of the performance period in which the target is met. The Firm has contractual arrangements with third parties to provide certain services in connection with its asset management activities. Amounts paid to third-party service providers are predominantly expensed, such that asset management fees are recorded gross of payments made to third parties.

Mortgage fees and related income

This revenue category primarily reflects CCB's Mortgage Banking production and servicing revenue, including fees and income derived from mortgages originated with the intent to sell; mortgage sales and servicing including losses related to the repurchase of previously sold loans; the impact of risk-management activities associated with the mortgage pipeline, warehouse loans and MSRs; and revenue related to any residual interests held from mortgage securitizations. This revenue category also includes gains and losses on sales and lower of cost or fair value adjustments for mortgage loans held-for-sale, as well as changes in fair value for mortgage loans originated with the intent to sell and measured at fair value under the fair value option. Changes in the fair value of MSRs are reported in mortgage fees and related income. For a further discussion of MSRs, see Note 17. Net interest income from mortgage loans is recorded in interest income.

Card income

This revenue category includes interchange income from credit and debit cards and net fees earned from processing card transactions for merchants. Card income is recognized as earned. Costs related to rewards programs are recorded when the rewards are earned by the customer and presented as a reduction to interchange income. Annual fees and direct loan origination costs are deferred and recognized on a straight-line basis over a 12-month period.

Credit card revenue sharing agreements

The Firm has contractual agreements with numerous co-brand partners which grant the Firm exclusive rights to market to the customers or members of such partners. These partners endorse the credit card programs and provide their customer or member lists to the Firm, and they may also conduct marketing activities and provide awards under the various credit card programs. The terms of these agreements generally range from five to ten years.

The Firm typically makes incentive payments to the partners based on new account originations, sales volumes and the cost of the partners' marketing activities and awards. Payments based on new account originations are accounted for as direct loan origination costs. Payments to partners based on sales volumes are deducted from interchange income as the related revenue is earned. Payments based on marketing efforts undertaken by the partners are expensed by the Firm as incurred and reported as noninterest expense.

Other income

Other income on the Firm's Consolidated statements of income included the following:

Year ended December 31, (in millions)	2016	2015	2014
Operating lease income	\$ 2,724	\$ 2,081	\$ 1,699

Operating lease income is recognized on a straight-line basis over the lease term.

Note 8 – Interest income and Interest expense

Interest income and interest expense are recorded in the Consolidated statements of income and classified based on the nature of the underlying asset or liability.

The following table presents the components of interest income and interest expense:

Year ended December 31, (in millions)	2016	2015	2014
Interest Income			
Loans(a)	\$ 36,634	\$ 33,134	\$ 32,218
Taxable securities	5,538	6,550	7,617
Non taxable securities(b)	1,766	1,706	1,423
Total securities	7,304	8,256	9,040
Trading assets	7,292	6,621	7,312
Federal funds sold and securities purchased under resale agreements	2,265	1,592	1,642
Securities borrowed(c)	(332)	(532)	(501)
Deposits with banks	1,863	1,250	1,157
Other assets(d)	875	652	663
Total interest income	\$ 55,901	\$ 50,973	\$ 51,531
Interest expense			
Interest bearing deposits	\$ 1,356	\$ 1,252	\$ 1,633
Federal funds purchased and securities loaned or sold under repurchase agreements	1,089	609	604
Commercial paper	135	110	134
Trading liabilities - debt, short-term and other liabilities(e)	1,170	622	712
Long-term debt	5,564	4,435	4,409
Beneficial interest issued by consolidated VIEs	504	435	405
Total interest expense	\$ 9,818	\$ 7,463	\$ 7,897
Net interest income	\$ 46,083	\$ 43,510	\$ 43,634
Provision for credit losses	5,361	3,827	3,139
Net interest income after provision for credit losses	\$ 40,722	\$ 39,683	\$ 40,495

- (a) Includes the amortization of purchase price discounts or premiums, as well as net deferred loan fees or costs.
(b) Represents securities that are tax exempt for U.S. federal income tax purposes.
(c) Securities borrowed's negative interest income, for the years ended December 31, 2016, 2015 and 2014, is a result of client-driven demand for certain securities combined with the impact of low interest rates; this is matched book activity and the negative interest expense on the corresponding securities loaned is recognized in interest expense.
(d) Largely margin loans.
(e) Includes brokerage customer payables.

Interest income and interest expense includes the current-period interest accruals for financial instruments measured at fair value, except for derivatives and financial instruments containing embedded derivatives that would be separately accounted for in accordance with U.S. GAAP, absent the fair value option election; for those instruments, all changes in fair value including any interest elements, are reported in principal transactions revenue. For financial instruments that are not measured at fair value, the related interest is included within interest income or interest expense, as applicable.

Note 9 – Pension and other postretirement employee benefit plans

The Firm has various defined benefit pension plans and OPEB plans that provide benefits to its employees. These plans are discussed below.

Defined benefit pension plans

The Firm has a qualified noncontributory U.S. defined benefit pension plan that provides benefits to substantially all U.S. employees. The U.S. plan employs a cash balance formula in the form of pay and interest credits to determine the benefits to be provided at retirement, based on years of service and eligible compensation (generally base salary/regular pay and variable cash incentive compensation capped at \$100,000 annually). Employees begin to accrue plan benefits after completing one year of service, and benefits generally vest after three years of service. The Firm also offers benefits through defined benefit pension plans to qualifying employees in certain non-U.S. locations based on factors such as eligible compensation, age and/or years of service.

It is the Firm's policy to fund the pension plans in amounts sufficient to meet the requirements under applicable laws. The Firm does not anticipate at this time any contribution to the U.S. defined benefit pension plan in 2017. The 2017 contributions to the non-U.S. defined benefit pension plans are expected to be \$44 million of which \$28 million are contractually required.

JPMorgan Chase also has a number of defined benefit pension plans that are not subject to Title IV of the Employee Retirement Income Security Act. The most significant of these plans is the Excess Retirement Plan, pursuant to which certain employees previously earned pay credits on compensation amounts above the maximum stipulated by law under a qualified plan; no further pay credits are allocated under this plan. The Excess Retirement Plan had an unfunded projected benefit obligation ("PBO") in the amount of \$215 million and \$237 million, at December 31, 2016 and 2015, respectively.

Defined contribution plans

JPMorgan Chase currently provides two qualified defined contribution plans in the U.S. and other similar arrangements in certain non-U.S. locations, all of which are administered in accordance with applicable local laws and regulations. The most significant of these plans is the JPMorgan Chase 401(k) Savings Plan (the "401(k) Savings Plan"), which covers substantially all U.S. employees. Employees can contribute to the 401(k) Savings Plan on a pretax and/or Roth 401(k) after-tax basis. The JPMorgan Chase Common Stock Fund, which is an investment option under the 401(k) Savings Plan, is a nonleveraged employee stock ownership plan.

The Firm matches eligible employee contributions up to 5% of eligible compensation (generally base salary/regular pay and variable cash incentive compensation) on an annual basis. Employees begin to receive matching contributions

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after completing a one-year-of-service requirement. Employees with total annual cash compensation of \$250,000 or more are not eligible for matching contributions. Matching contributions vest after three years of service. The 401(k) Savings Plan also permits discretionary profit-sharing contributions by participating companies for certain employees, subject to a specified vesting schedule.

OPEB plans

JPMorgan Chase offers postretirement medical and life insurance benefits to certain retirees and postretirement medical benefits to qualifying U.S. employees. These benefits vary with the length of service and the date of hire and provide for limits on the Firm's share of covered medical benefits. The medical and life insurance benefits are both contributory. Effective January 1, 2015, there was

a transition of certain Medicare eligible retirees from JPMorgan Chase group sponsored coverage to Medicare exchanges. As a result of this change, eligible retirees will receive a Healthcare Reimbursement Account amount each year if they enroll through the Medicare exchange. The impact of this change was not material. Postretirement medical benefits also are offered to qualifying U.K. employees.

JPMorgan Chase's U.S. OPEB obligation is funded with corporate-owned life insurance ("COLI") purchased on the lives of eligible employees and retirees. While the Firm owns the COLI policies, COLI proceeds (death benefits, withdrawals and other distributions) may be used only to reimburse the Firm for its net postretirement benefit claim payments and related administrative expense. The U.K. OPEB plan is unfunded.

The following table presents the changes in benefit obligations, plan assets and funded status amounts reported on the Consolidated balance sheets for the Firm's U.S. and non-U.S. defined benefit pension and OPEB plans.

	Defined benefit pension plans							
As of or for the year ended December 31, (in millions)	U.S.		Non-U.S.		OPEB plans(d)			
	2016	2015	2016	2015	2016	2015		
Change in benefit obligation								
Benefit obligation, beginning of year	\$ (11,912)	\$ (12,536)	\$ (3,347)	\$ (3,640)	\$ (744)	\$ (842)		
Benefits earned during the year	(296)	(340)	(36)	(37)	—	(1)		
Interest cost on benefit obligations	(530)	(498)	(99)	(112)	(31)	(31)		
Special termination benefits	—	—	—	(1)	—	—		
Employee contributions	NA	NA	(7)	(7)	(19)	(25)		
Net gain/(loss)	(203)	702	(540)	146	4	71		
Benefits paid	725	760	126	120	76	88		
Plan settlements	—	—	21	—	—	—		
Expected Medicare Part D subsidy receipts	NA	NA	NA	NA	—	(6)		
Foreign exchange impact and other	—	—	504	184	6	2		
Benefit obligation, end of year	\$ (12,216)	\$ (11,912)	\$ (3,378)	\$ (3,347)	\$ (708)	\$ (744)		
Change in plan assets								
Fair value of plan assets, beginning of year	\$ 14,125	\$ 14,623	\$ 3,511	\$ 3,718	\$ 1,855	\$ 1,903		
Actual return on plan assets	838	231	537	52	131	13		
Firm contributions	34	31	52	45	2	2		
Employee contributions	—	—	7	7	—	—		
Benefits paid	(725)	(760)	(126)	(120)	(32)	(63)		
Plan settlements	—	—	(21)	—	—	—		
Foreign exchange impact and other	—	—	(529)	(191)	—	—		
Fair value of plan assets, end of year	\$ 14,272	\$ 14,125	\$ 3,431	\$ 3,511	\$ 1,956	\$ 1,855		
Net funded status(a)	\$ 2,056	\$ 2,213	\$ 53	\$ 164	\$ 1,248	\$ 1,111		
Accumulated benefit obligation, end of year	\$ (12,062)	\$ (11,774)	\$ (3,359)	\$ (3,322)	NA	NA		

(a) Represents plans with an aggregate overfunded balance of \$4.0 billion and \$4.1 billion at December 31, 2016 and 2015, respectively, and plans with an aggregate underfunded balance of \$639 million and \$636 million at December 31, 2016 and 2015, respectively.

(b) At December 31, 2016 and 2015, approximately \$390 million and \$533 million, respectively, of U.S. plan assets included participation rights under participating annuity contracts.

(c) At December 31, 2016 and 2015, defined benefit pension plan amounts that were not measured at fair value included \$130 million and \$74 million, respectively, of accrued receivables, and \$224 million and \$123 million, respectively, of accrued liabilities, for U.S. plans.

(d) Includes an unfunded accumulated postretirement benefit obligation of \$35 million and \$32 million at December 31, 2016 and 2015, respectively, for the U.K. plan.

Gains and losses

For the Firm's defined benefit pension plans, fair value is used to determine the expected return on plan assets. Amortization of net gains and losses is included in annual net periodic benefit cost if, as of the beginning of the year, the net gain or loss exceeds 10% of the greater of the PBO or the fair value of the plan assets. Any excess is amortized over the average future service period of defined benefit pension plan participants, which for the U.S. defined benefit pension plan is currently seven years and for the non-U.S. defined benefit pension plans is the period appropriate for the affected plan. In addition, prior service costs are amortized over the average remaining service period of active employees expected to receive benefits under the plan when the prior service cost is first recognized. The average remaining amortization period for the U.S. defined benefit pension plan for current prior service costs is three years.

For the Firm's OPEB plans, a calculated value that recognizes changes in fair value over a five-year period is used to determine the expected return on plan assets. This value is referred to as the market related value of assets. Amortization of net gains and losses, adjusted for gains and losses not yet recognized, is included in annual net periodic benefit cost if, as of the beginning of the year, the net gain or loss exceeds 10% of the greater of the accumulated postretirement benefit obligation or the market related value of assets. Any excess net gain or loss is amortized over the average expected lifetime of retired participants, which is currently twelve years; however, prior service costs resulting from plan changes are amortized over the average years of service remaining to full eligibility age, which is currently two years.

The following table presents pretax pension and OPEB amounts recorded in AOCI.

December 31, (in millions)	Defined benefit pension plans						OPEB plans	
	U.S.		Non-U.S.					
	2016	2015	2016	2015	2016	2015		
Net gain/(loss)	\$ (3,116)	\$ (3,096)	\$ (551)	\$ (513)	\$ 138	\$ 109		
Prior service credit/(cost)	34	68	8	9	—	—		
Accumulated other comprehensive income/(loss), pretax, end of year	\$ (3,082)	\$ (3,028)	\$ (543)	\$ (504)	\$ 138	\$ 109		

The following table presents the components of net periodic benefit costs reported in the Consolidated statements of income and other comprehensive income for the Firm's U.S. and non-U.S. defined benefit pension, defined contribution and OPEB plans.

Year ended December 31, (in millions)	Pension plans						OPEB plans		
	U.S.			Non-U.S.					
	2016	2015	2014	2016	2015	2014	2016	2015	2014
Components of net periodic benefit cost									
Benefits earned during the year	\$ 296	\$ 340	\$ 281	\$ 36	\$ 37	\$ 33	\$ —	\$ 1	\$ —
Interest cost on benefit obligations	530	498	534	99	112	137	31	31	38
Expected return on plan assets	(891)	(929)	(985)	(139)	(150)	(172)	(105)	(106)	(101)
Amortization:									
Net (gain)/loss	235	247	25	22	35	47	—	—	—
Prior service cost/(credit)	(34)	(34)	(41)	(2)	(2)	(2)	—	—	(1)
Special termination benefits	—	—	—	—	1	—	—	—	—
Settlement loss	—	—	—	4	—	—	—	—	—
Net periodic defined benefit cost	136	122	(186)	20	33	43	(74)	(74)	(64)
Other defined benefit pension plans(a)	14	14	14	11	10	6	NA	NA	NA
Total defined benefit plans	150	136	(172)	31	43	49	(74)	(74)	(64)
Total defined contribution plans	473	449	438	316	320	329	NA	NA	NA
Total pension and OPEB cost included in compensation expense	\$ 623	\$ 585	\$ 266	\$ 347	\$ 363	\$ 378	\$ (74)	\$ (74)	\$ (64)
Changes in plan assets and benefit obligations recognized in other comprehensive income									
Net (gain)/loss arising during the year	\$ 255	\$ (3)	\$ 1,645	\$ 140	\$ (47)	\$ 57	\$ (29)	\$ 21	\$ (5)
Prior service credit arising during the year	—	—	53	—	—	—	—	—	—
Amortization of net loss	(235)	(247)	(25)	(22)	(35)	(47)	—	—	—
Amortization of prior service (cost)/credit	34	34	41	2	2	2	—	—	1
Settlement loss	—	—	—	(4)	—	—	—	—	—
Foreign exchange impact and other	—	—	—	(77)	(33)	(39)	—	—	—
Total recognized in other comprehensive income	\$ 54	\$ (216)	\$ 1,714	\$ 39	\$ (113)	\$ (27)	\$ (29)	\$ 21	\$ (4)
Total recognized in net periodic benefit cost and other comprehensive income	\$ 190	\$ (94)	\$ 1,528	\$ 59	\$ (80)	\$ 16	\$ (103)	\$ (53)	\$ (68)

(a) Includes various defined benefit pension plans which are individually immaterial.

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The estimated pretax amounts that will be amortized from AOCI into net periodic benefit cost in 2017 are as follows.

(in millions)	Defined benefit pension plans		OPEB plans	
	U.S.	Non-U.S.	U.S.	Non-U.S.
Net loss/(gain)	\$ 216	\$ 28	\$ —	\$ —
Prior service cost/(credit)	(34)	(2)	—	—
Total	\$ 182	\$ 26	\$ —	\$ —

The following table presents the actual rate of return on plan assets for the U.S. and non-U.S. defined benefit pension and OPEB plans.

Year ended December 31,	U.S.			Non-U.S.		
	2016	2015	2014	2016	2015	2014
Actual rate of return:						
Defined benefit pension plans	6.12%	0.88%	7.29%	1.07 – 20.60%	(0.48) – 4.92%	5.62 – 17.69%
OPEB plans	7.29	1.16	9.84	NA	NA	NA

Plan assumptions

JPMorgan Chase's expected long-term rate of return for U.S. defined benefit pension and OPEB plan assets is a blended average of the investment advisor's projected long-term (10 or more years) returns for the various asset classes, weighted by the asset allocation. Returns on asset classes are developed using a forward-looking approach and are not strictly based on historical returns. Equity returns are generally developed as the sum of inflation, expected real earnings growth and expected long-term dividend yield. Bond returns are generally developed as the sum of inflation, real bond yield and risk spread (as appropriate), adjusted for the expected effect on returns from changing yields. Other asset-class returns are derived from their relationship to the equity and bond markets. Consideration is also given to current market conditions and the short-term portfolio mix of each plan.

For the U.K. defined benefit pension plans, which represent the most significant of the non-U.S. defined benefit pension plans, procedures similar to those in the U.S. are used to develop the expected long-term rate of return on plan assets, taking into consideration local market conditions and the specific allocation of plan assets. The expected long-term rate of return on U.K. plan assets is an average of projected long-term returns for each asset class. The return on equities has been selected by reference to the yield on long-term U.K. government bonds plus an equity risk premium above the risk-free rate. The expected return on "AA" rated long-term corporate bonds is based on an implied yield for similar bonds.

The discount rate used in determining the benefit obligation under the U.S. defined benefit pension and OPEB plans was provided by the Firm's actuaries. This rate was selected by reference to the yields on portfolios of bonds with maturity dates and coupons that closely match each of the plan's projected cash flows; such portfolios are derived from a broad-based universe of high-quality corporate bonds as of the measurement date. In years in which these hypothetical bond portfolios generate excess cash, such excess is assumed to be reinvested at the one-year forward rates

implied by the Mercer Yield Curve published as of the measurement date. The discount rate for the U.K. defined benefit pension plan represents a rate of appropriate duration from the analysis of yield curves provided by the Firm's actuaries.

At December 31, 2016, the Firm decreased the discount rates used to determine its benefit obligations for the U.S. defined benefit pension and OPEB plans in light of current market interest rates, which will increase expense by approximately \$45 million in 2017. The 2017 expected long-term rate of return on U.S. defined benefit pension plan assets and U.S. OPEB plan assets are 6.00% and 5.00%, respectively. For 2017, the initial health care benefit obligation trend assumption has been set at 5.00%, while the ultimate health care trend assumption and the year to reach the ultimate rate remain at 5.00% and 2017, respectively, unchanged from 2016. As of December 31, 2016, the interest crediting rate assumption remained at 5.00% and the assumed rate of compensation increase was reduced to 2.30%.

The following tables present the weighted-average annualized actuarial assumptions for the projected and accumulated postretirement benefit obligations, and the components of net periodic benefit costs, for the Firm's significant U.S. and non-U.S. defined benefit pension and OPEB plans, as of and for the periods indicated.

Weighted-average assumptions used to determine benefit obligations

December 31,	U.S.		Non-U.S.	
	2016	2015	2016	2015
Discount rate:				
Defined benefit pension plans	4.30%	4.50%	0.60 – 2.60%	0.80 – 3.70%
OPEB plans	4.20	4.40	—	—
Rate of compensation increase	2.30	3.50	2.25 – 3.00	2.25 – 4.30
Health care cost trend rate:				
Assumed for next year	5.00	5.50	—	—
Ultimate	5.00	5.00	—	—
Year when rate will reach ultimate	2017	2017	—	—

Weighted-average assumptions used to determine net periodic benefit costs

Year ended December 31,	U.S.			Non-U.S.		
	2016	2015	2014	2016	2015	2014
Discount rate:						
Defined benefit pension plans	4.50%	4.00%	5.00%	0.90 – 3.70%	1.00 – 3.60%	1.10 – 4.40%
OPEB plans	4.40	4.10	4.90	—	—	—
Expected long-term rate of return on plan assets:						
Defined benefit pension plans	6.50	6.50	7.00	0.80 – 4.60	0.90 – 4.80	1.20 – 5.30
OPEB plans	5.75	6.00	6.25	NA	NA	NA
Rate of compensation increase	3.50	3.50	3.50	2.25 – 4.30	2.75 – 4.20	2.75 – 4.60
Health care cost trend rate:						
Assumed for next year	5.50	6.00	6.50	—	—	—
Ultimate	5.00	5.00	5.00	—	—	—
Year when rate will reach ultimate	2017	2017	2017	—	—	—

The following table presents the effect of a one-percentage-point change in the assumed health care cost trend rate on JPMorgan Chase's accumulated postretirement benefit obligation. As of December 31, 2016, there was no material effect on total service and interest cost.

Year ended December 31, 2016 (in millions)	1-Percentage point increase	1-Percentage point decrease
Effect on accumulated postretirement benefit obligation	\$ 8	\$ (7)

JPMorgan Chase's U.S. defined benefit pension and OPEB plan expense is sensitive to the expected long-term rate of return on plan assets and the discount rate. With all other assumptions held constant, a 25-basis point decline in the expected long-term rate of return on U.S. plan assets would result in an aggregate increase of approximately \$40 million in 2017 U.S. defined benefit pension and OPEB plan expense. A 25-basis point decline in the discount rate for the U.S. plans would result in an increase in 2017 U.S. defined benefit pension and OPEB plan expense of approximately an aggregate \$31 million and an increase in the related benefit obligations of approximately an aggregate \$316 million. A 25-basis point decrease in the interest crediting rate for the U.S. defined benefit pension plan would result in a decrease in 2017 U.S. defined benefit pension expense of approximately \$36 million and a decrease in the related PBO of approximately \$160 million. A 25-basis point decline in the discount rates for the non-U.S. plans would result in an increase in the 2017 non-U.S. defined benefit pension plan expense of approximately \$12 million.

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Investment strategy and asset allocation

The Firm's U.S. defined benefit pension plan assets are held in trust and are invested in a well-diversified portfolio of equity and fixed income securities, cash and cash equivalents, and alternative investments (e.g., hedge funds, private equity, real estate and real assets). Non-U.S. defined benefit pension plan assets are held in various trusts and are also invested in well-diversified portfolios of equity, fixed income and other securities. Assets of the Firm's COLI policies, which are used to partially fund the U.S. OPEB plan, are held in separate accounts of an insurance company and are allocated to investments intended to replicate equity and fixed income indices.

The investment policy for the Firm's U.S. defined benefit pension plan assets is to optimize the risk-return relationship as appropriate to the needs and goals of the plan using a global portfolio of various asset classes diversified by market segment, economic sector, and issuer. Assets are managed by a combination of internal and external investment managers. Periodically the Firm performs a comprehensive analysis on the U.S. defined benefit pension plan asset allocations, incorporating projected asset and liability data, which focuses on the short- and long-term impact of the asset allocation on cumulative pension expense, economic cost, present value of contributions and funded status. Currently, approved asset allocation ranges are: U.S. equity 0% to 45%, international equity 0% to 40%, debt securities 0% to 80%, hedge funds 0% to 5%, real estate 0% to 10%, real assets 0% to 10% and private equity 0% to 20%. Asset allocations are not managed to a specific target but seek to shift asset class allocations within these stated ranges. Investment strategies incorporate the economic outlook and the anticipated implications of the macroeconomic environment on the various asset classes while maintaining an appropriate level of liquidity for the plan. The Firm

regularly reviews the asset allocations and asset managers, as well as other factors that impact the portfolio, which is rebalanced when deemed necessary.

For the U.K. defined benefit pension plans, which represent the most significant of the non-U.S. defined benefit pension plans, the assets are invested to maximize returns subject to an appropriate level of risk relative to the plans' liabilities. To reduce the volatility in returns relative to the plans' liability profiles, the U.K. defined benefit pension plans' largest asset allocations are to debt securities of appropriate durations. Other assets, mainly equity securities, are then invested for capital appreciation, to provide long-term investment growth. Similar to the U.S. defined benefit pension plan, asset allocations and asset managers for the U.K. plans are reviewed regularly and the portfolios are rebalanced when deemed necessary.

Investments held by the U.S. and non-U.S. defined benefit pension and OPEB plans include financial instruments that are exposed to various risks such as market, credit, liquidity and country risks. Exposure to a concentration of credit risk is mitigated by the broad diversification of both U.S. and non-U.S. investment instruments. Additionally, the investments in each of the common/collective trust funds and registered investment companies are further diversified into various financial instruments. As of December 31, 2016, assets held by the Firm's U.S. and non-U.S. defined benefit pension and OPEB plans do not include JPMorgan Chase common stock, except through indirect exposures through investments in third-party stock-index funds. The plans hold investments in funds that are sponsored or managed by affiliates of JPMorgan Chase in the amount of \$3.4 billion and \$3.2 billion for U.S. plans and \$1.2 billion and \$1.2 billion for non-U.S. plans, as of December 31, 2016 and 2015, respectively.

The following table presents the weighted-average asset allocation of the fair values of total plan assets at December 31 for the years indicated, as well as the respective approved range/target allocation by asset category, for the Firm's U.S. and non-U.S. defined benefit pension and OPEB plans.

	Defined benefit pension plans						OPEB plans(c)		
	U.S.			Non-U.S.					
	Target	% of plan assets		Target	% of plan assets		Target	% of plan assets	
December 31,	Allocation	2016	2015	Allocation	2016	2015	Allocation	2016	2015
Asset category									
Debt securities(a)	0-80%	35%	32%	59%	60%	60%	30-70%	50%	50%
Equity securities	0-85	47	48	40	39	38	30-70	50	50
Real estate	0-10	4	4	—	—	1	—	—	—
Alternatives(b)	0-35	14	16	1	1	1	—	—	—
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

(a) Debt securities primarily include corporate debt, U.S. federal, state, local and non-U.S. government, and mortgage-backed securities.

(b) Alternatives primarily include limited partnerships.

(c) Represents the U.S. OPEB plan only, as the U.K. OPEB plan is unfunded.

Fair value measurement of the plans' assets and liabilities

For information on fair value measurements, including descriptions of level 1, 2, and 3 of the fair value hierarchy and the valuation methods employed by the Firm, see Note 3.

Pension and OPEB plan assets and liabilities measured at fair value

December 31, 2016 (in millions)	U.S. defined benefit pension plans				Non-U.S. defined benefit pension plans(h)		
	Level 1	Level 2	Level 3	Total fair value	Level 1	Level 2	Total fair value
Cash and cash equivalents	\$ 74	\$ —	\$ —	\$ 74	\$ 122	\$ 2	\$ 124
Equity securities	5,178	12	2	5,192	980	154	1,134
Common/collective trust funds(a)	266	—	—	266	118	—	118
Limited partnerships(b)	62	—	—	62	—	—	—
Corporate debt securities(c)	—	1,791	4	1,795	—	715	715
U.S. federal, state, local and non-U.S. government debt securities	926	234	—	1,160	213	570	783
Mortgage-backed securities	39	65	—	104	3	10	13
Derivative receivables	—	24	—	24	—	219	219
Other(d)	1,274	—	390	1,664	223	53	276
Total assets measured at fair value(e)	\$ 7,819	\$ 2,126	\$ 396	\$ 10,341 (f)	\$ 1,659	\$ 1,723	\$ 3,382
Derivative payables	\$ —	\$ (14)	\$ —	\$ (14)	\$ —	\$ (194)	\$ (194)
Total liabilities measured at fair value	\$ —	\$ (14)	\$ —	\$ (14) (g)	\$ —	\$ (194)	\$ (194)

December 31, 2015 (in millions)	U.S. defined benefit pension plans				Non-U.S. defined benefit pension plans(h)		
	Level 1	Level 2	Level 3	Total fair value	Level 1	Level 2	Total fair value
Cash and cash equivalents	\$ 112	\$ —	\$ —	\$ 112	\$ 114	\$ 1	\$ 115
Equity securities	4,826	5	2	4,833	1,002	157	1,159
Common/collective trust funds(a)	339	—	—	339	135	—	135
Limited partnerships(b)	53	—	—	53	—	—	—
Corporate debt securities(c)	—	1,619	2	1,621	—	758	758
U.S. federal, state, local and non-U.S. government debt securities	580	108	—	688	212	504	716
Mortgage-backed securities	—	67	1	68	2	26	28
Derivative receivables	—	104	—	104	—	209	209
Other(d)	1,760	27	534	2,321	257	53	310
Total assets measured at fair value(e)	\$ 7,670	\$ 1,930	\$ 539	\$ 10,139 (f)	\$ 1,722	\$ 1,708	\$ 3,430
Derivative payables	\$ —	\$ (35)	\$ —	\$ (35)	\$ —	\$ (153)	\$ (153)
Total liabilities measured at fair value	\$ —	\$ (35)	\$ —	\$ (35) (g)	\$ —	\$ (153)	\$ (153)

(a) At December 31, 2016 and 2015, common/collective trust funds primarily included a mix of short-term investment funds, domestic and international equity investments (including index) and real estate funds.

(b) Unfunded commitments to purchase limited partnership investments for the plans were \$735 million and \$895 million for 2016 and 2015, respectively.

(c) Corporate debt securities include debt securities of U.S. and non-U.S. corporations.

(d) Other consists primarily of money market funds and participating and non-participating annuity contracts. Money market funds are primarily classified within level 1 of the fair value hierarchy given they are valued using market observable prices. Participating and non-participating annuity contracts are classified within level 3 of the fair value hierarchy due to a lack of market mechanisms for transferring each policy and surrender restrictions.

(e) Certain investments that are measured at fair value using the net asset value per share (or its equivalent) as a practical expedient are not required to be classified in the fair value hierarchy. At December 31, 2016 and 2015, the fair values of these investments, which include certain limited partnerships and common/collective trust funds, were \$4.0 billion and \$4.1 billion, respectively, of U.S. defined benefit pension plan investments, and \$243 million and \$234 million, respectively, of non-U.S. defined benefit pension plan investments.

(f) At December 31, 2016 and 2015, excluded U.S. defined benefit pension plan receivables for investments sold and dividends and interest receivables of \$130 million and \$74 million, respectively.

(g) At December 31, 2016 and 2015, excluded \$203 million and \$106 million, respectively, of U.S. defined benefit pension plan payables for investments purchased; and \$21 million and \$17 million, respectively, of other liabilities.

(h) There were zero assets or liabilities classified as level 3 for the non-U.S. defined benefit pension plans as of December 31, 2016 and 2015.

The Firm's U.S. OPEB plan was partially funded with COLI policies of \$2.0 billion and \$1.9 billion at December 31, 2016 and 2015, which were classified in level 3 of the valuation hierarchy.

Notes to consolidated financial statements

Changes in level 3 fair value measurements using significant unobservable inputs

Year ended December 31, 2016 (in millions)	Fair value, January 1, 2016	Actual return on plan assets		Purchases, sales and settlements, net	Transfers in and/or out of level 3	Fair value, December 31, 2016
		Realized gains/(losses)	Unrealized gains/(losses)			
U.S. defined benefit pension plans						
Equity securities	\$ 2	\$ —	\$ —	\$ —	\$ —	\$ 2
Corporate debt securities	2	—	—	1	1	4
Mortgage-backed securities	1	—	—	(1)	—	—
Other	534	—	(157)	—	13	390
Total U.S. defined benefit pension plans	\$ 539	\$ —	\$ (157)	\$ —	\$ 14	\$ 396
OPEB plans						
COLI	\$ 1,855	\$ —	\$ 102	\$ —	\$ —	\$ 1,957
Total OPEB plans	\$ 1,855	\$ —	\$ 102	\$ —	\$ —	\$ 1,957

Year ended December 31, 2015 (in millions)	Fair value, January 1, 2015	Actual return on plan assets		Purchases, sales and settlements, net	Transfers in and/or out of level 3	Fair value, December 31, 2015
		Realized gains/(losses)	Unrealized gains/(losses)			
U.S. defined benefit pension plans						
Equity securities	\$ 4	\$ —	\$ (2)	\$ —	\$ —	\$ 2
Corporate debt securities	9	—	—	(7)	—	2
Mortgage-backed securities	1	—	—	—	—	1
Other	337	—	197	—	—	534
Total U.S. defined benefit pension plans	\$ 351	\$ —	\$ 195	\$ (7)	\$ —	\$ 539
OPEB plans						
COLI	\$ 1,903	\$ —	\$ (48)	\$ —	\$ —	\$ 1,855
Total OPEB plans	\$ 1,903	\$ —	\$ (48)	\$ —	\$ —	\$ 1,855

Year ended December 31, 2014 (in millions)	Fair value, January 1, 2014	Actual return on plan assets		Purchases, sales and settlements, net	Transfers in and/or out of level 3	Fair value, December 31, 2014
		Realized gains/(losses)	Unrealized gains/(losses)			
U.S. defined benefit pension plans						
Equity securities	\$ 4	\$ —	\$ —	\$ —	\$ —	\$ 4
Corporate debt securities	7	(2)	2	4	(2)	9
Mortgage-backed securities	—	—	—	1	—	1
Other	430	—	(93)	—	—	337
Total U.S. defined benefit pension plans	\$ 441	\$ (2)	\$ (91)	\$ 5	\$ (2)	\$ 351
OPEB plans						
COLI	\$ 1,749	\$ —	\$ 154	\$ —	\$ —	\$ 1,903
Total OPEB plans	\$ 1,749	\$ —	\$ 154	\$ —	\$ —	\$ 1,903

Estimated future benefit payments

The following table presents benefit payments expected to be paid, which include the effect of expected future service, for the years indicated. The OPEB medical and life insurance payments are net of expected retiree contributions.

Year ended December 31, (in millions)	U.S. defined benefit pension plans	Non-U.S. defined benefit pension plans	OPEB before Medicare Part D subsidy	Medicare Part D subsidy
2017	\$ 766	\$ 103	\$ 68	\$ 1
2018	768	104	65	1
2019	758	107	63	1
2020	765	113	60	1
2021	775	117	58	1
Years 2022–2026	3,961	646	250	2

Note 10 – Employee stock-based incentives

Employee stock-based awards

In 2016, 2015 and 2014, JPMorgan Chase granted long-term stock-based awards to certain employees under its LTIP, as amended and restated effective May 19, 2015. Under the terms of the LTIP, as of December 31, 2016, 78 million shares of common stock were available for issuance through May 2019. The LTIP is the only active plan under which the Firm is currently granting stock-based incentive awards. In the following discussion, the LTIP, plus prior Firm plans and plans assumed as the result of acquisitions, are referred to collectively as the “LTI Plans,” and such plans constitute the Firm’s stock-based incentive plans.

RSUs are awarded at no cost to the recipient upon their grant. Generally, RSUs are granted annually and vest at a rate of 50% after two years and 50% after three years and are converted into shares of common stock as of the vesting date. In addition, RSUs typically include full-career eligibility provisions, which allow employees to continue to vest upon voluntary termination, subject to post-employment and other restrictions based on age or service-related requirements. All RSU awards are subject to forfeiture until vested and contain clawback provisions that may result in cancellation under certain specified circumstances. RSUs entitle the recipient to receive cash payments equivalent to any dividends paid on the underlying common stock during the period the RSUs are outstanding and, as such, are considered participating securities as discussed in Note 24.

In January 2016, the Firm’s Board of Directors approved the grant of performance share units (“PSUs”) to members of the Firm’s Operating Committee under the variable compensation program for performance year 2015. PSUs are subject to the Firm’s achievement of specified performance criteria over a three-year period. The number of awards that vest can range from zero to 150% of the grant amount. The awards vest and are converted into shares of common stock in the quarter after the end of the three-year performance period. In addition, dividends are notionally reinvested in the Firm’s common stock and will be delivered only in respect of any earned shares.

Once the PSUs have vested, the shares of common stock that are delivered, after applicable tax withholding, must be held for an additional two-year period, for a total combined vesting and holding period of five years from the grant date.

Under the LTI Plans, stock options and stock appreciation rights (“SARs”) have generally been granted with an exercise price equal to the fair value of JPMorgan Chase’s common stock on the grant date. The Firm periodically grants employee stock options to individual employees. There were no material grants of stock options or SARs in 2016, 2015 and 2014. SARs generally expire ten years after the grant date.

The Firm separately recognizes compensation expense for each tranche of each award, net of estimated forfeitures, as if it were a separate award with its own vesting date. Generally, for each tranche granted, compensation expense is recognized on a straight-line basis from the grant date until the vesting date of the respective tranche, provided that the employees will not become full-career eligible during the vesting period. For awards with full-career eligibility provisions and awards granted with no future substantive service requirement, the Firm accrues the estimated value of awards expected to be awarded to employees as of the grant date without giving consideration to the impact of post-employment restrictions. For each tranche granted to employees who will become full-career eligible during the vesting period, compensation expense is recognized on a straight-line basis from the grant date until the earlier of the employee’s full-career eligibility date or the vesting date of the respective tranche.

The Firm’s policy for issuing shares upon settlement of employee stock-based incentive awards is to issue either new shares of common stock or treasury shares. During 2016, 2015 and 2014, the Firm settled all of its employee stock-based awards by issuing treasury shares.

In January 2008, the Firm awarded to its Chairman and Chief Executive Officer up to 2 million SARs. The terms of this award are distinct from, and more restrictive than, other equity grants regularly awarded by the Firm. On July 15, 2014, the Compensation & Management Development Committee and Board of Directors determined that all requirements for the vesting of the 2 million SAR awards had been met and thus, the awards became exercisable. The SARs, which will expire in January 2018, have an exercise price of \$39.83 (the price of JPMorgan Chase common stock on the date of grant). The expense related to this award was dependent on changes in fair value of the SARs through July 15, 2014 (the date when the vested number of SARs were determined), and the cumulative expense was recognized ratably over the service period, which was initially assumed to be five years but, effective in the first quarter of 2013, was extended to six and one-half years. The Firm recognized \$3 million in compensation expense in 2014 for this award.

Notes to consolidated financial statements

RSUs, PSUs, employee stock options and SARs activity

Compensation expense for RSUs and PSUs is measured based on the number of units granted multiplied by the stock price at the grant date, and for employee stock options and SARs, is measured at the grant date using the Black-Scholes valuation model. Compensation expense for these awards is recognized in net income as described previously. The following table summarizes JPMorgan Chase's RSUs, PSUs, employee stock options and SARs activity for 2016.

Year ended December 31, 2016 (in thousands, except weighted-average data, and where otherwise stated)	RSUs/PSUs		Options/SARs			
	Number of units	Weighted-average grant date fair value	Number of awards	Weighted-average exercise price	Weighted-average remaining contractual life (in years)	Aggregate intrinsic value
Outstanding, January 1	85,307	\$ 54.60	43,466	\$ 43.51		
Granted	36,775	57.80	77	72.63		
Exercised or vested	(37,121)	52.09	(12,836)	41.55		
Forfeited	(3,254)	56.45	(240)	44.28		
Canceled	NA	NA	(200)	612.18		
Outstanding, December 31	81,707	\$ 57.15	30,267	\$ 40.65	3.9	\$ 1,378,254
Exercisable, December 31	NA	NA	24,815	40.08	3.6	1,144,937

The total fair value of RSUs that vested during the years ended December 31, 2016, 2015 and 2014, was \$2.2 billion, \$2.8 billion and \$3.2 billion, respectively. The total intrinsic value of options exercised during the years ended December 31, 2016, 2015 and 2014, was \$338 million, \$335 million and \$539 million, respectively.

Compensation expense

The Firm recognized the following noncash compensation expense related to its various employee stock-based incentive plans in its Consolidated statements of income.

Year ended December 31, (in millions)	2016	2015	2014
Cost of prior grants of RSUs, PSUs and SARs that are amortized over their applicable vesting periods	\$ 1,046	\$ 1,109	\$ 1,371
Accrual of estimated costs of stock-based awards to be granted in future periods including those to full-career eligible employees	894	878	819
Total noncash compensation expense related to employee stock-based incentive plans	\$ 1,940	\$ 1,987	\$ 2,190

At December 31, 2016, approximately \$700 million (pretax) of compensation expense related to unvested awards had not yet been charged to net income. That cost is expected to be amortized into compensation expense over a weighted-average period of 1.0 year. The Firm does not capitalize any compensation expense related to share-based compensation awards to employees.

Cash flows and tax benefits

Effective January 1, 2016, the Firm adopted new accounting guidance related to employee share-based payments. As a result of the adoption of this new guidance, all excess tax benefits (including tax benefits from dividends or dividend equivalents) on share-based payment awards are recognized within income tax expense in the Consolidated statements of income. In prior years these tax benefits were recorded as increases to additional paid-in capital. Income tax benefits related to stock-based incentive arrangements recognized in the Firm's Consolidated statements of income for the years ended December 31, 2016, 2015 and 2014, were \$916 million, \$746 million and \$854 million, respectively.

The following table sets forth the cash received from the exercise of stock options under all stock-based incentive arrangements, and the actual income tax benefit related to tax deductions from the exercise of the stock options.

Year ended December 31, (in millions)	2016	2015	2014
Cash received for options exercised	\$ 26	\$ 20	\$ 63
Tax benefit	70	64	104

Note 11 – Noninterest expense

For details on noninterest expense, see Consolidated statements of income on page 141. Included within other expense are the following:

Year ended December 31, (in millions)	2016	2015	2014
Legal (benefit)/expense	\$ (317)	\$ 2,969	\$ 2,883
FDIC-related expense	1,296	1,227	1,037

Note 12 – Securities

Securities are classified as trading, AFS or HTM. Securities classified as trading assets are discussed in Note 3. Predominantly all of the Firm's AFS and HTM investment securities (the "investment securities portfolio") are held by Treasury and CIO in connection with its asset-liability management objectives. At December 31, 2016, the investment securities portfolio consisted of debt securities with an average credit rating of AA+ (based upon external ratings where available, and where not available, based primarily upon internal ratings which correspond to ratings as defined by S&P and Moody's). AFS securities are carried at fair value on the Consolidated balance sheets. Unrealized gains and losses, after any applicable hedge accounting adjustments, are reported as net increases or decreases to AOCI. The specific identification method is used to determine realized gains and losses on AFS securities, which are included in securities gains/(losses) on the Consolidated statements of income. HTM debt securities, which management has the intent and ability to hold until maturity, are carried at amortized cost on the Consolidated balance sheets. For both AFS and HTM debt securities, purchase discounts or premiums are generally amortized into interest income over the contractual life of the security.

During 2016, the Firm transferred commercial MBS and obligations of U.S. states and municipalities with a fair value of \$7.5 billion from AFS to HTM. These securities were transferred at fair value. AOCI included net pretax unrealized gains of \$78 million on the securities at the date of transfer. The transfers reflect the Firm's intent to hold the securities to maturity in order to reduce the impact of price volatility on AOCI. This transfer was a non-cash transaction.

Notes to consolidated financial statements

The amortized costs and estimated fair values of the investment securities portfolio were as follows for the dates indicated.

December 31, (in millions)	2016				2015			
	Amortized cost	Gross unrealized gains	Gross unrealized losses	Fair value	Amortized cost	Gross unrealized gains	Gross unrealized losses	Fair value
Available-for-sale debt securities								
Mortgage-backed securities:								
U.S. government agencies(a)	\$ 63,367	\$ 1,112	\$ 474	\$ 64,005	\$ 53,689	\$ 1,483	\$ 106	\$ 55,066
Residential:								
Prime and Alt-A(b)	4,256	38	22	4,272	6,594	38	49	6,583
Subprime(b)	3,915	62	6	3,971	1,078	9	8	1,079
Non-U.S.	6,049	158	7	6,200	19,629	341	13	19,957
Commercial	9,002	122	20	9,104	22,990	150	243	22,897
Total mortgage-backed securities	86,589	1,492	529	87,552	103,980	2,021	419	105,582
U.S. Treasury and government agencies(a)	44,822	75	796	44,101	11,202	—	166	11,036
Obligations of U.S. states and municipalities	30,284	1,492	184	31,592	31,328	2,245	23	33,550
Certificates of deposit	106	—	—	106	282	1	—	283
Non-U.S. government debt securities	34,497	836	45	35,288	35,864	853	41	36,676
Corporate debt securities	4,916	64	22	4,958	12,464	142	170	12,436
Asset-backed securities:								
Collateralized loan obligations	27,352	75	26	27,401	31,146	52	191	31,007
Other	6,950	62	45	6,967	9,125	72	100	9,097
Total available-for-sale debt securities	235,516	4,096	1,647	237,965	235,391	5,386	1,110	239,667
Available-for-sale equity securities	914	12	—	926	2,067	20	—	2,087
Total available-for-sale securities	236,430	4,108	1,647	238,891	237,458	5,406	1,110	241,754
Held-to-maturity debt securities								
Mortgage-backed securities								
U.S. government agencies(c)	29,910	638	37	30,511	36,271	852	42	37,081
Commercial	5,783	—	129	5,654	—	—	—	—
Total mortgage-backed securities	35,693	638	166	36,165	36,271	852	42	37,081
Obligations of U.S. states and municipalities	14,475	374	125	14,724	12,802	708	4	13,506
Total held-to-maturity debt securities	50,168	1,012	291	50,889	49,073	1,560	46	50,587
Total securities	\$ 286,598	\$ 5,120	\$ 1,938	\$ 289,780	\$ 286,531	\$ 6,966	\$ 1,156	\$ 292,341

(a) Includes total U.S. government-sponsored enterprise obligations with fair values of \$45.8 billion and \$42.3 billion at December 31, 2016 and 2015, respectively, which were predominantly mortgage-related.

(b) Prior period amounts have been revised to conform with current period presentation.

(c) Included total U.S. government-sponsored enterprise obligations with amortized cost of \$25.6 billion and \$30.8 billion at December 31, 2016 and 2015, respectively, which were mortgage-related.

Securities impairment

The following tables present the fair value and gross unrealized losses for the investment securities portfolio by aging category at December 31, 2016 and 2015.

December 31, 2016 (in millions)	Securities with gross unrealized losses						Total gross unrealized losses
	Less than 12 months		12 months or more		Total fair value		
	Fair value	Gross unrealized losses	Fair value	Gross unrealized losses			
Available-for-sale debt securities							
Mortgage-backed securities:							
U.S. government agencies	\$ 29,856	\$ 463	\$ 506	\$ 11	\$ 30,362		\$ 474
Residential:							
Prime and Alt-A	977	2	1,018	20	1,995		22
Subprime	396	4	55	2	451		6
Non-U.S.	—	—	886	7	886		7
Commercial	2,328	17	1,078	3	3,406		20
Total mortgage-backed securities	33,557	486	3,543	43	37,100		529
U.S. Treasury and government agencies	23,543	796	—	—	23,543		796
Obligations of U.S. states and municipalities	7,215	181	55	3	7,270		184
Certificates of deposit	—	—	—	—	—		—
Non-U.S. government debt securities	4,436	36	421	9	4,857		45
Corporate debt securities	797	2	829	20	1,626		22
Asset-backed securities:							
Collateralized loan obligations	766	2	5,263	24	6,029		26
Other	739	6	1,992	39	2,731		45
Total available-for-sale debt securities	71,053	1,509	12,103	138	83,156		1,647
Available-for-sale equity securities	—	—	—	—	—		—
Held-to-maturity securities							
Mortgage-backed securities							
U.S. government securities	3,129	37	—	—	3,129		37
Commercial	5,163	114	441	15	5,604		129
Total mortgage-backed securities	8,292	151	441	15	8,733		166
Obligations of U.S. states and municipalities	4,702	125	—	—	4,702		125
Total held-to-maturity securities	12,994	276	441	15	13,435		291
Total securities with gross unrealized losses	\$ 84,047	\$ 1,785	\$ 12,544	\$ 153	\$ 96,591		\$ 1,938

Notes to consolidated financial statements

December 31, 2015 (in millions)	Securities with gross unrealized losses						Total gross unrealized losses
	Less than 12 months		12 months or more		Total fair value		
	Fair value	Gross unrealized losses	Fair value	Gross unrealized losses			
Available-for-sale debt securities							
Mortgage-backed securities:							
U.S. government agencies	\$ 13,002	\$ 95	\$ 697	\$ 11	\$ 13,699	\$ 106	
Residential:							
Prime and Alt-A(a)	4,455	43	238	6	4,693	49	
Subprime(a)	692	8	—	—	692	8	
Non-U.S.	2,021	12	167	1	2,188	13	
Commercial	13,779	239	658	4	14,437	243	
Total mortgage-backed securities	33,949	397	1,760	22	35,709	419	
U.S. Treasury and government agencies	10,998	166	—	—	10,998	166	
Obligations of U.S. states and municipalities	1,676	18	205	5	1,881	23	
Certificates of deposit	—	—	—	—	—	—	
Non-U.S. government debt securities	3,267	26	367	15	3,634	41	
Corporate debt securities	3,198	125	848	45	4,046	170	
Asset-backed securities:							
Collateralized loan obligations	15,340	67	10,692	124	26,032	191	
Other	4,284	60	1,005	40	5,289	100	
Total available-for-sale debt securities	72,712	859	14,877	251	87,589	1,110	
Available-for-sale equity securities	—	—	—	—	—	—	
Held-to-maturity debt securities							
Mortgage-backed securities							
U.S. government agencies	3,294	42	—	—	3,294	42	
Commercial	—	—	—	—	—	—	
Total mortgage-backed securities	3,294	42	—	—	3,294	42	
Obligations of U.S. states and municipalities	469	4	—	—	469	4	
Total held-to-maturity securities	3,763	46	—	—	3,763	46	
Total securities with gross unrealized losses	\$ 76,475	\$ 905	\$ 14,877	\$ 251	\$ 91,352	\$ 1,156	

(a) Prior period amounts have been revised to conform with current period presentation.

Gross unrealized losses

The Firm has recognized unrealized losses on securities it intends to sell as OTTI. The Firm does not intend to sell any of the remaining securities with an unrealized loss in AOCI as of December 31, 2016, and it is not likely that the Firm will be required to sell these securities before recovery of their amortized cost basis. Except for the securities for which credit losses have been recognized in income, the Firm believes that the securities with an unrealized loss in AOCI are not other-than-temporarily impaired as of December 31, 2016.

Other-than-temporary impairment

AFS debt and equity securities and HTM debt securities in unrealized loss positions are analyzed as part of the Firm's ongoing assessment of OTTI. For most types of debt securities, the Firm considers a decline in fair value to be other-than-temporary when the Firm does not expect to recover the entire amortized cost basis of the security. For beneficial interests in securitizations that are rated below "AA" at their acquisition, or that can be contractually prepaid or otherwise settled in such a way that the Firm would not recover substantially all of its recorded investment, the Firm considers an impairment to be other-than-temporary when there is an adverse change in expected cash flows. For AFS equity securities, the Firm considers a decline in fair value to be other-than-temporary if it is probable that the Firm will not recover its cost basis.

Potential OTTI is considered using a variety of factors, including the length of time and extent to which the market value has been less than cost; adverse conditions specifically related to the industry, geographic area or financial condition of the issuer or underlying collateral of a security; payment structure of the security; changes to the rating of the security by a rating agency; the volatility of the fair value changes; and the Firm's intent and ability to hold the security until recovery.

For AFS debt securities, the Firm recognizes OTTI losses in earnings if the Firm has the intent to sell the debt security, or if it is more likely than not that the Firm will be required to sell the debt security before recovery of its amortized cost basis. In these circumstances the impairment loss is equal to the full difference between the amortized cost basis and the fair value of the securities. For debt securities in an unrealized loss position that the Firm has the intent and ability to hold, the expected cash flows to be received from the securities are evaluated to determine if a credit loss exists. In the event of a credit loss, only the amount of impairment associated with the credit loss is recognized in income. Amounts relating to factors other than credit losses are recorded in OCI.

The Firm's cash flow evaluations take into account the factors noted above and expectations of relevant market and economic data as of the end of the reporting period. For securities issued in a securitization, the Firm estimates cash flows considering underlying loan-level data and structural features of the securitization, such as subordination, excess spread, overcollateralization or other forms of credit enhancement, and compares the losses projected for the underlying collateral ("pool losses") against the level of credit enhancement in the securitization structure to determine whether these features are sufficient to absorb the pool losses, or whether a credit loss exists. The Firm also performs other analyses to support its cash flow projections, such as first-loss analyses or stress scenarios.

For equity securities, OTTI losses are recognized in earnings if the Firm intends to sell the security. In other cases the Firm considers the relevant factors noted above, as well as the Firm's intent and ability to retain its investment for a period of time sufficient to allow for any anticipated recovery in market value, and whether evidence exists to support a realizable value equal to or greater than the cost basis. Any impairment loss on an equity security is equal to the full difference between the cost basis and the fair value of the security.

Securities gains and losses

The following table presents realized gains and losses and OTTI from AFS securities that were recognized in income.

Year ended December 31, (in millions)	2016	2015	2014
Realized gains	\$ 401	\$ 351	\$ 314
Realized losses	(232)	(127)	(233)
OTTI losses	(28)	(22)	(4)
Net securities gains	141	202	77

OTTI losses

Credit losses recognized in income	(1)	(1)	(2)
Securities the Firm intends to sell(a)	(27)	(21)	(2)
Total OTTI losses recognized in income	\$ (28)	\$ (22)	\$ (4)

(a) Excludes realized losses on securities sold of \$24 million, \$5 million and \$3 million for the years ended December 31, 2016, 2015 and 2014, respectively that had been previously reported as an OTTI loss due to the intention to sell the securities.

Changes in the credit loss component of credit-impaired debt securities

The cumulative credit loss component, including any changes therein, of OTTI losses that have been recognized in income related to AFS debt securities was not material as of and during the years ended December 31, 2016, 2015 and 2014.

Notes to consolidated financial statements

Contractual maturities and yields

The following table presents the amortized cost and estimated fair value at December 31, 2016, of JPMorgan Chase's investment securities portfolio by contractual maturity.

By remaining maturity December 31, 2016 (in millions)	Due in one year or less	Due after one year through five years	Due after five years through 10 years	Due after 10 years ^(c)	Total
Available-for-sale debt securities					
Mortgage-backed securities ^(a)					
Amortized cost	\$ 2,012	\$ 2,393	\$ 7,574	\$ 74,610	\$ 86,589
Fair value	2,022	2,449	7,756	75,325	87,552
Average yield ^(b)	2.04%	2.36%	3.03%	3.26%	3.19%
U.S. Treasury and government agencies ^(a)					
Amortized cost	\$ 132	\$ 4,573	\$ 38,976	\$ 1,141	\$ 44,822
Fair value	132	4,561	38,317	1,091	44,101
Average yield ^(b)	0.42%	0.86%	1.27%	1.13%	1.22%
Obligations of U.S. states and municipalities					
Amortized cost	\$ 134	\$ 752	\$ 1,096	\$ 28,302	\$ 30,284
Fair value	135	767	1,148	29,542	31,592
Average yield ^(b)	5.85%	3.58%	6.29%	6.63%	6.54%
Certificates of deposit					
Amortized cost	\$ 106	\$ —	\$ —	\$ —	\$ 106
Fair value	106	—	—	—	106
Average yield ^(b)	1.78%	—%	—%	—%	1.78%
Non-U.S. government debt securities					
Amortized cost	\$ 5,831	\$ 14,109	\$ 13,503	\$ 1,054	\$ 34,497
Fair value	5,838	14,444	13,944	1,062	35,288
Average yield ^(b)	2.92%	1.55%	0.93%	0.58%	1.51%
Corporate debt securities					
Amortized cost	\$ 2,059	\$ 1,312	\$ 1,424	\$ 121	\$ 4,916
Fair value	2,070	1,332	1,433	123	4,958
Average yield ^(b)	2.88%	3.11%	3.24%	3.52%	3.06%
Asset-backed securities					
Amortized cost	\$ —	\$ 444	\$ 21,551	\$ 12,307	\$ 34,302
Fair value	—	446	21,577	12,345	34,368
Average yield ^(b)	—%	0.49%	2.33%	2.21%	2.26%
Total available-for-sale debt securities					
Amortized cost	\$ 10,274	\$ 23,583	\$ 84,124	\$ 117,535	\$ 235,516
Fair value	10,303	23,999	84,175	119,488	237,965
Average yield ^(b)	2.73%	1.63%	1.74%	3.92%	2.86%
Available-for-sale equity securities					
Amortized cost	\$ —	\$ —	\$ —	\$ 914	\$ 914
Fair value	—	—	—	926	926
Average yield ^(b)	—%	—%	—%	0.58%	0.58%
Total available-for-sale securities					
Amortized cost	\$ 10,274	\$ 23,583	\$ 84,124	\$ 118,449	\$ 236,430
Fair value	10,303	23,999	84,175	120,414	238,891
Average yield ^(b)	2.73%	1.63%	1.74%	3.89%	2.85%
Held-to-maturity debt securities					
Mortgage-backed securities ^(a)					
Amortized Cost	\$ —	\$ —	\$ —	\$ 35,693	\$ 35,693
Fair value	—	—	—	36,165	36,165
Average yield ^(b)	—%	—%	—%	3.30%	3.30%
Obligations of U.S. states and municipalities					
Amortized cost	\$ —	\$ 29	\$ 1,439	\$ 13,007	\$ 14,475
Fair value	—	29	1,467	13,228	14,724
Average yield ^(b)	—%	6.61%	5.11%	5.68%	5.63%
Total held-to-maturity securities					
Amortized cost	\$ —	\$ 29	\$ 1,439	\$ 48,700	\$ 50,168
Fair value	—	29	1,467	49,393	50,889
Average yield ^(b)	—%	6.61%	5.11%	3.94%	3.97%

(a) U.S. government-sponsored enterprises were the only issuers whose securities exceeded 10% of JPMorgan Chase's total stockholders' equity at December 31, 2016.

(b) Average yield is computed using the effective yield of each security owned at the end of the period, weighted based on the amortized cost of each security. The effective yield considers the contractual coupon, amortization of premiums and accretion of discounts, and the effect of related hedging derivatives. Taxable-equivalent amounts are used.

where applicable. The effective yield excludes unscheduled principal prepayments; and accordingly, actual maturities of securities may differ from their contractual or expected maturities as certain securities may be prepaid.

- (c) Includes securities with no stated maturity. Substantially all of the Firm's residential MBS and collateralized mortgage obligations are due in 10 years or more, based on contractual maturity. The estimated weighted-average life, which reflects anticipated future prepayments, is approximately seven years for agency residential MBS, three years for agency residential collateralized mortgage obligations and three years for nonagency residential collateralized mortgage obligations.

Note 13 – Securities financing activities

JPMorgan Chase enters into resale agreements, repurchase agreements, securities borrowed transactions and securities loaned transactions (collectively, "securities financing agreements") primarily to finance the Firm's inventory positions, acquire securities to cover short positions, accommodate customers' financing needs, and settle other securities obligations.

Securities financing agreements are treated as collateralized financings on the Firm's Consolidated balance sheets. Resale and repurchase agreements are generally carried at the amounts at which the securities will be subsequently sold or repurchased. Securities borrowed and securities loaned transactions are generally carried at the amount of cash collateral advanced or received. Where appropriate under applicable accounting guidance, resale and repurchase agreements with the same counterparty are reported on a net basis. For further discussion of the offsetting of assets and liabilities, see Note 1. Fees received and paid in connection with securities financing agreements are recorded in interest income and interest expense on the Consolidated statements of income.

The Firm has elected the fair value option for certain securities financing agreements. For further information regarding the fair value option, see Note 4. The securities financing agreements for which the fair value option has been elected are reported within securities purchased under resale agreements, securities loaned or sold under repurchase agreements, and securities borrowed on the Consolidated balance sheets. Generally, for agreements carried at fair value, current-period interest accruals are recorded within interest income and interest expense, with changes in fair value reported in principal transactions revenue. However, for financial instruments containing embedded derivatives that would be separately accounted for in accordance with accounting guidance for hybrid instruments, all changes in fair value, including any interest elements, are reported in principal transactions revenue.

Securities financing transactions expose the Firm to credit and liquidity risk. To manage these risks, the Firm monitors the value of the underlying securities (predominantly high-quality securities collateral, including government-issued debt and agency MBS) that it has received from or provided to its counterparties compared to the value of cash proceeds and exchanged collateral, and either requests additional collateral or returns securities or collateral when appropriate. Margin levels are initially established based upon the counterparty, the type of underlying securities, and the permissible collateral, and are monitored on an ongoing basis.

In resale agreements and securities borrowed transactions, the Firm is exposed to credit risk to the extent that the value of the securities received is less than initial cash principal advanced and any collateral amounts exchanged. In repurchase agreements and securities loaned transactions, credit risk exposure arises to the extent that the value of underlying securities exceeds the value of the initial cash principal advanced, and any collateral amounts exchanged.

Additionally, the Firm typically enters into master netting agreements and other similar arrangements with its counterparties, which provide for the right to liquidate the underlying securities and any collateral amounts exchanged in the event of a counterparty default. It is also the Firm's policy to take possession, where possible, of the securities underlying resale agreements and securities borrowed transactions. For further information regarding assets pledged and collateral received in securities financing agreements, see Note 30.

As a result of the Firm's credit risk mitigation practices with respect to resale and securities borrowed agreements as described above, the Firm did not hold any reserves for credit impairment with respect to these agreements as of December 31, 2016 and 2015.

Notes to consolidated financial statements

The table below summarizes the gross and net amounts of the Firm's securities financing agreements, as of December 31, 2016, and 2015. When the Firm has obtained an appropriate legal opinion with respect to the master netting agreement with a counterparty and where other relevant netting criteria under U.S. GAAP are met, the Firm nets, on the Consolidated balance sheets, the balances outstanding under its securities financing agreements with the same counterparty. In addition, the Firm exchanges securities and/or cash collateral with its counterparties; this collateral also reduces, in the Firm's view, the economic exposure with the counterparty. Such collateral, along with securities financing balances that do not meet all these relevant netting criteria under U.S. GAAP, is presented as "Amounts not nettable on the Consolidated balance sheets," and reduces the "Net amounts" presented below, if the Firm has an appropriate legal opinion with respect to the master netting agreement with the counterparty. Where a legal opinion has not been either sought or obtained, the securities financing balances are presented gross in the "Net amounts" below, and related collateral does not reduce the amounts presented.

2016						
December 31, (in millions)	Gross amounts	Amounts netted on the Consolidated balance sheets	Amounts presented on the Consolidated balance sheets(b)	Amounts not nettable on the Consolidated balance sheets(c)	Net amounts(d)	
Assets						
Securities purchased under resale agreements	\$ 480,735	\$ (250,832)	\$ 229,903	\$ (222,413)	\$ 7,490	
Securities borrowed	96,409	—	96,409	(66,822)	29,587	
Liabilities						
Securities sold under repurchase agreements	\$ 402,465	\$ (250,832)	\$ 151,633	\$ (133,300)	\$ 18,333	
Securities loaned and other(a)	22,451	—	22,451	(22,177)	274	
2015						
December 31, (in millions)	Gross amounts	Amounts netted on the Consolidated balance sheets	Amounts presented on the Consolidated balance sheets(b)	Amounts not nettable on the Consolidated balance sheets(c)	Net amounts(d)	
Assets						
Securities purchased under resale agreements	\$ 368,148	\$ (156,258)	\$ 211,890	\$ (207,958)	\$ 3,932	(e)
Securities borrowed	98,721	—	98,721	(65,081)	33,640	
Liabilities						
Securities sold under repurchase agreements	\$ 290,044	\$ (156,258)	\$ 133,786	\$ (119,332)	\$ 14,454	(e)
Securities loaned and other(a)	22,556	—	22,556	(22,245)	311	

(a) Includes securities-for-securities lending transactions of \$9.1 billion and \$4.4 billion at December 31, 2016 and 2015, respectively, accounted for at fair value, where the Firm is acting as lender. These amounts are presented within other liabilities in the Consolidated balance sheets.

(b) Includes securities financing agreements accounted for at fair value. At December 31, 2016 and 2015, included securities purchased under resale agreements of \$21.5 billion and \$23.1 billion, respectively, and securities sold under agreements to repurchase of \$687 million and \$3.5 billion, respectively. There were no securities borrowed at December 31, 2016 and \$395 million at December 31, 2015. There were no securities loaned accounted for at fair value in either period.

(c) In some cases, collateral exchanged with a counterparty exceeds the net asset or liability balance with that counterparty. In such cases, the amounts reported in this column are limited to the related asset or liability with that counterparty.

(d) Includes securities financing agreements that provide collateral rights, but where an appropriate legal opinion with respect to the master netting agreement has not been either sought or obtained. At December 31, 2016 and 2015, included \$4.8 billion and \$2.3 billion, respectively, of securities purchased under resale agreements; \$27.1 billion and \$31.3 billion, respectively, of securities borrowed; \$15.9 billion and \$12.6 billion, respectively, of securities sold under agreements to repurchase; and \$90 million and \$45 million, respectively, of securities loaned and other.

(e) Prior period amounts have been revised to conform with the current presentation.

The tables below present as of December 31, 2016 and 2015 the types of financial assets pledged in securities financing agreements and the remaining contractual maturity of the securities financing agreements.

December 31, (in millions)	Gross liability balance			
	2016		2015	
	Securities sold under repurchase agreements	Securities loaned and other(a)	Securities sold under repurchase agreements	Securities loaned and other(a)
Mortgage-backed securities	\$ 10,546	\$ —	\$ 12,790	\$ —
U.S. Treasury and government agencies	199,030	—	154,377	5
Obligations of U.S. states and municipalities	2,491	—	1,316	—
Non-U.S. government debt	149,008	1,279	80,162	4,426
Corporate debt securities	18,140	108	21,286	78
Asset-backed securities	7,721	—	4,394	—
Equity securities	15,529	21,064	15,719	18,047
Total	\$ 402,465	\$ 22,451	\$ 290,044	\$ 22,556

2016 (in millions)	Remaining contractual maturity of the agreements				
	Overnight and continuous	Up to 30 days	30 – 90 days	Greater than 90 days	Total
Total securities sold under repurchase agreements	\$ 140,318	\$ 157,860	\$ 55,621	\$ 48,666	\$ 402,465
Total securities loaned and other(a)	13,586	1,371	2,877	4,617	22,451

2015 (in millions)	Remaining contractual maturity of the agreements				
	Overnight and continuous	Up to 30 days	30 – 90 days	Greater than 90 days	Total
Total securities sold under repurchase agreements	\$ 114,595	\$ 100,082	\$ 29,955	\$ 45,412	\$ 290,044
Total securities loaned and other(a)	8,320	708	793	12,735	22,556

(a) Includes securities-for-securities lending transactions of \$9.1 billion and \$4.4 billion at December 31, 2016 and 2015, respectively, accounted for at fair value, where the Firm is acting as lender. These amounts are presented within other liabilities on the Consolidated balance sheets.

Transfers not qualifying for sale accounting

At December 31, 2016 and 2015, the Firm held \$5.9 billion and \$7.5 billion, respectively, of financial assets for which the rights have been transferred to third parties; however, the transfers did not qualify as a sale in accordance with U.S. GAAP. These transfers have been recognized as collateralized financing transactions. The transferred assets are recorded in trading assets and loans, and the corresponding liabilities are recorded predominantly in other borrowed funds on the Consolidated balance sheets.

Note 14 – Loans

Loan accounting framework

The accounting for a loan depends on management's strategy for the loan, and on whether the loan was credit-impaired at the date of acquisition. The Firm accounts for loans based on the following categories:

- Originated or purchased loans held-for-investment (i.e., "retained"), other than PCI loans
- Loans held-for-sale
- Loans at fair value
- PCI loans held-for-investment

The following provides a detailed accounting discussion of these loan categories:

Loans held-for-investment (other than PCI loans)

Originated or purchased loans held-for-investment, other than PCI loans, are recorded at the principal amount outstanding, net of the following: charge-offs; interest applied to principal (for loans accounted for on the cost recovery method); unamortized discounts and premiums; and net deferred loan fees or costs. Credit card loans also include billed finance charges and fees net of an allowance for uncollectible amounts.

Interest income

Interest income on performing loans held-for-investment, other than PCI loans, is accrued and recognized as interest income at the contractual rate of interest. Purchase price discounts or premiums, as well as net deferred loan fees or costs, are amortized into interest income over the contractual life of the loan to produce a level rate of return.

Nonaccrual loans

Nonaccrual loans are those on which the accrual of interest has been suspended. Loans (other than credit card loans and certain consumer loans insured by U.S. government agencies) are placed on nonaccrual status and considered nonperforming when full payment of principal and interest is not expected, regardless of delinquency status, or when principal and interest has been in default for a period of 90 days or more, unless the loan is both well-secured and in the process of collection. A loan is determined to be past due when the minimum payment is not received from the borrower by the contractually specified due date or for certain loans (e.g., residential real estate loans), when a monthly payment is due and unpaid for 30 days or more. Finally, collateral-dependent loans are typically maintained on nonaccrual status.

On the date a loan is placed on nonaccrual status, all interest accrued but not collected is reversed against interest income. In addition, the amortization of deferred amounts is suspended. Interest income on nonaccrual loans may be recognized as cash interest payments are received (i.e., on a cash basis) if the recorded loan balance is deemed fully collectible; however, if there is doubt regarding the ultimate collectibility of the recorded loan balance, all interest cash receipts are applied to reduce the

carrying value of the loan (the cost recovery method). For consumer loans, application of this policy typically results in the Firm recognizing interest income on nonaccrual consumer loans on a cash basis.

A loan may be returned to accrual status when repayment is reasonably assured and there has been demonstrated performance under the terms of the loan or, if applicable, the terms of the restructured loan.

As permitted by regulatory guidance, credit card loans are generally exempt from being placed on nonaccrual status; accordingly, interest and fees related to credit card loans continue to accrue until the loan is charged off or paid in full. However, the Firm separately establishes an allowance, which is offset against loans and charged to interest income, for the estimated uncollectible portion of accrued and billed interest and fee income on credit card loans. The allowance is established with a charge to interest income and is reported as an offset to loans.

Allowance for loan losses

The allowance for loan losses represents the estimated probable credit losses inherent in the held-for-investment loan portfolio at the balance sheet date and is recognized on the balance sheet as a contra asset, which brings the recorded investment to the net carrying value. Changes in the allowance for loan losses are recorded in the provision for credit losses on the Firm's Consolidated statements of income. See Note 15 for further information on the Firm's accounting policies for the allowance for loan losses.

Charge-offs

Consumer loans, other than risk-rated business banking, risk-rated auto and PCI loans, are generally charged off or charged down to the net realizable value of the underlying collateral (i.e., fair value less costs to sell), with an offset to the allowance for loan losses, upon reaching specified stages of delinquency in accordance with standards established by the FFIEC. Residential real estate loans, non-modified credit card loans and scored business banking loans are generally charged off no later than 180 days past due. Auto, student and modified credit card loans are charged off no later than 120 days past due.

Certain consumer loans will be charged off earlier than the FFIEC charge-off standards in certain circumstances as follows:

- A charge-off is recognized when a loan is modified in a TDR if the loan is determined to be collateral-dependent.
- Loans to borrowers who have experienced an event (e.g., bankruptcy) that suggests a loss is either known or highly certain are subject to accelerated charge-off standards. Residential real estate and auto loans are charged off when the loan becomes 60 days past due, or sooner if the loan is determined to be collateral-dependent. Credit card, student and scored business banking loans are charged off within 60 days of

receiving notification of the bankruptcy filing or other event.

- Auto loans are written down to net realizable value upon repossession of the automobile and after a redemption period (i.e., the period during which a borrower may cure the loan) has passed.

Other than in certain limited circumstances, the Firm typically does not recognize charge-offs on government-guaranteed loans.

Wholesale loans, risk-rated business banking loans and risk-rated auto loans are charged off when it is highly certain that a loss has been realized, including situations where a loan is determined to be both impaired and collateral-dependent. The determination of whether to recognize a charge-off includes many factors, including the prioritization of the Firm's claim in bankruptcy, expectations of the workout/restructuring of the loan and valuation of the borrower's equity or the loan collateral.

When a loan is charged down to the estimated net realizable value, the determination of the fair value of the collateral depends on the type of collateral (e.g., securities, real estate). In cases where the collateral is in the form of liquid securities, the fair value is based on quoted market prices or broker quotes. For illiquid securities or other financial assets, the fair value of the collateral is estimated using a discounted cash flow model.

For residential real estate loans, collateral values are based upon external valuation sources. When it becomes likely that a borrower is either unable or unwilling to pay, the Firm obtains a broker's price opinion of the home based on an exterior-only valuation ("exterior opinions"), which is then updated at least every six months thereafter. As soon as practicable after the Firm receives the property in satisfaction of a debt (e.g., by taking legal title or physical possession), generally, either through foreclosure or upon the execution of a deed in lieu of foreclosure transaction with the borrower, the Firm obtains an appraisal based on an inspection that includes the interior of the home ("interior appraisals"). Exterior opinions and interior appraisals are discounted based upon the Firm's experience with actual liquidation values as compared with the estimated values provided by exterior opinions and interior appraisals, considering state- and product-specific factors.

For commercial real estate loans, collateral values are generally based on appraisals from internal and external valuation sources. Collateral values are typically updated every six to twelve months, either by obtaining a new appraisal or by performing an internal analysis, in accordance with the Firm's policies. The Firm also considers both borrower- and market-specific factors, which may result in obtaining appraisal updates or broker price opinions at more frequent intervals.

Loans held-for-sale

Held-for-sale loans are measured at the lower of cost or fair value, with valuation changes recorded in noninterest revenue. For consumer loans, the valuation is performed on a portfolio basis. For wholesale loans, the valuation is performed on an individual loan basis.

Interest income on loans held-for-sale is accrued and recognized based on the contractual rate of interest.

Loan origination fees or costs and purchase price discounts or premiums are deferred in a contra loan account until the related loan is sold. The deferred fees and discounts or premiums are an adjustment to the basis of the loan and therefore are included in the periodic determination of the lower of cost or fair value adjustments and/or the gain or loss recognized at the time of sale.

Held-for-sale loans are subject to the nonaccrual policies described above.

Because held-for-sale loans are recognized at the lower of cost or fair value, the Firm's allowance for loan losses and charge-off policies do not apply to these loans.

Loans at fair value

Loans used in a market-making strategy or risk managed on a fair value basis are measured at fair value, with changes in fair value recorded in noninterest revenue.

Interest income on loans is accrued and recognized based on the contractual rate of interest. Changes in fair value are recognized in noninterest revenue. Loan origination fees are recognized upfront in noninterest revenue. Loan origination costs are recognized in the associated expense category as incurred.

Because these loans are recognized at fair value, the Firm's allowance for loan losses and charge-off policies do not apply to these loans.

See Note 4 for further information on the Firm's elections of fair value accounting under the fair value option. See Note 3 and Note 4 for further information on loans carried at fair value and classified as trading assets.

PCI loans

PCI loans held-for-investment are initially measured at fair value. PCI loans have evidence of credit deterioration since the loan's origination date and therefore it is probable, at acquisition, that all contractually required payments will not be collected. Because PCI loans are initially measured at fair value, which includes an estimate of future credit losses, no allowance for loan losses related to PCI loans is recorded at the acquisition date. See page 219 of this Note for information on accounting for PCI loans subsequent to their acquisition.

Loan classification changes

Loans in the held-for-investment portfolio that management decides to sell are transferred to the held-for-sale portfolio at the lower of cost or fair value on the date of transfer. Credit-related losses are charged against the allowance for loan losses; non-credit related losses such as those due to changes in interest rates or foreign currency exchange rates are recognized in noninterest revenue.

In the event that management decides to retain a loan in the held-for-sale portfolio, the loan is transferred to the held-for-investment portfolio at the lower of cost or fair value on the date of transfer. These loans are subsequently assessed for impairment based on the Firm's allowance methodology. For a further discussion of the methodologies used in establishing the Firm's allowance for loan losses, see Note 15.

Loan modifications

The Firm seeks to modify certain loans in conjunction with its loss-mitigation activities. Through the modification, JPMorgan Chase grants one or more concessions to a borrower who is experiencing financial difficulty in order to minimize the Firm's economic loss, avoid foreclosure or repossession of the collateral, and to ultimately maximize payments received by the Firm from the borrower. The concessions granted vary by program and by borrower-specific characteristics, and may include interest rate reductions, term extensions, payment deferrals, principal forgiveness, or the acceptance of equity or other assets in lieu of payments.

Such modifications are accounted for and reported as TDRs. A loan that has been modified in a TDR is generally considered to be impaired until it matures, is repaid, or is otherwise liquidated, regardless of whether the borrower performs under the modified terms. In certain limited cases, the effective interest rate applicable to the modified loan is at or above the current market rate at the time of the restructuring. In such circumstances, and assuming that the loan subsequently performs under its modified terms and the Firm expects to collect all contractual principal and interest cash flows, the loan is disclosed as impaired and as a TDR only during the year of the modification; in subsequent years, the loan is not disclosed as an impaired loan or as a TDR so long as repayment of the restructured loan under its modified terms is reasonably assured.

Loans, except for credit card loans, modified in a TDR are generally placed on nonaccrual status, although in many cases such loans were already on nonaccrual status prior to modification. These loans may be returned to performing status (the accrual of interest is resumed) if the following criteria are met: (i) the borrower has performed under the modified terms for a minimum of six months and/or six payments, and (ii) the Firm has an expectation that repayment of the modified loan is reasonably assured based on, for example, the borrower's debt capacity and level of future earnings, collateral values, LTV ratios, and other current market considerations. In certain limited and well-defined circumstances in which the loan is current at the modification date, such loans are not placed on nonaccrual status at the time of modification.

Because loans modified in TDRs are considered to be impaired, these loans are measured for impairment using the Firm's established asset-specific allowance methodology, which considers the expected re-default rates for the modified loans. A loan modified in a TDR generally remains subject to the asset-specific allowance methodology throughout its remaining life, regardless of whether the loan is performing and has been returned to accrual status and/or the loan has been removed from the impaired loans disclosures (i.e., loans restructured at market rates). For further discussion of the methodology used to estimate the Firm's asset-specific allowance, see Note 15.

Foreclosed property

The Firm acquires property from borrowers through loan restructurings, workouts, and foreclosures. Property acquired may include real property (e.g., residential real estate, land, and buildings) and commercial and personal property (e.g., automobiles, aircraft, railcars, and ships).

The Firm recognizes foreclosed property upon receiving assets in satisfaction of a loan (e.g., by taking legal title or physical possession). For loans collateralized by real property, the Firm generally recognizes the asset received at foreclosure sale or upon the execution of a deed in lieu of foreclosure transaction with the borrower. Foreclosed assets are reported in other assets on the Consolidated balance sheets and initially recognized at fair value less costs to sell. Each quarter the fair value of the acquired property is reviewed and adjusted, if necessary, to the lower of cost or fair value. Subsequent adjustments to fair value are charged/credited to noninterest revenue. Operating expense, such as real estate taxes and maintenance, are charged to other expense.

Loan portfolio

The Firm's loan portfolio is divided into three portfolio segments, which are the same segments used by the Firm to determine the allowance for loan losses: Consumer, excluding credit card; Credit card; and Wholesale. Within each portfolio segment the Firm monitors and assesses the credit risk in the following classes of loans, based on the risk characteristics of each loan class.

Consumer, excluding credit card ^(a)	Credit card	Wholesale ^(f)
<u>Residential real estate – excluding PCI</u> <ul style="list-style-type: none"> • Home equity^(b) • Residential mortgage^(c) <u>Other consumer loans</u> <ul style="list-style-type: none"> • Auto^(d) • Business banking^{(d)(e)} • Student and other <u>Residential real estate – PCI</u> <ul style="list-style-type: none"> • Home equity • Prime mortgage • Subprime mortgage • Option ARMs 	<ul style="list-style-type: none"> • Credit card loans 	<ul style="list-style-type: none"> • Commercial and industrial • Real estate • Financial institutions • Government agencies • Other^(g)

(a) Includes loans held in CCB, prime mortgage and home equity loans held in AWM and prime mortgage loans held in Corporate.

(b) Includes senior and junior lien home equity loans.

(c) Includes prime (including option ARMs) and subprime loans.

(d) Includes certain business banking and auto dealer risk-rated loans that apply the wholesale methodology for determining the allowance for loan losses; these loans are managed by CCB, and therefore, for consistency in presentation, are included with the other consumer loan classes.

(e) Predominantly includes Business Banking loans as well as deposit overdrafts.

(f) Includes loans held in CIB, CB, AWM and Corporate. Excludes prime mortgage and home equity loans held in AWM and prime mortgage loans held in Corporate. Classes are internally defined and may not align with regulatory definitions.

(g) Includes loans to: individuals; SPEs; holding companies; and private education and civic organizations. For more information on exposures to SPEs, see Note 16.

The following tables summarize the Firm's loan balances by portfolio segment.

December 31, 2016					
	(in millions)	Consumer, excluding credit card	Credit card ^(a)	Wholesale	Total
Retained		\$ 364,406	\$ 141,711	\$ 383,790	\$ 889,907 ^(b)
Held-for-sale		238	105	2,285	2,628
At fair value		—	—	2,230	2,230
Total		\$ 364,644	\$ 141,816	\$ 388,305	\$ 894,765

December 31, 2015					
	(in millions)	Consumer, excluding credit card	Credit card ^(a)	Wholesale	Total
Retained		\$ 344,355	\$ 131,387	\$ 357,050	\$ 832,792 ^(b)
Held-for-sale		466	76	1,104	1,646
At fair value		—	—	2,861	2,861
Total		\$ 344,821	\$ 131,463	\$ 361,015	\$ 837,299

(a) Includes billed interest and fees net of an allowance for uncollectible interest and fees.

(b) Loans (other than PCI loans and those for which the fair value option has been elected) are presented net of unearned income, unamortized discounts and premiums, and net deferred loan costs. These amounts were not material as of December 31, 2016 and 2015.

Notes to consolidated financial statements

The following tables provide information about the carrying value of retained loans purchased, sold and reclassified to held-for-sale during the periods indicated. These tables exclude loans recorded at fair value. The Firm manages its exposure to credit risk on an ongoing basis. Selling loans is one way that the Firm reduces its credit exposures.

Year ended December 31, (in millions)	2016			
	Consumer, excluding credit card	Credit card	Wholesale	Total
Purchases	\$ 4,116 (a)(b)	\$ —	\$ 1,448	\$ 5,564
Sales	6,368	—	8,739	15,107
Retained loans reclassified to held-for-sale	321	—	2,381	2,702

Year ended December 31, (in millions)	2015			
	Consumer, excluding credit card	Credit card	Wholesale	Total
Purchases	\$ 5,279 (a)(b)	\$ —	\$ 2,154	\$ 7,433
Sales	5,099	—	9,188	14,287
Retained loans reclassified to held-for-sale	1,514	79	642	2,235

Year ended December 31, (in millions)	2014			
	Consumer, excluding credit card	Credit card	Wholesale	Total
Purchases	\$ 7,434 (a)(b)	\$ —	\$ 885	\$ 8,319
Sales	6,655	—	7,381	14,036
Retained loans reclassified to held-for-sale	1,190	3,039	581	4,810

(a) Purchases predominantly represent the Firm's voluntary repurchase of certain delinquent loans from loan pools as permitted by Government National Mortgage Association ("Ginnie Mae") guidelines. The Firm typically elects to repurchase these delinquent loans as it continues to service them and/or manage the foreclosure process in accordance with applicable requirements of Ginnie Mae, FHA, RHS, and/or VA.

(b) Excludes purchases of retained loans sourced through the correspondent origination channel and underwritten in accordance with the Firm's standards. Such purchases were \$30.4 billion, \$50.3 billion and \$15.1 billion for the years ended December 31, 2016, 2015 and 2014, respectively.

The following table provides information about gains and losses, including lower of cost or fair value adjustments, on loan sales by portfolio segment.

Year ended December 31, (in millions)	2016	2015	2014
Net gains/(losses) on sales of loans (including lower of cost or fair value adjustments)^(a)			
Consumer, excluding credit card	\$ 231	\$ 305	\$ 341
Credit card	(12)	1	(241)
Wholesale	26	34	101
Total net gains on sales of loans (including lower of cost or fair value adjustments)	\$ 245	\$ 340	\$ 201

(a) Excludes sales related to loans accounted for at fair value.

Consumer, excluding credit card, loan portfolio

Consumer loans, excluding credit card loans, consist primarily of residential mortgages, home equity loans and lines of credit, auto loans, business banking loans, and student and other loans, with a focus on serving the prime consumer credit market. The portfolio also includes home equity loans secured by junior liens, prime mortgage loans with an interest-only payment period, and certain payment-option loans that may result in negative amortization.

The table below provides information about retained consumer loans, excluding credit card, by class.

December 31, (in millions)	2016	2015
Residential real estate – excluding PCI		
Home equity	\$ 39,063	\$ 45,559
Residential mortgage	192,163	166,239
Other consumer loans		
Auto	65,814	60,255
Business banking	22,698	21,208
Student and other	8,989	10,096
Residential real estate – PCI		
Home equity	12,902	14,989
Prime mortgage	7,602	8,893
Subprime mortgage	2,941	3,263
Option ARMs	12,234	13,853
Total retained loans	\$ 364,406	\$ 344,355

Delinquency rates are a primary credit quality indicator for consumer loans. Loans that are more than 30 days past due provide an early warning of borrowers who may be experiencing financial difficulties and/or who may be unable or unwilling to repay the loan. As the loan continues to age, it becomes more clear that the borrower is likely either unable or unwilling to pay. In the case of residential real estate loans, late-stage delinquencies (greater than 150 days past due) are a strong indicator of loans that will ultimately result in a foreclosure or similar liquidation transaction. In addition to delinquency rates, other credit quality indicators for consumer loans vary based on the class of loan, as follows:

- For residential real estate loans, including both non-PCI and PCI portfolios, the current estimated LTV ratio, or the combined LTV ratio in the case of junior lien loans, is an indicator of the potential loss severity in the event of default. Additionally, LTV or combined LTV ratios can provide insight into a borrower's continued willingness to pay, as the delinquency rate of high-LTV loans tends to be greater than that for loans where the borrower has equity in the collateral. The geographic distribution of

the loan collateral also provides insight as to the credit quality of the portfolio, as factors such as the regional economy, home price changes and specific events such as natural disasters, will affect credit quality. The borrower's current or "refreshed" FICO score is a secondary credit-quality indicator for certain loans, as FICO scores are an indication of the borrower's credit payment history. Thus, a loan to a borrower with a low FICO score (660 or below) is considered to be of higher risk than a loan to a borrower with a high FICO score. Further, a loan to a borrower with a high LTV ratio and a low FICO score is at greater risk of default than a loan to a borrower that has both a high LTV ratio and a high FICO score.

- For scored auto, scored business banking and student loans, geographic distribution is an indicator of the credit performance of the portfolio. Similar to residential real estate loans, geographic distribution provides insights into the portfolio performance based on regional economic activity and events.
- Risk-rated business banking and auto loans are similar to wholesale loans in that the primary credit quality indicators are the risk rating that is assigned to the loan and whether the loans are considered to be criticized and/or nonaccrual. Risk ratings are reviewed on a regular and ongoing basis by Credit Risk Management and are adjusted as necessary for updated information about borrowers' ability to fulfill their obligations. For further information about risk-rated wholesale loan credit quality indicators, see pages 224–225 of this Note.

Residential real estate — excluding PCI loans

The following table provides information by class for residential real estate — excluding retained PCI loans in the consumer, excluding credit card, portfolio segment.

The following factors should be considered in analyzing certain credit statistics applicable to the Firm's residential real estate — excluding PCI loans portfolio: (i) junior lien home equity loans may be fully charged off when the loan becomes 180 days past due, and the value of the collateral does not support the repayment of the loan, resulting in relatively high charge-off rates for this product class; and (ii) the lengthening of loss-mitigation timelines may result in higher delinquency rates for loans carried at the net realizable value of the collateral that remain on the Firm's Consolidated balance sheets.

Notes to consolidated financial statements

Residential real estate – excluding PCI loans

December 31, (in millions, except ratios)	Home equity(g)		Residential mortgage(g)		Total residential real estate – excluding PCI	
	2016	2015	2016	2015	2016	2015
Loan delinquency(a)						
Current	\$ 37,941	\$ 44,299	\$ 183,819	\$ 156,463	\$ 221,760	\$ 200,762
30–149 days past due	646	708	3,824	4,042	4,470	4,750
150 or more days past due	476	552	4,520	5,734	4,996	6,286
Total retained loans	\$ 39,063	\$ 45,559	\$ 192,163	\$ 166,239	\$ 231,226	\$ 211,798
% of 30+ days past due to total retained loans(b)	2.87%	2.77%	0.75%	1.03%	1.11%	1.40%
90 or more days past due and government guaranteed(c)	\$ —	\$ —	\$ 4,858	\$ 6,056	\$ 4,858	\$ 6,056
Nonaccrual loans	1,845	2,191	2,247	2,503	4,092	4,694
Current estimated LTV ratios(d)(e)						
Greater than 125% and refreshed FICO scores:						
Equal to or greater than 660	\$ 70	\$ 165	\$ 30	\$ 58	\$ 100	\$ 223
Less than 660	15	32	48	77	63	109
101% to 125% and refreshed FICO scores:						
Equal to or greater than 660	668	1,344	135	274	803	1,618
Less than 660	221	434	177	291	398	725
80% to 100% and refreshed FICO scores:						
Equal to or greater than 660	2,961	4,537	4,026	3,159	6,987	7,696
Less than 660	945	1,409	718	996	1,663	2,405
Less than 80% and refreshed FICO scores:						
Equal to or greater than 660	27,317	29,648	169,579	142,241	196,896	171,889
Less than 660	4,380	4,934	6,759	6,797	11,139	11,731
No FICO/LTV available	2,486	3,056	1,327	1,658	3,813	4,714
U.S. government-guaranteed	—	—	9,364	10,688	9,364	10,688
Total retained loans	\$ 39,063	\$ 45,559	\$ 192,163	\$ 166,239	\$ 231,226	\$ 211,798
Geographic region						
California	\$ 7,644	\$ 8,945	\$ 59,785	\$ 47,263	\$ 67,429	\$ 56,208
New York	7,978	9,147	24,813	21,462	32,791	30,609
Illinois	2,947	3,420	13,115	11,524	16,062	14,944
Texas	2,225	2,532	10,717	9,128	12,942	11,660
Florida	2,133	2,409	8,387	7,177	10,520	9,586
New Jersey	2,253	2,590	6,371	5,567	8,624	8,157
Colorado	677	807	6,304	5,409	6,981	6,216
Washington	1,229	1,451	5,443	4,176	6,672	5,627
Massachusetts	371	459	5,833	5,340	6,204	5,799
Arizona	1,772	2,143	3,577	3,155	5,349	5,298
All other(f)	9,834	11,656	47,818	46,038	57,652	57,694
Total retained loans	\$ 39,063	\$ 45,559	\$ 192,163	\$ 166,239	\$ 231,226	\$ 211,798

- (a) Individual delinquency classifications include mortgage loans insured by U.S. government agencies as follows: current included \$2.5 billion and \$2.6 billion; 30–149 days past due included \$3.1 billion and \$3.2 billion; and 150 or more days past due included \$3.8 billion and \$4.9 billion at December 31, 2016 and 2015, respectively.
- (b) At December 31, 2016 and 2015, residential mortgage loans excluded mortgage loans insured by U.S. government agencies of \$6.9 billion and \$8.1 billion, respectively, that are 30 or more days past due. These amounts have been excluded based upon the government guarantee.
- (c) These balances, which are 90 days or more past due, were excluded from nonaccrual loans as the loans are guaranteed by U.S government agencies. Typically the principal balance of the loans is insured and interest is guaranteed at a specified reimbursement rate subject to meeting agreed-upon servicing guidelines. At December 31, 2016 and 2015, these balances included \$2.2 billion and \$3.4 billion, respectively, of loans that are no longer accruing interest based on the agreed-upon servicing guidelines. For the remaining balance, interest is being accrued at the guaranteed reimbursement rate. There were no loans that were not guaranteed by U.S. government agencies that are 90 or more days past due and still accruing interest at December 31, 2016 and 2015.
- (d) Represents the aggregate unpaid principal balance of loans divided by the estimated current property value. Current property values are estimated, at a minimum, quarterly, based on home valuation models using nationally recognized home price index valuation estimates incorporating actual data to the extent available and forecasted data where actual data is not available. These property values do not represent actual appraised loan level collateral values; as such, the resulting ratios are necessarily imprecise and should be viewed as estimates. Current estimated combined LTV for junior lien home equity loans considers all available lien positions, as well as unused lines, related to the property.
- (e) Refreshed FICO scores represent each borrower's most recent credit score, which is obtained by the Firm on at least a quarterly basis.
- (f) At December 31, 2016 and 2015, included mortgage loans insured by U.S. government agencies of \$9.4 billion and \$10.7 billion, respectively.
- (g) Includes residential real estate loans to private banking clients in AWM, for which the primary credit quality indicators are the borrower's financial position and LTV.

The following table represents the Firm's delinquency statistics for junior lien home equity loans and lines as of December 31, 2016 and 2015.

December 31, (in millions except ratios)	Total loans		Total 30+ day delinquency rate	
	2016	2015	2016	2015
HELOCs:(a)				
Within the revolving period(b)	\$ 10,304	\$ 17,050	1.27%	1.57%
Beyond the revolving period	13,272	11,252	3.05	3.10
HELOANs	1,861	2,409	2.85	3.03
Total	\$ 25,437	\$ 30,711	2.32%	2.25%

(a) These HELOCs are predominantly revolving loans for a 10-year period, after which time the HELOC converts to a loan with a 20-year amortization period, but also include HELOCs that allow interest-only payments beyond the revolving period.

(b) The Firm manages the risk of HELOCs during their revolving period by closing or reducing the undrawn line to the extent permitted by law when borrowers are experiencing financial difficulty or when the collateral does not support the loan amount.

HELOCs beyond the revolving period and HELOANs have higher delinquency rates than HELOCs within the revolving period. That is primarily because the fully-amortizing payment that is generally required for those products is higher than the minimum payment options available for HELOCs within the revolving period. The higher delinquency rates associated with amortizing HELOCs and HELOANs are factored into the Firm's allowance for loan losses.

Impaired loans

The table below sets forth information about the Firm's residential real estate impaired loans, excluding PCI loans. These loans are considered to be impaired as they have been modified in a TDR. All impaired loans are evaluated for an asset-specific allowance as described in Note 15.

December 31, (in millions)	Home equity		Residential mortgage		Total residential real estate – excluding PCI	
	2016	2015	2016	2015	2016	2015
Impaired loans						
With an allowance	\$ 1,266	\$ 1,293	\$ 4,689	\$ 5,243	\$ 5,955	\$ 6,536
Without an allowance(a)	998	1,065	1,343	1,447	2,341	2,512
Total impaired loans(b)(c)	\$ 2,264	\$ 2,358	\$ 6,032	\$ 6,690	\$ 8,296	\$ 9,048
Allowance for loan losses related to impaired loans	\$ 121	\$ 138	\$ 68	\$ 108	\$ 189	\$ 246
Unpaid principal balance of impaired loans(d)	3,847	3,960	8,285	9,082	12,132	13,042
Impaired loans on nonaccrual status(e)	1,116	1,220	1,755	1,957	2,871	3,177

(a) Represents collateral-dependent residential real estate loans that are charged off to the fair value of the underlying collateral less cost to sell. The Firm reports, in accordance with regulatory guidance, residential real estate loans that have been discharged under Chapter 7 bankruptcy and not reaffirmed by the borrower ("Chapter 7 loans") as collateral-dependent nonaccrual TDRs, regardless of their delinquency status. At December 31, 2016, Chapter 7 residential real estate loans included approximately 12% home equity and 16% of residential mortgages that were 30 days or more past due.

(b) At December 31, 2016 and 2015, \$3.4 billion and \$3.8 billion, respectively, of loans modified subsequent to repurchase from Ginnie Mae in accordance with the standards of the appropriate government agency (i.e., FHA, VA, RHS) are not included in the table above. When such loans perform subsequent to modification in accordance with Ginnie Mae guidelines, they are generally sold back into Ginnie Mae loan pools. Modified loans that do not re-perform become subject to foreclosure.

(c) Predominantly all residential real estate impaired loans, excluding PCI loans, are in the U.S.

(d) Represents the contractual amount of principal owed at December 31, 2016 and 2015. The unpaid principal balance differs from the impaired loan balances due to various factors including charge-offs, net deferred loan fees or costs, and unamortized discounts or premiums on purchased loans.

(e) As of December 31, 2016 and 2015, nonaccrual loans included \$2.3 billion and \$2.5 billion, respectively, of TDRs for which the borrowers were less than 90 days past due. For additional information about loans modified in a TDR that are on nonaccrual status refer, to the Loan accounting framework on pages 208–210 of this Note.

Notes to consolidated financial statements

The following table presents average impaired loans and the related interest income reported by the Firm.

Year ended December 31, (in millions)	Average impaired loans			Interest income on impaired loans ^(a)			Interest income on impaired loans on a cash basis ^(a)		
	2016	2015	2014	2016	2015	2014	2016	2015	2014
Home equity	\$ 2,311	\$ 2,369	\$ 2,435	\$ 125	\$ 128	\$ 137	\$ 80	\$ 85	\$ 90
Residential mortgage	6,376	7,697	10,174	305	348	444	77	87	105
Total residential real estate – excluding PCI	\$ 8,687	\$ 10,066	\$ 12,609	\$ 430	\$ 476	\$ 581	\$ 157	\$ 172	\$ 195

(a) Generally, interest income on loans modified in TDRs is recognized on a cash basis until such time as the borrower has made a minimum of six payments under the new terms, unless the loan is deemed to be collateral-dependent.

Loan modifications

Modifications of residential real estate loans, excluding PCI loans, are generally accounted for and reported as TDRs. There were no additional commitments to lend to borrowers whose residential real estate loans, excluding PCI loans, have been modified in TDRs.

The following table presents new TDRs reported by the Firm.

Year ended December 31, (in millions)	2016	2015	2014
Home equity	\$ 385	\$ 401	\$ 321
Residential mortgage	254	267	411
Total residential real estate – excluding PCI	\$ 639	\$ 668	\$ 732

Nature and extent of modifications

The U.S. Treasury's Making Home Affordable programs, as well as the Firm's proprietary modification programs, generally provide various concessions to financially troubled borrowers including, but not limited to, interest rate reductions, term or payment extensions and deferral of principal and/or interest payments that would otherwise have been required under the terms of the original agreement.

The following table provides information about how residential real estate loans, excluding PCI loans, were modified under the Firm's loss mitigation programs described above during the periods presented. This table excludes Chapter 7 loans where the sole concession granted is the discharge of debt.

Year ended December 31,	Home equity			Residential mortgage			Total residential real estate – excluding PCI		
	2016	2015	2014	2016	2015	2014	2016	2015	2014
Number of loans approved for a trial modification	3,760	3,933	1,565	1,945	2,711	3,108	5,705	6,644	4,673
Number of loans permanently modified	4,824	4,296	3,984	3,338	3,145	5,648	8,162	7,441	9,632
Concession granted:^(a)									
Interest rate reduction	75%	66%	75%	76%	71%	45%	76%	68%	58%
Term or payment extension	83	89	78	90	81	52	86	86	63
Principal and/or interest deferred	19	23	21	16	27	15	18	24	18
Principal forgiveness	9	7	26	26	28	52	16	16	41
Other ^(b)	6	—	—	25	11	10	14	5	6

(a) Represents concessions granted in permanent modifications as a percentage of the number of loans permanently modified. The sum of the percentages exceeds 100% because predominantly all of the modifications include more than one type of concession. A significant portion of trial modifications include interest rate reductions and/or term or payment extensions.

(b) Represents variable interest rate to fixed interest rate modifications.

Financial effects of modifications and redefaults

The following table provides information about the financial effects of the various concessions granted in modifications of residential real estate loans, excluding PCI, under the loss mitigation programs described above and about redefaults of certain loans modified in TDRs for the periods presented. Because the specific types and amounts of concessions offered to borrowers frequently change between the trial modification and the permanent modification, the following table presents only the financial effects of permanent modifications. This table also excludes Chapter 7 loans where the sole concession granted is the discharge of debt.

Year ended December 31, (in millions, except weighted-average data and number of loans)	Home equity			Residential mortgage			Total residential real estate – excluding PCI		
	2016	2015	2014	2016	2015	2014	2016	2015	2014
Weighted-average interest rate of loans with interest rate reductions – before TDR	4.99%	5.20%	5.27%	5.59%	5.67%	5.74%	5.36%	5.51%	5.61%
Weighted-average interest rate of loans with interest rate reductions – after TDR	2.34	2.35	2.30	2.93	2.79	2.96	2.70	2.64	2.78
Weighted-average remaining contractual term (in years) of loans with term or payment extensions – before TDR	18	18	19	24	25	24	22	22	23
Weighted-average remaining contractual term (in years) of loans with term or payment extensions – after TDR	38	35	33	38	37	36	38	36	36
Charge-offs recognized upon permanent modification	\$ 1	\$ 4	\$ 27	\$ 4	\$ 11	\$ 12	\$ 5	\$ 15	\$ 39
Principal deferred	23	27	16	30	58	58	53	85	74
Principal forgiven	7	6	35	44	66	172	51	72	207
Balance of loans that redefaulted within one year of permanent modification ^(a)	\$ 40	\$ 21	\$ 29	\$ 98	\$ 133	\$ 214	\$ 138	\$ 154	\$ 243

(a) Represents loans permanently modified in TDRs that experienced a payment default in the periods presented, and for which the payment default occurred within one year of the modification. The dollar amounts presented represent the balance of such loans at the end of the reporting period in which such loans defaulted. For residential real estate loans modified in TDRs, payment default is deemed to occur when the loan becomes two contractual payments past due. In the event that a modified loan redefaults, it is probable that the loan will ultimately be liquidated through foreclosure or another similar type of liquidation transaction. Redefaults of loans modified within the last 12 months may not be representative of ultimate redefault levels.

At December 31, 2016, the weighted-average estimated remaining lives of residential real estate loans, excluding PCI loans, permanently modified in TDRs were 9 years for home equity and 10 years for residential mortgage. The estimated remaining lives of these loans reflect estimated prepayments, both voluntary and involuntary (i.e., foreclosures and other forced liquidations).

Active and suspended foreclosure

At December 31, 2016 and 2015, the Firm had non-PCI residential real estate loans, excluding those insured by U.S. government agencies, with a carrying value of \$932 million and \$1.2 billion, respectively, that were not included in REO, but were in the process of active or suspended foreclosure.

Notes to consolidated financial statements

Other consumer loans

The table below provides information for other consumer retained loan classes, including auto, business banking and student loans.

December 31, (in millions, except ratios)	Auto		Business banking		Student and other		Total other consumer	
	2016	2015	2016	2015	2016	2015	2016	2015
Loan delinquency^(a)								
Current	\$ 65,029	\$ 59,442	\$ 22,312	\$ 20,887	\$ 8,397	\$ 9,405	\$ 95,738	\$ 89,734
30–119 days past due	773	804	247	215	374	445	1,394	1,464
120 or more days past due	12	9	139	106	218	246	369	361
Total retained loans	\$ 65,814	\$ 60,255	\$ 22,698	\$ 21,208	\$ 8,989	\$ 10,096	\$ 97,501	\$ 91,559
% of 30+ days past due to total retained loans	1.19%	1.35%	1.70%	1.51%	1.38% (d)	1.63% (d)	1.33% (d)	1.42% (d)
90 or more days past due and still accruing (b)	\$ —	\$ —	\$ —	\$ —	\$ 263	\$ 290	\$ 263	\$ 290
Nonaccrual loans	214	116	286	263	175	242	675	621
Geographic region								
California	\$ 7,975	\$ 7,186	\$ 4,158	\$ 3,530	\$ 935	\$ 1,051	\$ 13,068	\$ 11,767
Texas	7,041	6,457	2,769	2,622	739	839	10,549	9,918
New York	4,078	3,874	3,510	3,359	1,187	1,224	8,775	8,457
Illinois	3,984	3,678	1,627	1,459	582	679	6,193	5,816
Florida	3,374	2,843	1,068	941	475	516	4,917	4,300
Ohio	2,194	2,340	1,366	1,363	490	559	4,050	4,262
Arizona	2,209	2,033	1,270	1,205	202	236	3,681	3,474
Michigan	1,567	1,550	1,308	1,361	355	415	3,230	3,326
New Jersey	2,031	1,998	546	500	320	366	2,897	2,864
Louisiana	1,814	1,713	961	997	120	134	2,895	2,844
All other	29,547	26,583	4,115	3,871	3,584	4,077	37,246	34,531
Total retained loans	\$ 65,814	\$ 60,255	\$ 22,698	\$ 21,208	\$ 8,989	\$ 10,096	\$ 97,501	\$ 91,559
Loans by risk ratings^(c)								
Noncriticized	\$ 13,899	\$ 11,277	\$ 16,858	\$ 15,505	NA	NA	\$ 30,757	\$ 26,782
Criticized performing	201	76	816	815	NA	NA	1,017	891
Criticized nonaccrual	94	—	217	210	NA	NA	311	210

(a) Student loan delinquency classifications included loans insured by U.S. government agencies under the FFELP as follows: current included \$3.3 billion and \$3.8 billion; 30–119 days past due included \$257 million and \$299 million; and 120 or more days past due included \$211 million and \$227 million at December 31, 2016 and 2015, respectively.

(b) These amounts represent student loans, insured by U.S. government agencies under the FFELP. These amounts were accruing as reimbursement of insured amounts is proceeding normally.

(c) For risk-rated business banking and auto loans, the primary credit quality indicator is the risk rating of the loan, including whether the loans are considered to be criticized and/or nonaccrual.

(d) December 31, 2016 and 2015, excluded loans 30 days or more past due and still accruing, that are insured by U.S. government agencies under the FFELP, of \$468 million and \$526 million, respectively. These amounts were excluded as reimbursement of insured amounts is proceeding normally.

Other consumer impaired loans and loan modifications

The following table sets forth information about the Firm's other consumer impaired loans, including risk-rated business banking and auto loans that have been placed on nonaccrual status, and loans that have been modified in TDRs.

December 31, (in millions)	2016	2015
Impaired loans		
With an allowance	\$ 614	\$ 527
Without an allowance ^(a)	30	31
Total impaired loans(b)(c)	\$ 644	\$ 558
Allowance for loan losses related to impaired loans	\$ 119	\$ 118
Unpaid principal balance of impaired loans ^(d)	753	668
Impaired loans on nonaccrual status	508	449

(a) When discounted cash flows, collateral value or market price equals or exceeds the recorded investment in the loan, the loan does not require an allowance. This typically occurs when the impaired loans have been partially charged off and/or there have been interest payments received and applied to the loan balance.

(b) Predominantly all other consumer impaired loans are in the U.S.

(c) Other consumer average impaired loans were \$635 million, \$566 million and \$599 million for the years ended December 31, 2016, 2015 and 2014, respectively. The related interest income on impaired loans, including those on a cash basis, was not material for the years ended December 31, 2016, 2015 and 2014.

(d) Represents the contractual amount of principal owed at December 31, 2016 and 2015. The unpaid principal balance differs from the impaired loan balances due to various factors, including charge-offs, interest payments received and applied to the principal balance, net deferred loan fees or costs and unamortized discounts or premiums on purchased loans.

Loan modifications

Certain other consumer loan modifications are considered to be TDRs as they provide various concessions to borrowers who are experiencing financial difficulty. All of these TDRs are reported as impaired loans in the table above. The following table provides information about the Firm's other consumer loans modified in TDRs. New TDRs were not material for the years ended December 31, 2016 and 2015.

December 31, (in millions)	2016	2015
Loans modified in TDRs ^{(a)(b)}	\$ 362	\$ 384
TDRs on nonaccrual status	226	275

(a) The impact of these modifications was not material to the Firm for the years ended December 31, 2016 and 2015.

(b) Additional commitments to lend to borrowers whose loans have been modified in TDRs as of December 31, 2016 and 2015 were immaterial.

Purchased credit-impaired loans

PCI loans are initially recorded at fair value at acquisition. PCI loans acquired in the same fiscal quarter may be aggregated into one or more pools, provided that the loans have common risk characteristics. A pool is then accounted for as a single asset with a single composite interest rate and an aggregate expectation of cash flows. With respect to the Washington Mutual transaction, all of the consumer PCI loans were aggregated into pools of loans with common risk characteristics.

On a quarterly basis, the Firm estimates the total cash flows (both principal and interest) expected to be collected over the remaining life of each pool. These estimates incorporate assumptions regarding default rates, loss severities, the amounts and timing of prepayments and other factors that reflect then-current market conditions. Probable decreases in expected cash flows (i.e., increased credit losses) trigger the recognition of impairment, which is then measured as the present value of the expected principal loss plus any related forgone interest cash flows, discounted at the pool's effective interest rate. Impairments are recognized through the provision for credit losses and an increase in the allowance for loan losses. Probable and significant increases in expected cash flows (e.g., decreased credit losses, the net benefit of modifications) would first reverse any previously recorded allowance for loan losses with any remaining increases recognized prospectively as a yield adjustment over the remaining estimated lives of the underlying loans. The impacts of (i) prepayments, (ii) changes in variable interest rates, and (iii) any other changes in the timing of expected cash flows are recognized prospectively as adjustments to interest income.

The Firm continues to modify certain PCI loans. The impact of these modifications is incorporated into the Firm's quarterly assessment of whether a probable and significant change in expected cash flows has occurred, and the loans continue to be accounted for and reported as PCI loans. In evaluating the effect of modifications on expected cash flows, the Firm incorporates the effect of any forgone interest and also considers the potential for redefault. The Firm develops product-specific probability of default estimates, which are used to compute expected credit losses. In developing these probabilities of default, the Firm

considers the relationship between the credit quality characteristics of the underlying loans and certain assumptions about home prices and unemployment based upon industry-wide data. The Firm also considers its own historical loss experience to-date based on actual redefaulted modified PCI loans.

The excess of cash flows expected to be collected over the carrying value of the underlying loans is referred to as the accretable yield. This amount is not reported on the Firm's Consolidated balance sheets but is accreted into interest income at a level rate of return over the remaining estimated lives of the underlying pools of loans.

If the timing and/or amounts of expected cash flows on PCI loan pools were determined not to be reasonably estimable, no interest would be accreted and the loan pools would be reported as nonaccrual loans; however, since the timing and amounts of expected cash flows for the Firm's PCI consumer loan pools are reasonably estimable, interest is being accreted and the loan pools are being reported as performing loans.

The liquidation of PCI loans, which may include sales of loans, receipt of payment in full from the borrower, or foreclosure, results in removal of the loans from the underlying PCI pool. When the amount of the liquidation proceeds (e.g., cash, real estate), if any, is less than the unpaid principal balance of the loan, the difference is first applied against the PCI pool's nonaccretable difference for principal losses (i.e., the lifetime credit loss estimate established as a purchase accounting adjustment at the acquisition date). When the nonaccretable difference for a particular loan pool has been fully depleted, any excess of the unpaid principal balance of the loan over the liquidation proceeds is written off against the PCI pool's allowance for loan losses. Beginning in 2014, write-offs of PCI loans also include other adjustments, primarily related to interest forgiveness modifications. Because the Firm's PCI loans are accounted for at a pool level, the Firm does not recognize charge-offs of PCI loans when they reach specified stages of delinquency (i.e., unlike non-PCI consumer loans, these loans are not charged off based on FFIEC standards).

The PCI portfolio affects the Firm's results of operations primarily through: (i) contribution to net interest margin; (ii) expense related to defaults and servicing resulting from the liquidation of the loans; and (iii) any provision for loan losses. The PCI loans acquired in the Washington Mutual transaction were funded based on the interest rate characteristics of the loans. For example, variable-rate loans were funded with variable-rate liabilities and fixed-rate loans were funded with fixed-rate liabilities with a similar maturity profile. A net spread will be earned on the declining balance of the portfolio, which is estimated as of December 31, 2016, to have a remaining weighted-average life of 8 years.

Notes to consolidated financial statements

Residential real estate – PCI loans

The table below sets forth information about the Firm's consumer, excluding credit card, PCI loans.

December 31, (in millions, except ratios)	Home equity		Prime mortgage		Subprime mortgage		Option ARMs		Total PCI	
	2016	2015	2016	2015	2016	2015	2016	2015	2016	2015
Carrying value(a)	\$ 12,902	\$ 14,989	\$ 7,602	\$ 8,893	\$ 2,941	\$ 3,263	\$ 12,234	\$ 13,853	\$ 35,679	\$ 40,998
Related allowance for loan losses(b)	1,433	1,708	829	985	—	—	49	49	2,311	2,742
Loan delinquency (based on unpaid principal balance)										
Current	\$ 12,423	\$ 14,387	\$ 6,840	\$ 7,894	\$ 3,005	\$ 3,232	\$ 11,074	\$ 12,370	\$ 33,342	\$ 37,883
30–149 days past due	291	322	336	424	361	439	555	711	1,543	1,896
150 or more days past due	478	633	451	601	240	380	917	1,272	2,086	2,886
Total loans	\$ 13,192	\$ 15,342	\$ 7,627	\$ 8,919	\$ 3,606	\$ 4,051	\$ 12,546	\$ 14,353	\$ 36,971	\$ 42,665
% of 30+ days past due to total loans	5.83%	6.22%	10.32%	11.49%	16.67%	20.22%	11.73%	13.82%	9.82%	11.21%
Current estimated LTV ratios (based on unpaid principal balance)(c)(d)										
Greater than 125% and refreshed FICO scores:										
Equal to or greater than 660	\$ 69	\$ 153	\$ 6	\$ 10	\$ 7	\$ 10	\$ 12	\$ 19	\$ 94	\$ 192
Less than 660	39	80	17	28	31	55	18	36	105	199
101% to 125% and refreshed FICO scores:										
Equal to or greater than 660	555	942	52	120	39	77	83	166	729	1,305
Less than 660	256	444	84	152	135	220	144	239	619	1,055
80% to 100% and refreshed FICO scores:										
Equal to or greater than 660	1,860	2,709	442	816	214	331	558	977	3,074	4,833
Less than 660	804	1,136	381	614	439	643	609	1,050	2,233	3,443
Lower than 80% and refreshed FICO scores:										
Equal to or greater than 660	6,676	6,724	3,967	4,243	919	863	6,754	7,073	18,316	18,903
Less than 660	2,183	2,265	2,287	2,438	1,645	1,642	3,783	4,065	9,898	10,410
No FICO/LTV available	750	889	391	498	177	210	585	728	1,903	2,325
Total unpaid principal balance	\$ 13,192	\$ 15,342	\$ 7,627	\$ 8,919	\$ 3,606	\$ 4,051	\$ 12,546	\$ 14,353	\$ 36,971	\$ 42,665
Geographic region (based on unpaid principal balance)										
California	\$ 7,899	\$ 9,205	\$ 4,396	\$ 5,172	\$ 899	\$ 1,005	\$ 7,128	\$ 8,108	\$ 20,322	\$ 23,490
Florida	1,306	1,479	501	586	332	373	1,026	1,183	3,165	3,621
New York	697	788	515	580	363	400	711	813	2,286	2,581
Washington	673	819	167	194	68	81	290	339	1,198	1,433
New Jersey	280	310	210	238	125	139	401	470	1,016	1,157
Illinois	314	358	226	263	178	196	282	333	1,000	1,150
Massachusetts	94	112	173	199	110	125	346	398	723	834
Maryland	64	73	144	159	145	161	267	297	620	690
Arizona	241	281	124	143	68	76	181	203	614	703
Virginia	77	88	142	170	56	62	314	354	589	674
All other	1,547	1,829	1,029	1,215	1,262	1,433	1,600	1,855	5,438	6,332
Total unpaid principal balance	\$ 13,192	\$ 15,342	\$ 7,627	\$ 8,919	\$ 3,606	\$ 4,051	\$ 12,546	\$ 14,353	\$ 36,971	\$ 42,665

(a) Carrying value includes the effect of fair value adjustments that were applied to the consumer PCI portfolio at the date of acquisition.

(b) Management concluded as part of the Firm's regular assessment of the PCI loan pools that it was probable that higher expected credit losses would result in a decrease in expected cash flows. As a result, an allowance for loan losses for impairment of these pools has been recognized.

(c) Represents the aggregate unpaid principal balance of loans divided by the estimated current property value. Current property values are estimated, at a minimum, quarterly, based on home valuation models using nationally recognized home price index valuation estimates incorporating actual data to the extent available and forecasted data where actual data is not available. These property values do not represent actual appraised loan level collateral values; as such, the resulting ratios are necessarily imprecise and should be viewed as estimates. Current estimated combined LTV for junior lien home equity loans considers all available lien positions, as well as unused lines, related to the property.

(d) Refreshed FICO scores represent each borrower's most recent credit score, which is obtained by the Firm on at least a quarterly basis.

Approximately 24% of the PCI home equity portfolio are senior lien loans; the remaining balance are junior lien HELOANs or HELOCs. The following table sets forth delinquency statistics for PCI junior lien home equity loans and lines of credit based on the unpaid principal balance as of December 31, 2016 and 2015.

December 31,	Total loans		Total 30+ day delinquency rate	
	2016	2015	2016	2015
(in millions, except ratios)				
HELOCs:(a)				
Within the revolving period(b)	\$ 2,126	\$ 5,000	3.67%	4.10%
Beyond the revolving period(c)	7,452	6,252	4.03	4.46
HELOANs	465	582	5.38	5.33
Total	\$ 10,043	\$ 11,834	4.01%	4.35%

(a) In general, these HELOCs are revolving loans for a 10-year period, after which time the HELOC converts to an interest-only loan with a balloon payment at the end of the loan's term.

(b) Substantially all undrawn HELOCs within the revolving period have been closed.

(c) Includes loans modified into fixed rate amortizing loans.

The table below sets forth the accretable yield activity for the Firm's PCI consumer loans for the years ended December 31, 2016, 2015 and 2014, and represents the Firm's estimate of gross interest income expected to be earned over the remaining life of the PCI loan portfolios. The table excludes the cost to fund the PCI portfolios, and therefore the accretable yield does not represent net interest income expected to be earned on these portfolios.

Year ended December 31, (in millions, except ratios)	Total PCI		
	2016	2015	2014
Beginning balance	\$ 13,491	\$ 14,592	\$ 16,167
Accretion into interest income	(1,555)	(1,700)	(1,934)
Changes in interest rates on variable-rate loans	260	279	(174)
Other changes in expected cash flows(a)	(428)	230	533
Reclassification from nonaccretable difference(b)	—	90	—
Balance at December 31	\$ 11,768	\$ 13,491	\$ 14,592
Accretable yield percentage	4.35%	4.20%	4.19%

(a) Other changes in expected cash flows may vary from period to period as the Firm continues to refine its cash flow model, for example cash flows expected to be collected due to the impact of modifications and changes in prepayment assumptions.

(b) Reclassifications from the nonaccretable difference in the year ended December 31, 2015 were driven by continued improvement in home prices and delinquencies, as well as increased granularity in the impairment estimates.

Active and suspended foreclosure

At December 31, 2016 and 2015, the Firm had PCI residential real estate loans with an unpaid principal balance of \$1.7 billion and \$2.3 billion, respectively, that were not included in REO, but were in the process of active or suspended foreclosure.

Credit card loan portfolio

The credit card portfolio segment includes credit card loans originated and purchased by the Firm. Delinquency rates are the primary credit quality indicator for credit card loans as they provide an early warning that borrowers may be experiencing difficulties (30 days past due); information on those borrowers that have been delinquent for a longer period of time (90 days past due) is also considered. In addition to delinquency rates, the geographic distribution of the loans provides insight as to the credit quality of the portfolio based on the regional economy.

While the borrower's credit score is another general indicator of credit quality, the Firm does not view credit scores as a primary indicator of credit quality because the borrower's credit score tends to be a lagging indicator. However, the distribution of such scores provides a general indicator of credit quality trends within the portfolio. Refreshed FICO score information, which is obtained at least quarterly, for a statistically significant random sample of the credit card portfolio is indicated in the following table; FICO is considered to be the industry benchmark for credit scores.

The Firm generally originates new card accounts to prime consumer borrowers. However, certain cardholders' FICO scores may decrease over time, depending on the performance of the cardholder and changes in credit score technology.

The table below sets forth information about the Firm's credit card loans.

As of or for the year ended December 31, (in millions, except ratios)	2016	2015
Net charge-offs	\$ 3,442	\$ 3,122
% of net charge-offs to retained loans	2.63%	2.51%
Loan delinquency		
Current and less than 30 days past due and still accruing	\$ 139,434	\$ 129,502
30–89 days past due and still accruing	1,134	941
90 or more days past due and still accruing	1,143	944
Total retained credit card loans	\$ 141,711	\$ 131,387
Loan delinquency ratios		
% of 30+ days past due to total retained loans	1.61%	1.43%
% of 90+ days past due to total retained loans	0.81	0.72
Credit card loans by geographic region		
California	\$ 20,571	\$ 18,802
Texas	13,220	11,847
New York	12,249	11,360
Florida	8,585	7,806
Illinois	8,189	7,655
New Jersey	6,271	5,879
Ohio	4,906	4,700
Pennsylvania	4,787	4,533
Michigan	3,741	3,562
Colorado	3,699	3,399
All other	55,493	51,844
Total retained credit card loans	\$ 141,711	\$ 131,387
Percentage of portfolio based on carrying value with estimated refreshed FICO scores^(a)		
Equal to or greater than 660	84.4%	84.4%
Less than 660	14.2	13.1
No FICO available	1.4	2.5

(a) The current period percentage of portfolio based on carrying value with estimated refreshed FICO scores disclosures have been updated to reflect where the FICO score is unavailable. The prior period amounts have been revised to conform with the current presentation.

Credit card impaired loans and loan modifications

The table below sets forth information about the Firm's impaired credit card loans. All of these loans are considered to be impaired as they have been modified in TDRs.

December 31, (in millions)	2016	2015
Impaired credit card loans with an allowance^{(a)(b)}		
Credit card loans with modified payment terms ^(c)	\$ 1,098	\$ 1,286
Modified credit card loans that have reverted to pre-modification payment terms ^(d)	142	179
Total impaired credit card loans^(e)	\$ 1,240	\$ 1,465
Allowance for loan losses related to impaired credit card loans	\$ 358	460

(a) The carrying value and the unpaid principal balance are the same for credit card impaired loans.

(b) There were no impaired loans without an allowance.

(c) Represents credit card loans outstanding to borrowers enrolled in a credit card modification program as of the date presented.

(d) Represents credit card loans that were modified in TDRs but that have subsequently reverted back to the loans' pre-modification payment terms. At December 31, 2016 and 2015, \$94 million and \$113 million, respectively, of loans have reverted back to the pre-modification payment terms of the loans due to noncompliance with the terms of the modified loans. The remaining \$48 million and \$66 million at December 31, 2016 and 2015, respectively, of these loans are to borrowers who have successfully completed a short-term modification program. The Firm continues to report these loans as TDRs since the borrowers' credit lines remain closed.

(e) Predominantly all impaired credit card loans are in the U.S.

The following table presents average balances of impaired credit card loans and interest income recognized on those loans.

Year ended December 31, (in millions)	2016	2015	2014
Average impaired credit card loans	\$ 1,325	\$ 1,710	\$ 2,503
Interest income on impaired credit card loans	63	82	123

Loan modifications

JPMorgan Chase may offer one of a number of loan modification programs to credit card borrowers who are experiencing financial difficulty. Most of the credit card loans have been modified under long-term programs for borrowers who are experiencing financial difficulties. Modifications under long-term programs involve placing the customer on a fixed payment plan, generally for 60 months. The Firm may also offer short-term programs for borrowers who may be in need of temporary relief; however, none are currently being offered. Modifications under all short- and long-term programs typically include reducing the interest rate on the credit card. Substantially all modifications are considered to be TDRs.

If the cardholder does not comply with the modified payment terms, then the credit card loan agreement reverts back to its pre-modification payment terms. Assuming that the cardholder does not begin to perform in accordance with those payment terms, the loan continues to age and will ultimately be charged-off in accordance with the Firm's standard charge-off policy. In addition, if a borrower successfully completes a short-term modification program, then the loan reverts back to its pre-modification payment terms. However, in most cases, the Firm does not reinstate the borrower's line of credit.

New enrollments in these loan modification programs for the years ended December 31, 2016, 2015 and 2014, were \$636 million, \$638 million and \$807 million, respectively.

Financial effects of modifications and redefaults

The following table provides information about the financial effects of the concessions granted on credit card loans modified in TDRs and redefaults for the periods presented.

Year ended December 31, (in millions, except weighted-average data)	2016	2015	2014
Weighted-average interest rate of loans – before TDR	15.56%	15.08%	14.96%
Weighted-average interest rate of loans – after TDR	4.76	4.40	4.40
Loans that redefaulted within one year of modification ^(a)	\$ 79	\$ 85	\$ 119

(a) Represents loans modified in TDRs that experienced a payment default in the periods presented, and for which the payment default occurred within one year of the modification. The amounts presented represent the balance of such loans as of the end of the quarter in which they defaulted.

For credit card loans modified in TDRs, payment default is deemed to have occurred when the loans become two payments past due. A substantial portion of these loans is expected to be charged-off in accordance with the Firm's standard charge-off policy. Based on historical experience, the estimated weighted-average default rate for modified credit card loans was expected to be 28.87%, 25.61% and 27.91% as of December 31, 2016, 2015 and 2014, respectively.

Wholesale loan portfolio

Wholesale loans include loans made to a variety of customers, ranging from large corporate and institutional clients to high-net-worth individuals.

The primary credit quality indicator for wholesale loans is the risk rating assigned to each loan. Risk ratings are used to identify the credit quality of loans and differentiate risk within the portfolio. Risk ratings on loans consider the PD and the LGD. The PD is the likelihood that a loan will default. The LGD is the estimated loss on the loan that would be realized upon the default of the borrower and takes into consideration collateral and structural support for each credit facility.

Management considers several factors to determine an appropriate risk rating, including the obligor's debt capacity and financial flexibility, the level of the obligor's earnings, the amount and sources for repayment, the level and nature of contingencies, management strength, and the industry and geography in which the obligor operates. The Firm's definition of criticized aligns with the banking regulatory definition of criticized exposures, which consist of special mention, substandard and doubtful categories. Risk ratings generally represent ratings profiles similar to those defined by S&P and Moody's. Investment-grade ratings range from "AAA/Aaa" to "BBB-/Baa3." Noninvestment-grade ratings are classified as noncriticized ("BB+/Ba1 and B-/B3") and criticized ("CCC+"/"Caa1 and below"), and the criticized portion is further subdivided into performing and nonaccrual loans, representing management's assessment of the collectibility of principal and interest. Criticized loans have a higher probability of default than noncriticized loans.

Risk ratings are reviewed on a regular and ongoing basis by Credit Risk Management and are adjusted as necessary for updated information affecting the obligor's ability to fulfill its obligations.

As noted above, the risk rating of a loan considers the industry in which the obligor conducts its operations. As part of the overall credit risk management framework, the Firm focuses on the management and diversification of its industry and client exposures, with particular attention paid to industries with actual or potential credit concern. See Note 5 for further detail on industry concentrations.

The table below provides information by class of receivable for the retained loans in the Wholesale portfolio segment.

As of or for the year ended December 31, (in millions, except ratios)	Commercial and industrial		Real estate		Financial institutions		Government agencies		Other(d)		Total retained loans	
	2016	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016	2015
Loans by risk ratings												
Investment grade	\$ 64,949	\$ 62,150	\$ 88,434	\$ 74,330	\$ 23,562	\$ 21,786	\$ 15,935	\$ 11,363	\$ 97,043	\$ 98,107	\$ 289,923	\$ 267,736
Noninvestment grade:												
Noncriticized	47,149	45,632	16,883	17,008	8,317	7,667	439	256	11,772	11,390	84,560	81,953
Criticized performing	6,161	4,542	798	1,251	200	320	6	7	188	253	7,353	6,373
Criticized nonaccrual	1,482	608	200	231	9	10	—	—	263	139	1,954	988
Total noninvestment grade	54,792	50,782	17,881	18,490	8,526	7,997	445	263	12,223	11,782	93,867	89,314
Total retained loans	\$ 119,741	\$ 112,932	\$ 106,315	\$ 92,820	\$ 32,088	\$ 29,783	\$ 16,380	\$ 11,626	\$ 109,266	\$ 109,889	\$ 383,790	\$ 357,050
% of total criticized to total retained loans	6.38%	4.56%	0.94%	1.60%	0.65%	1.11%	0.04%	0.06%	0.41%	0.36%	2.43%	2.06%
% of nonaccrual loans to total retained loans	1.24	0.54	0.19	0.25	0.03	0.03	—	—	0.24	0.13	0.51	0.28
Loans by geographic distribution(a)												
Total non-U.S.	\$ 30,259	\$ 30,063	\$ 3,292	\$ 3,003	\$ 14,741	\$ 17,166	\$ 3,726	\$ 1,788	\$ 39,496	\$ 42,031	\$ 91,514	\$ 94,051
Total U.S.	89,482	82,869	103,023	89,817	17,347	12,617	12,654	9,838	69,770	67,858	292,276	262,999
Total retained loans	\$ 119,741	\$ 112,932	\$ 106,315	\$ 92,820	\$ 32,088	\$ 29,783	\$ 16,380	\$ 11,626	\$ 109,266	\$ 109,889	\$ 383,790	\$ 357,050
Net charge-offs/(recoveries)	\$ 335	\$ 26	\$ (7)	\$ (14)	\$ (2)	\$ (5)	\$ (1)	\$ (8)	\$ 16	\$ 11	\$ 341	\$ 10
% of net charge-offs/(recoveries) to end-of-period retained loans	0.28%	0.02%	(0.01)%	(0.02)%	(0.01)%	(0.02)%	(0.01)%	(0.07)%	0.01%	0.01%	0.09%	—%
Loan delinquency(b)												
Current and less than 30 days past due and still accruing	\$ 117,905	\$ 112,058	\$ 105,958	\$ 92,381	\$ 32,036	\$ 29,713	\$ 16,269	\$ 11,565	\$ 108,350	\$ 108,734	\$ 380,518	\$ 354,451
30–89 days past due and still accruing	268	259	155	193	22	49	107	55	634	988	1,186	1,544
90 or more days past due and still accruing(c)	86	7	2	15	21	11	4	6	19	28	132	67
Criticized nonaccrual	1,482	608	200	231	9	10	—	—	263	139	1,954	988
Total retained loans	\$ 119,741	\$ 112,932	\$ 106,315	\$ 92,820	\$ 32,088	\$ 29,783	\$ 16,380	\$ 11,626	\$ 109,266	\$ 109,889	\$ 383,790	\$ 357,050

(a) The U.S. and non-U.S. distribution is determined based predominantly on the domicile of the borrower.

(b) The credit quality of wholesale loans is assessed primarily through ongoing review and monitoring of an obligor's ability to meet contractual obligations rather than relying on the past due status, which is generally a lagging indicator of credit quality.

(c) Represents loans that are considered well-collateralized and therefore still accruing interest.

(d) Other includes individuals, SPEs, holding companies, and private education and civic organizations. For more information on exposures to SPEs, see Note 16.

Notes to consolidated financial statements

The following table presents additional information on the real estate class of loans within the Wholesale portfolio for the periods indicated. Exposure consists primarily of secured commercial loans, of which multifamily is the largest segment. Multifamily lending finances acquisition, leasing and construction of apartment buildings, and includes exposure to real estate investment trusts (“REITs”). Other commercial lending largely includes financing for acquisition, leasing and construction, largely for office, retail and industrial real estate, and includes exposure to REITs. Included in real estate loans is \$9.2 billion and \$7.3 billion as of December 31, 2016 and 2015, respectively, of construction and development exposure consisting of loans originally purposed for construction and development, general purpose loans for builders, as well as loans for land subdivision and pre-development.

December 31, (in millions, except ratios)	Multifamily		Other Commercial		Total real estate loans	
	2016	2015	2016	2015	2016	2015
Real estate retained loans	\$ 71,978	\$ 64,271	\$ 34,337	\$ 28,549	\$ 106,315	\$ 92,820
Criticized	539	562	459	920	998	1,482
% of criticized to total real estate retained loans	0.75%	0.87%	1.34%	3.22%	0.94%	1.60%
Criticized nonaccrual	\$ 57	\$ 85	\$ 143	\$ 146	\$ 200	\$ 231
% of criticized nonaccrual to total real estate retained loans	0.08%	0.13%	0.42%	0.51%	0.19%	0.25%

Wholesale impaired loans and loan modifications

Wholesale impaired loans consist of loans that have been placed on nonaccrual status and/or that have been modified in a TDR. All impaired loans are evaluated for an asset-specific allowance as described in Note 15.

The table below sets forth information about the Firm’s wholesale impaired loans.

December 31, (in millions)	Commercial and industrial		Real estate		Financial institutions		Government agencies		Other		Total retained loans	
	2016	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016	2015
Impaired loans												
With an allowance	\$ 1,119	\$ 522	\$ 125	\$ 148	\$ 9	\$ 10	\$ —	\$ —	\$ 187	\$ 46	\$ 1,440	\$ 726
Without an allowance ^(a)	414	98	87	106	—	—	—	—	76	94	577	298
Total impaired loans	\$ 1,533	\$ 620	\$ 212	\$ 254	\$ 9	\$ 10	\$ —	\$ —	\$ 263	\$ 140	\$ 2,017	\$ 1,024
Allowance for loan losses related to impaired loans	\$ 258	\$ 220	\$ 18	\$ 27	\$ 3	\$ 3	\$ —	\$ —	\$ 63	\$ 24	\$ 342	\$ 274
Unpaid principal balance of impaired loans ^(b)	1,754	669	295	363	12	13	—	—	284	164	2,345	1,209

- (a) When the discounted cash flows, collateral value or market price equals or exceeds the recorded investment in the loan, the loan does not require an allowance. This typically occurs when the impaired loans have been partially charged-off and/or there have been interest payments received and applied to the loan balance.
- (b) Represents the contractual amount of principal owed at December 31, 2016 and 2015. The unpaid principal balance differs from the impaired loan balances due to various factors, including charge-offs; interest payments received and applied to the carrying value; net deferred loan fees or costs; and unamortized discount or premiums on purchased loans.
- (c) Based upon the domicile of the borrower, largely consists of loans in the U.S.

The following table presents the Firm’s average impaired loans for the years ended 2016, 2015 and 2014.

Year ended December 31, (in millions)	2016	2015	2014
Commercial and industrial	\$ 1,480	\$ 453	\$ 243
Real estate	217	250	297
Financial institutions	13	13	20
Government agencies	—	—	—
Other	213	129	155
Total^(a)	\$ 1,923	\$ 845	\$ 715

- (a) The related interest income on accruing impaired loans and interest income recognized on a cash basis were not material for the years ended December 31, 2016, 2015 and 2014.

Certain loan modifications are considered to be TDRs as they provide various concessions to borrowers who are experiencing financial difficulty. All TDRs are reported as impaired loans in the tables above. TDRs were \$733 million and \$208 million as of December 31, 2016 and 2015.

Note 15 – Allowance for credit losses

JPMorgan Chase's allowance for loan losses covers the consumer, including credit card, portfolio segments (primarily scored) and wholesale (risk-rated) portfolio, and represents management's estimate of probable credit losses inherent in the Firm's retained loan portfolio. The allowance for loan losses includes a formula-based component, an asset-specific component, and a component related to PCI loans, as described below. Management also estimates an allowance for wholesale and certain consumer lending-related commitments using methodologies similar to those used to estimate the allowance on the underlying loans. During 2016, the Firm did not make any significant changes to the methodologies or policies used to determine its allowance for credit losses; such policies are described in the following paragraphs.

Determining the appropriateness of the allowance is complex and requires judgment by management about the effect of matters that are inherently uncertain. Subsequent evaluations of the loan portfolio, in light of the factors then prevailing, may result in significant changes in the allowances for loan losses and lending-related commitments in future periods. At least quarterly, the allowance for credit losses is reviewed by the CRO, the CFO and the Controller of the Firm and discussed with the DRPC and the Audit Committee. As of December 31, 2016, JPMorgan Chase deemed the allowance for credit losses to be appropriate (i.e., sufficient to absorb probable credit losses inherent in the portfolio).

Formula-based component

The formula-based component is based on a statistical calculation to provide for incurred credit losses in all consumer loans and performing risk-rated loans, except for any loans restructured in TDRs and PCI loans, which are calculated as a part of the asset-specific and PCI components, respectively, and are discussed later in this Note. See Note 14 for more information on TDRs and PCI loans.

Formula-based component - Consumer loans and certain lending-related commitments

The formula-based allowance for credit losses for the consumer portfolio segments is calculated by applying statistical credit loss factors (estimated PD and loss severities) to the recorded investment balances or loan-equivalent amounts of pools of loan exposures with similar risk characteristics over a loss emergence period to arrive at an estimate of incurred credit losses. Estimated loss emergence periods may vary by product and may change over time; management applies judgment in estimating loss emergence periods, using available credit information and trends. In addition, management applies judgment to the statistical loss estimates for each loan portfolio category, using delinquency trends and other risk characteristics to estimate the total incurred credit losses in the portfolio. Management uses additional statistical methods and considers actual portfolio performance, including actual

losses recognized on defaulted loans and collateral valuation trends, to review the appropriateness of the primary statistical loss estimate. The economic impact of potential modifications of residential real estate loans is not included in the statistical calculation because of the uncertainty regarding the type and results of such modifications.

The statistical calculation is then adjusted to take into consideration model imprecision, external factors and current economic events that have occurred but that are not yet reflected in the factors used to derive the statistical calculation; these adjustments are accomplished in part by analyzing the historical loss experience for each major product segment. However, it is difficult to predict whether historical loss experience is indicative of future loss levels. Management applies judgment in making this adjustment, taking into account uncertainties associated with current macroeconomic and political conditions, quality of underwriting standards, borrower behavior, the potential impact of payment recasts within the HELOC portfolio, and other relevant internal and external factors affecting the credit quality of the portfolio. In certain instances, the interrelationships between these factors create further uncertainties. For example, the performance of a HELOC that experiences a payment recast may be affected by both the quality of underwriting standards applied in originating the loan and the general economic conditions in effect at the time of the payment recast. For junior lien products, management considers the delinquency and/or modification status of any senior liens in determining the adjustment. The application of different inputs into the statistical calculation, and the assumptions used by management to adjust the statistical calculation, are subject to management judgment, and emphasizing one input or assumption over another, or considering other inputs or assumptions, could affect the estimate of the allowance for credit losses for the consumer credit portfolio.

Overall, the allowance for credit losses for the consumer portfolio, including credit card, is sensitive to changes in the economic environment (e.g., unemployment rates), delinquency rates, the realizable value of collateral (e.g., housing prices), FICO scores, borrower behavior and other risk factors. While all of these factors are important determinants of overall allowance levels, changes in the various factors may not occur at the same time or at the same rate, or changes may be directionally inconsistent such that improvement in one factor may offset deterioration in the other. In addition, changes in these factors would not necessarily be consistent across all geographies or product types. Finally, it is difficult to predict the extent to which changes in these factors would ultimately affect the frequency of losses, the severity of losses or both.

Formula-based component - Wholesale loans and lending-related commitments

The Firm's methodology for determining the allowance for loan losses and the allowance for lending-related commitments involves the early identification of credits that are deteriorating. The formula-based component of the allowance for wholesale loans and lending-related commitments is calculated by applying statistical credit loss factors (estimated PD and LGD) to the recorded investment balances or loan-equivalent amount over a loss emergence period to arrive at an estimate of incurred credit losses.

The Firm assesses the credit quality of its borrower or counterparty and assigns a risk rating. Risk ratings are assigned at origination or acquisition, and if necessary, adjusted for changes in credit quality over the life of the exposure. In assessing the risk rating of a particular loan or lending-related commitment, among the factors considered are the obligor's debt capacity and financial flexibility, the level of the obligor's earnings, the amount and sources for repayment, the level and nature of contingencies, management strength, and the industry and geography in which the obligor operates. These factors are based on an evaluation of historical and current information and involve subjective assessment and interpretation. Determining risk ratings involves significant judgment; emphasizing one factor over another or considering additional factors could affect the risk rating assigned by the Firm.

PD estimates are based on observable external through-the-cycle data, using credit rating agency default statistics.

An LGD estimate is assigned to each loan or lending-related commitment. The estimate represents the amount of economic loss if the obligor were to default. The type of obligor, quality of collateral, and the seniority of the Firm's lending exposure in the obligor's capital structure affect LGD. LGD estimates are based on the Firm's history of actual credit losses over more than one credit cycle. Changes to the time period used for PD and LGD estimates (for example, point-in-time loss versus longer-term views of the credit cycle) could also affect the allowance for credit losses.

The Firm applies judgment in estimating PD, LGD, loss emergence period and loan-equivalent amounts used in calculating the allowance for credit losses. Wherever possible, the Firm uses independent, verifiable data or the Firm's own historical loss experience in its models for estimating the allowances, but differences in characteristics between the Firm's specific loans or lending-related commitments and those reflected in external and Firm-specific historical data could affect loss estimates. Estimates of PD, LGD, loss emergence period and loan-equivalent used are subject to periodic refinement based on any changes to underlying external or Firm-specific historical data. The use of different inputs, estimates or methodologies could change the amount of the allowance for credit losses determined appropriate by the Firm.

In addition to the modeled loss estimates applied to wholesale loans and lending-related commitments, management applies its judgment to adjust the modeled loss estimates for wholesale loans, taking into consideration model imprecision, external factors and economic events that have occurred but are not yet reflected in the loss factors. Historical experience of both LGD and PD are considered when estimating these adjustments. Factors related to concentrated and deteriorating industries also are incorporated where relevant. These estimates are based on management's view of uncertainties that relate to current macroeconomic, quality of underwriting standards and other relevant internal and external factors affecting the credit quality of the current portfolio.

Asset-specific component

The asset-specific component of the allowance relates to loans considered to be impaired, which includes loans that have been modified in TDRs as well as risk-rated loans that have been placed on nonaccrual status. To determine the asset-specific component of the allowance, larger loans are evaluated individually, while smaller loans are evaluated as pools using historical loss experience for the respective class of assets. Scored loans (i.e., consumer loans) are pooled by product type, while risk-rated loans (primarily wholesale loans) are segmented by risk rating.

The Firm generally measures the asset-specific allowance as the difference between the recorded investment in the loan and the present value of the cash flows expected to be collected, discounted at the loan's original effective interest rate. Subsequent changes in impairment are reported as an adjustment to the allowance for loan losses. In certain cases, the asset-specific allowance is determined using an observable market price, and the allowance is measured as the difference between the recorded investment in the loan and the loan's fair value. Impaired collateral-dependent loans are charged down to the fair value of collateral less costs to sell. For any of these impaired loans, the amount of the asset-specific allowance required to be recorded, if any, is dependent upon the recorded investment in the loan (including prior charge-offs), expected cash flows and/or fair value of assets. See Note 14 for more information about charge-offs and collateral-dependent loans.

The asset-specific component of the allowance for impaired loans that have been modified in TDRs incorporates the effects of forgone interest, if any, in the present value calculation and also incorporates the effect of the modification on the loan's expected cash flows, which considers the potential for redefault. For residential real estate loans modified in TDRs, the Firm develops product-specific probability of default estimates, which are applied at a loan level to compute expected losses. In developing these probabilities of default, the Firm considers the relationship between the credit quality characteristics of the underlying loans and certain assumptions about home prices and unemployment, based upon industry-wide data. The Firm also considers its own historical loss experience to date based on actual redefaulted modified loans. For credit

card loans modified in TDRs, expected losses incorporate projected redefaults based on the Firm's historical experience by type of modification program. For wholesale loans modified in TDRs, expected losses incorporate management's expectation of the borrower's ability to repay under the modified terms.

Estimating the timing and amounts of future cash flows is highly judgmental as these cash flow projections rely upon estimates such as loss severities, asset valuations, default rates (including redefault rates on modified loans), the amounts and timing of interest or principal payments (including any expected prepayments) or other factors that are reflective of current and expected market conditions. These estimates are, in turn, dependent on factors such as the duration of current overall economic conditions, industry-, portfolio-, or borrower-specific factors, the expected outcome of insolvency proceedings as well as, in certain circumstances, other economic factors, including the level of future home prices. All of these estimates and assumptions require significant management judgment and certain assumptions are highly subjective.

PCI loans

In connection with the Washington Mutual transaction, JPMorgan Chase acquired certain PCI loans, which are accounted for as described in Note 14. The allowance for loan losses for the PCI portfolio is based on quarterly estimates of the amount of principal and interest cash flows expected to be collected over the estimated remaining lives of the loans.

These cash flow projections are based on estimates regarding default rates (including redefault rates on modified loans), loss severities, the amounts and timing of prepayments and other factors that are reflective of current and expected future market conditions. These estimates are dependent on assumptions regarding the level of future home prices, and the duration of current overall economic conditions, among other factors. These estimates and assumptions require significant management judgment and certain assumptions are highly subjective.

Notes to consolidated financial statements

Allowance for credit losses and related information

The table below summarizes information about the allowances for loan losses, and lending-related commitments, and includes a breakdown of loans and lending-related commitments by impairment methodology.

Year ended December 31, (in millions)	2016			
	Consumer, excluding credit card	Credit card	Wholesale	Total
Allowance for loan losses				
Beginning balance at January 1,	\$ 5,806	\$ 3,434	\$ 4,315	\$ 13,555
Gross charge-offs	1,500	3,799	398	5,697
Gross recoveries	(591)	(357)	(57)	(1,005)
Net charge-offs/(recoveries)	909	3,442	341	4,692
Write-offs of PCI loans(a)	156	—	—	156
Provision for loan losses	467	4,042	571	5,080
Other	(10)	—	(1)	(11)
Ending balance at December 31,	\$ 5,198	\$ 4,034	\$ 4,544	\$ 13,776
Allowance for loan losses by impairment methodology				
Asset-specific(b)	\$ 308	\$ 358 (c)	\$ 342	\$ 1,008
Formula-based	2,579	3,676	4,202	10,457
PCI	2,311	—	—	2,311
Total allowance for loan losses	\$ 5,198	\$ 4,034	\$ 4,544	\$ 13,776
Loans by impairment methodology				
Asset-specific	\$ 8,940	\$ 1,240	\$ 2,017	\$ 12,197
Formula-based	319,787	140,471	381,770	842,028
PCI	35,679	—	3	35,682
Total retained loans	\$ 364,406	\$ 141,711	\$ 383,790	\$ 889,907
Impaired collateral-dependent loans				
Net charge-offs	\$ 98	\$ —	\$ 7	\$ 105
Loans measured at fair value of collateral less cost to sell	2,391	—	300	2,691
Allowance for lending-related commitments				
Beginning balance at January 1,	\$ 14	\$ —	\$ 772	\$ 786
Provision for lending-related commitments	—	—	281	281
Other	12	—	(1)	11
Ending balance at December 31,	\$ 26	\$ —	\$ 1,052	\$ 1,078
Allowance for lending-related commitments by impairment methodology				
Asset-specific	\$ —	\$ —	\$ 169	\$ 169
Formula-based	26	—	883	909
Total allowance for lending-related commitments	\$ 26	\$ —	\$ 1,052	\$ 1,078
Lending-related commitments by impairment methodology				
Asset-specific	\$ —	\$ —	\$ 506	\$ 506
Formula-based	54,797	553,891	367,508	976,196
Total lending-related commitments	\$ 54,797	\$ 553,891	\$ 368,014	\$ 976,702

(a) Write-offs of PCI loans are recorded against the allowance for loan losses when actual losses for a pool exceed estimated losses that were recorded as purchase accounting adjustments at the time of acquisition. A write-off of a PCI loan is recognized when the underlying loan is removed from a pool (e.g., upon liquidation). During the fourth quarter of 2014, the Firm recorded a \$291 million adjustment to reduce the PCI allowance and the recorded investment in the Firm's PCI loan portfolio, primarily reflecting the cumulative effect of interest forgiveness modifications. This adjustment had no impact to the Firm's Consolidated statements of income.

(b) Includes risk-rated loans that have been placed on nonaccrual status and loans that have been modified in a TDR.

(c) The asset-specific credit card allowance for loan losses is related to loans that have been modified in a TDR; such allowance is calculated based on the loans' original contractual interest rates and does not consider any incremental penalty rates.

(d) Effective January 1, 2015, the Firm no longer includes within its disclosure of wholesale lending-related commitments the unused amount of advised uncommitted lines of credit as it is within the Firm's discretion whether or not to make a loan under these lines, and the Firm's approval is generally required prior to funding. Prior period amounts have been revised to conform with the current period presentation.

(table continued from previous page)

2015				2014			
Consumer, excluding credit card	Credit card	Wholesale	Total	Consumer, excluding credit card	Credit card	Wholesale	Total
\$ 7,050	\$ 3,439	\$ 3,696	\$ 14,185	\$ 8,456	\$ 3,795	\$ 4,013	\$ 16,264
1,658	3,488	95	5,241	2,132	3,831	151	6,114
(704)	(366)	(85)	(1,155)	(814)	(402)	(139)	(1,355)
954	3,122	10	4,086	1,318	3,429	12	4,759
208	—	—	208	533	—	—	533
(82)	3,122	623	3,663	414	3,079	(269)	3,224
—	(5)	6	1	31	(6)	(36)	(11)
\$ 5,806	\$ 3,434	\$ 4,315	\$ 13,555	\$ 7,050	\$ 3,439	\$ 3,696	\$ 14,185
\$ 364	\$ 460 (c)	\$ 274	\$ 1,098	\$ 539	\$ 500 (c)	\$ 87	\$ 1,126
2,700	2,974	4,041	9,715	3,186	2,939	3,609	9,734
2,742	—	—	2,742	3,325	—	—	3,325
\$ 5,806	\$ 3,434	\$ 4,315	\$ 13,555	\$ 7,050	\$ 3,439	\$ 3,696	\$ 14,185
\$ 9,606	\$ 1,465	\$ 1,024	\$ 12,095	\$ 12,020	\$ 2,029	\$ 637	\$ 14,686
293,751	129,922	356,022	779,695	236,263	125,998	323,861	686,122
40,998	—	4	41,002	46,696	—	4	46,700
\$ 344,355	\$ 131,387	\$ 357,050	\$ 832,792	\$ 294,979	\$ 128,027	\$ 324,502	\$ 747,508
\$ 104	\$ —	\$ 16	\$ 120	\$ 133	\$ —	\$ 21	\$ 154
2,566	—	283	2,849	3,025	—	326	3,351
\$ 13	\$ —	\$ 609	\$ 622	\$ 8	\$ —	\$ 697	\$ 705
1	—	163	164	5	—	(90)	(85)
—	—	—	—	—	—	2	2
\$ 14	\$ —	\$ 772	\$ 786	\$ 13	\$ —	\$ 609	\$ 622
\$ —	\$ —	\$ 73	\$ 73	\$ —	\$ —	\$ 60	\$ 60
14	—	699	713	13	—	549	562
\$ 14	\$ —	\$ 772	\$ 786	\$ 13	\$ —	\$ 609	\$ 622
\$ —	\$ —	\$ 193	\$ 193	\$ —	\$ —	\$ 103	\$ 103
58,478	515,518	366,206 (d)	940,202	58,153	525,963	366,778 (d)	950,894
\$ 58,478	\$ 515,518	\$ 366,399	\$ 940,395	\$ 58,153	\$ 525,963	\$ 366,881	\$ 950,997

Note 16 – Variable interest entities

For a further description of JPMorgan Chase’s accounting policies regarding consolidation of VIEs, see Note 1.

The following table summarizes the most significant types of Firm-sponsored VIEs by business segment. The Firm considers a “sponsored” VIE to include any entity where: (1) JPMorgan Chase is the primary beneficiary of the structure; (2) the VIE is used by JPMorgan Chase to securitize Firm assets; (3) the VIE issues financial instruments with the JPMorgan Chase name; or (4) the entity is a JPMorgan Chase-administered asset-backed commercial paper conduit.

Line of Business	Transaction Type	Activity	Annual Report page references
CCB	Credit card securitization trusts	Securitization of both originated and purchased credit card receivables	232
	Mortgage securitization trusts	Servicing and securitization of both originated and purchased residential mortgages	233–235
	Mortgage and other securitization trusts	Securitization of both originated and purchased residential and commercial mortgages and student loans	233–235
CIB	Multi-seller conduits	Assist clients in accessing the financial markets in a cost-efficient manner and structures transactions to meet investor needs	235–237
	Investor intermediation activities:		
	Municipal bond vehicles		235–236

The Firm’s other business segments are also involved with VIEs, but to a lesser extent, as follows:

- **Asset & Wealth Management:** AWM sponsors and manages certain funds that are deemed VIEs. As asset manager of the funds, AWM earns a fee based on assets managed; the fee varies with each fund’s investment objective and is competitively priced. For fund entities that qualify as VIEs, AWM’s interests are, in certain cases, considered to be significant variable interests that result in consolidation of the financial results of these entities.
- **Commercial Banking:** CB makes investments in and provides lending to community development entities that may meet the definition of a VIE. In addition, CB provides financing and lending-related services to certain client-sponsored VIEs. In general, CB does not control the activities of these entities and does not consolidate these entities.
- **Corporate:** Corporate is involved with entities that may meet the definition of VIEs; however these entities are generally subject to specialized investment company accounting, which does not require the consolidation of investments, including VIEs.

The Firm also invests in and provides financing and other services to VIEs sponsored by third parties, as described on page 237 of this Note.

Significant Firm-sponsored variable interest entities

Credit card securitizations

The Card business securitizes both originated and purchased credit card loans, primarily through the Chase Issuance Trust (the “Trust”). The Firm’s continuing involvement in credit card securitizations includes servicing the receivables, retaining an undivided seller’s interest in the receivables, retaining certain senior and subordinated securities and maintaining escrow accounts.

The Firm is considered to be the primary beneficiary of these Firm-sponsored credit card securitization trusts based on the Firm’s ability to direct the activities of these VIEs through its servicing responsibilities and other duties, including making decisions as to the receivables that are transferred into those trusts and as to any related modifications and workouts. Additionally, the nature and extent of the Firm’s other continuing involvement with the trusts, as indicated above, obligates the Firm to absorb losses and gives the Firm the right to receive certain benefits from these VIEs that could potentially be significant.

The underlying securitized credit card receivables and other assets of the securitization trusts are available only for payment of the beneficial interests issued by the securitization trusts; they are not available to pay the Firm’s other obligations or the claims of the Firm’s creditors.

The agreements with the credit card securitization trusts require the Firm to maintain a minimum undivided interest in the credit card trusts (generally 5%). As of December 31, 2016 and 2015, the Firm held undivided interests in Firm-sponsored credit card securitization trusts of \$8.9 billion and \$13.6 billion, respectively. The Firm maintained an average undivided interest in principal receivables owned by those trusts of approximately 16% and 22% for the years ended December 31, 2016 and 2015. As of both December 31, 2016 and 2015, the Firm did not retain any senior securities and retained \$5.3 billion of subordinated securities in certain of its credit card securitization trusts. The Firm’s undivided interests in the credit card trusts and securities retained are eliminated in consolidation.

Firm-sponsored mortgage and other securitization trusts

The Firm securitizes (or has securitized) originated and purchased residential mortgages, commercial mortgages and other consumer loans (including student loans) primarily in its CCB and CIB businesses. Depending on the

particular transaction, as well as the respective business involved, the Firm may act as the servicer of the loans and/or retain certain beneficial interests in the securitization trusts.

The following table presents the total unpaid principal amount of assets held in Firm-sponsored private-label securitization entities, including those in which the Firm has continuing involvement, and those that are consolidated by the Firm. Continuing involvement includes servicing the loans, holding senior interests or subordinated interests, recourse or guarantee arrangements, and derivative transactions. In certain instances, the Firm's only continuing involvement is servicing the loans. See Securitization activity on page 238 of this Note for further information regarding the Firm's cash flows with and interests retained in nonconsolidated VIEs, and pages 238-239 of this Note for information on the Firm's loan sales to U.S. government agencies.

	Principal amount outstanding			JPMorgan Chase interest in securitized assets in nonconsolidated VIEs(c)(d)(e)		
	Total assets held by securitization VIEs	Assets held in consolidated securitization VIEs	Assets held in nonconsolidated securitization VIEs with continuing involvement	Trading assets	AFS securities	Total interests held by JPMorgan Chase
December 31, 2016 (in millions)						
Securitization-related(a)						
Residential mortgage:						
Prime/Alt-A and option ARMs	\$ 76,789	\$ 4,209	\$ 57,543	\$ 226	\$ 1,334	\$ 1,560
Subprime	21,542	—	19,903	76	—	76
Commercial and other(b)	101,265	107	71,464	509	2,064	2,573
Total	\$ 199,596	\$ 4,316	\$ 148,910	\$ 811	\$ 3,398	\$ 4,209

	Principal amount outstanding			JPMorgan Chase interest in securitized assets in nonconsolidated VIEs(c)(d)(e)		
	Total assets held by securitization VIEs	Assets held in consolidated securitization VIEs	Assets held in nonconsolidated securitization VIEs with continuing involvement	Trading assets	AFS securities	Total interests held by JPMorgan Chase
December 31, 2015 (in millions)						
Securitization-related(a)						
Residential mortgage:						
Prime/Alt-A and option ARMs	\$ 85,687	\$ 1,400	\$ 66,708	\$ 394	\$ 1,619	\$ 2,013
Subprime	24,389	64	22,549	109	—	109
Commercial and other(b)	123,474	107	80,319	447	3,451	3,898
Total	\$ 233,550	\$ 1,571	\$ 169,576	\$ 950	\$ 5,070	\$ 6,020

(a) Excludes U.S. government agency securitizations and re-securitizations, which are not Firm-sponsored. See pages 238-239 of this Note for information on the Firm's loan sales to U.S. government agencies.

(b) Consists of securities backed by commercial loans (predominantly real estate) and non-mortgage-related consumer receivables purchased from third parties.

(c) Excludes the following: retained servicing (see Note 17 for a discussion of MSRs); securities retained from loan sales to U.S. government agencies; interest rate and foreign exchange derivatives primarily used to manage interest rate and foreign exchange risks of securitization entities (See Note 6 for further information on derivatives); senior and subordinated securities of \$180 million and \$49 million, respectively, at December 31, 2016, and \$163 million and \$73 million, respectively, at December 31, 2015, which the Firm purchased in connection with CIB's secondary market-making activities.

(d) Includes interests held in re-securitization transactions.

(e) As of December 31, 2016 and 2015, 61% and 76%, respectively, of the Firm's retained securitization interests, which are carried at fair value, were risk-rated "A" or better, on an S&P-equivalent basis. The retained interests in prime residential mortgages consisted of \$1.5 billion and \$1.9 billion of investment-grade and \$77 million and \$93 million of noninvestment-grade retained interests at December 31, 2016 and 2015, respectively. The retained interests in commercial and other securitizations trusts consisted of \$2.4 billion and \$3.7 billion of investment-grade and \$210 million and \$198 million of noninvestment-grade retained interests at December 31, 2016 and 2015, respectively.

Residential mortgage

The Firm securitizes residential mortgage loans originated by CCB, as well as residential mortgage loans purchased from third parties by either CCB or CIB. CCB generally retains servicing for all residential mortgage loans it originated or purchased, and for certain mortgage loans purchased by CIB. For securitizations of loans serviced by CCB, the Firm has the power to direct the significant activities of the VIE because it is responsible for decisions related to loan modifications and workouts. CCB may also retain an interest upon securitization.

In addition, CIB engages in underwriting and trading activities involving securities issued by Firm-sponsored securitization trusts. As a result, CIB at times retains senior and/or subordinated interests (including residual interests) in residential mortgage securitizations at the time of securitization, and/or reacquires positions in the secondary market in the normal course of business. In certain instances, as a result of the positions retained or reacquired by CIB or held by CCB, when considered together with the servicing arrangements entered into by CCB, the Firm is deemed to be the primary beneficiary of certain securitization trusts. See the table on page 237 of this Note for more information on consolidated residential mortgage securitizations.

The Firm does not consolidate a residential mortgage securitization (Firm-sponsored or third-party-sponsored) when it is not the servicer (and therefore does not have the power to direct the most significant activities of the trust) or does not hold a beneficial interest in the trust that could potentially be significant to the trust. At December 31, 2016 and 2015, the Firm did not consolidate the assets of certain Firm-sponsored residential mortgage securitization VIEs, in which the Firm had continuing involvement, primarily due to the fact that the Firm did not hold an interest in these trusts that could potentially be significant to the trusts. See the table on page 237 of this Note for more information on the consolidated residential mortgage securitizations, and the table on the previous page of this Note for further information on interests held in nonconsolidated residential mortgage securitizations.

Commercial mortgages and other consumer securitizations

CIB originates and securitizes commercial mortgage loans, and engages in underwriting and trading activities involving the securities issued by securitization trusts. CIB may retain unsold senior and/or subordinated interests in commercial mortgage securitizations at the time of securitization but, generally, the Firm does not service commercial loan securitizations. For commercial mortgage securitizations the power to direct the significant activities of the VIE generally is held by the servicer or investors in a specified class of securities ("controlling class"). The Firm generally does not retain an interest in the controlling class in its sponsored commercial mortgage securitization transactions. See the table on page 237 of this Note for more information on the consolidated commercial mortgage securitizations, and the table on the previous

page of this Note for further information on interests held in nonconsolidated securitizations.

The Firm retains servicing responsibilities for certain student loan securitizations. The Firm has the power to direct the activities of these VIEs through these servicing responsibilities. See the table on page 237 of this Note for more information on the consolidated student loan securitizations, and the table on the previous page of this Note for further information on interests held in nonconsolidated securitizations.

Re-securitizations

The Firm engages in certain re-securitization transactions in which debt securities are transferred to a VIE in exchange for new beneficial interests. These transfers occur in connection with both agency (Federal National Mortgage Association ("Fannie Mae"), Federal Home Loan Mortgage Corporation ("Freddie Mac") and Government National Mortgage Association ("Ginnie Mae")) and nonagency (private-label) sponsored VIEs, which may be backed by either residential or commercial mortgages. The Firm's consolidation analysis is largely dependent on the Firm's role and interest in the re-securitization trusts. During the years ended December 31, 2016, 2015 and 2014, the Firm transferred \$11.2 billion, \$21.9 billion and \$22.7 billion, respectively, of securities to agency VIEs, and \$647 million, \$777 million and \$1.1 billion, respectively, of securities to private-label VIEs.

Most re-securitizations with which the Firm is involved are client-driven transactions in which a specific client or group of clients is seeking a specific return or risk profile. For these transactions, the Firm has concluded that the decision-making power of the entity is shared between the Firm and its clients, considering the joint effort and decisions in establishing the re-securitization trust and its assets, as well as the significant economic interest the client holds in the re-securitization trust; therefore the Firm does not consolidate the re-securitization VIE.

In more limited circumstances, the Firm creates a nonagency re-securitization trust independently and not in conjunction with specific clients. In these circumstances, the Firm is deemed to have the unilateral ability to direct the most significant activities of the re-securitization trust because of the decisions made during the establishment and design of the trust; therefore, the Firm consolidates the re-securitization VIE if the Firm holds an interest that could potentially be significant.

Additionally, the Firm may invest in beneficial interests of third-party re-securitizations and generally purchases these interests in the secondary market. In these circumstances, the Firm does not have the unilateral ability to direct the most significant activities of the re-securitization trust, either because it was not involved in the initial design of the trust, or the Firm is involved with an independent third-party sponsor and demonstrates shared power over the creation of the trust; therefore, the Firm does not consolidate the re-securitization VIE.

As of December 31, 2016 and 2015, total assets (including the notional amount of interest-only securities) of nonconsolidated Firm-sponsored private-label re-securitization entities in which the Firm has continuing involvement were \$875 million and \$2.2 billion, respectively. At December 31, 2016 and 2015, the Firm held \$2.0 billion and \$4.6 billion, respectively, of interests in nonconsolidated agency re-securitization entities. The Firm's exposure to non-consolidated private-label re-securitization entities as of December 31, 2016 and 2015 was not material. As of December 31, 2016 and 2015, the Firm did not consolidate any agency re-securitizations. As of December 31, 2016 and 2015, the Firm consolidated an insignificant amount of assets and liabilities of Firm-sponsored private-label re-securitizations.

Multi-seller conduits

Multi-seller conduit entities are separate bankruptcy remote entities that provide secured financing, collateralized by pools of receivables and other financial assets, to customers of the Firm. The conduits fund their financing facilities through the issuance of highly rated commercial paper. The primary source of repayment of the commercial paper is the cash flows from the pools of assets. In most instances, the assets are structured with deal-specific credit enhancements provided to the conduits by the customers (i.e., sellers) or other third parties. Deal-specific credit enhancements are generally structured to cover a multiple of historical losses expected on the pool of assets, and are typically in the form of overcollateralization provided by the seller. The deal-specific credit enhancements mitigate the Firm's potential losses on its agreements with the conduits.

To ensure timely repayment of the commercial paper, and to provide the conduits with funding to provide financing to customers in the event that the conduits do not obtain funding in the commercial paper market, each asset pool financed by the conduits has a minimum 100% deal-specific liquidity facility associated with it provided by JPMorgan Chase Bank, N.A. JPMorgan Chase Bank, N.A. also provides the multi-seller conduit vehicles with uncommitted program-wide liquidity facilities and program-wide credit enhancement in the form of standby letters of credit. The amount of program-wide credit enhancement required is based upon commercial paper issuance and approximates 10% of the outstanding balance of commercial paper.

The Firm consolidates its Firm-administered multi-seller conduits, as the Firm has both the power to direct the significant activities of the conduits and a potentially significant economic interest in the conduits. As administrative agent and in its role in structuring transactions, the Firm makes decisions regarding asset types and credit quality, and manages the commercial paper funding needs of the conduits. The Firm's interests that could potentially be significant to the VIEs include the fees received as administrative agent and liquidity and program-wide credit enhancement provider, as well as the potential exposure created by the liquidity and credit

enhancement facilities provided to the conduits. See page 237 of this Note for further information on consolidated VIE assets and liabilities.

In the normal course of business, JPMorgan Chase makes markets in and invests in commercial paper issued by the Firm-administered multi-seller conduits. The Firm held \$21.2 billion and \$15.7 billion of the commercial paper issued by the Firm-administered multi-seller conduits at December 31, 2016 and 2015, respectively. The Firm's investments reflect the Firm's funding needs and capacity and were not driven by market illiquidity. The Firm is not obligated under any agreement to purchase the commercial paper issued by the Firm-administered multi-seller conduits.

Deal-specific liquidity facilities, program-wide liquidity and credit enhancement provided by the Firm have been eliminated in consolidation. The Firm or the Firm-administered multi-seller conduits provide lending-related commitments to certain clients of the Firm-administered multi-seller conduits. The unfunded commitments were \$7.4 billion and \$5.6 billion at December 31, 2016 and 2015, respectively, and are reported as off-balance sheet lending-related commitments. For more information on off-balance sheet lending-related commitments, see Note 29.

VIEs associated with investor intermediation activities

As a financial intermediary, the Firm creates certain types of VIEs and also structures transactions with these VIEs, typically using derivatives, to meet investor needs. The Firm may also provide liquidity and other support. The risks inherent in the derivative instruments or liquidity commitments are managed similarly to other credit, market or liquidity risks to which the Firm is exposed. The principal types of VIEs for which the Firm is engaged in on behalf of clients are municipal bond vehicles.

Municipal bond vehicles

Municipal bond vehicles or tender option bond ("TOB") trusts allow investors to finance their municipal bond investments at short-term rates. In a typical TOB transaction, the trust purchases highly rated municipal bond(s) of a single issuer and funds the purchase by issuing two types of securities: (1) puttable floating-rate certificates ("Floaters") and (2) inverse floating-rate residual interests ("Residuals"). The Floaters are typically purchased by money market funds or other short-term investors and may be tendered, with requisite notice, to the TOB trust. The Residuals are retained by the investor seeking to finance its municipal bond investment. TOB transactions where the Residual is held by a third party investor are typically known as Customer TOB trusts, and Non-Customer TOB trusts are transactions where the Residual is retained by the Firm. The Firm serves as sponsor for all Non-Customer TOB transactions and certain Customer TOB transactions established prior to 2014. The Firm may provide various services to a TOB trust, including remarketing agent, liquidity or tender option provider, and/or sponsor.

Notes to consolidated financial statements

J.P. Morgan Securities LLC may serve as a remarketing agent on the Floaters for TOB trusts. The remarketing agent is responsible for establishing the periodic variable rate on the Floaters, conducting the initial placement and remarketing tendered Floaters. The remarketing agent may, but is not obligated to, make markets in Floaters. At December 31, 2016 and 2015, the Firm held an insignificant amount of Floaters on its Consolidated balance sheets and did not hold any significant amounts during 2016 and 2015.

JPMorgan Chase Bank, N.A. or J.P. Morgan Securities LLC often serves as the sole liquidity or tender option provider for the TOB trusts. The liquidity provider's obligation to perform is conditional and is limited by certain events ("Termination Events"), which include bankruptcy or failure to pay by the municipal bond issuer or credit enhancement provider, an event of taxability on the municipal bonds or the immediate downgrade of the municipal bond to below investment grade. In addition, the liquidity provider's exposure is typically further limited by the high credit quality of the underlying municipal bonds, the excess collateralization in the vehicle, or, in certain transactions, the reimbursement agreements with the Residual holders.

Holders of the Floaters may "put," or tender, their Floaters to the TOB trust. If the remarketing agent cannot successfully remarket the Floaters to another investor, the liquidity provider either provides a loan to the TOB trust for the TOB trust's purchase of the Floaters, or it directly purchases the tendered Floaters. In certain Customer TOB transactions, the Firm, as liquidity provider, has entered into a reimbursement agreement with the Residual holder. In those transactions, upon the termination of the vehicle, if the proceeds from the sale of the underlying municipal bonds are not sufficient to repay amounts owed to the Firm, as liquidity or tender option provider, the Firm has recourse to the third party Residual holders for any shortfall. Residual holders with reimbursement agreements are required to post collateral with the Firm to support such reimbursement obligations should the market value of the underlying municipal bonds decline. The Firm does not have any intent to protect Residual holders from potential losses on any of the underlying municipal bonds.

TOB trusts are considered to be variable interest entities. The Firm consolidates Non-Customer TOB trusts because as the Residual holder, the Firm has the right to make decisions that significantly impact the economic performance of the municipal bond vehicle, and it has the right to receive benefits and bear losses that could potentially be significant to the municipal bond vehicle. The Firm does not consolidate Customer TOB trusts, since the Firm does not have the power to make decisions that significantly impact the economic performance of the municipal bond vehicle. Certain non-consolidated Customer TOB trusts are sponsored by a third party, and not the Firm. See page 237 of this Note for further information on consolidated municipal bond vehicles.

The Firm's exposure to nonconsolidated municipal bond VIEs at December 31, 2016 and 2015, including the ratings profile of the VIEs' assets, was as follows.

December 31, (in millions)	Fair value of assets held by VIEs				Liquidity facilities		Excess/(deficit)(a)		Maximum exposure					
Nonconsolidated municipal bond vehicles														
	2016	\$		1,096	\$		662	\$	434	\$	662			
	2015			6,937			3,794		3,143		3,794			
Ratings profile of VIE assets(b)														
December 31, (in millions, except where otherwise noted)	Investment-grade						Fair value of assets held by VIEs	Wt. avg. expected life of assets (years)						
	AAA to AAA-	AA+ to AA-	A+ to A-	BBB+ to BBB-	Unrated(c)									
	2016	\$	264	\$	700	\$	43	\$	24	\$	65	\$	1,096	1.6
	2015		1,743		4,631		448		24		91	\$	6,937	4.0

(a) Represents the excess/(deficit) of the fair values of municipal bond assets available to repay the liquidity facilities, if drawn.

(b) The ratings scale is presented on an S&P-equivalent basis.

(c) These security positions have been defeased by the municipality and no longer carry credit ratings, but are backed by high-quality assets such as U.S. treasuries and cash.

VIEs sponsored by third parties

The Firm enters into transactions with VIEs structured by other parties. These include, for example, acting as a derivative counterparty, liquidity provider, investor, underwriter, placement agent, remarketing agent, trustee or custodian. These transactions are conducted at arm's-length, and individual credit decisions are based on the analysis of the specific VIE, taking into consideration the

quality of the underlying assets. Where the Firm does not have the power to direct the activities of the VIE that most significantly impact the VIE's economic performance, or a variable interest that could potentially be significant, the Firm records and reports these positions on its Consolidated balance sheets in the same manner it would record and report positions in respect of any other third-party transaction.

Consolidated VIE assets and liabilities

The following table presents information on assets and liabilities related to VIEs consolidated by the Firm as of December 31, 2016 and 2015.

December 31, 2016 (in millions)	Assets				Liabilities		
	Trading assets	Loans	Other(c)	Total assets(d)	Beneficial interests in VIE assets(e)	Other(f)	Total liabilities
VIE program type(a)							
Firm-sponsored credit card trusts	\$ —	\$ 45,919	\$ 790	\$ 46,709	\$ 31,181	\$ 18	\$ 31,199
Firm-administered multi-seller conduits	—	23,760	43	23,803	2,719	33	2,752
Municipal bond vehicles	2,897	—	8	2,905	2,969	2	2,971
Mortgage securitization entities(b)	143	4,246	103	4,492	468	313	781
Student loan securitization entities	—	1,689	59	1,748	1,527	4	1,531
Other	145	—	2,318	2,463	183	120	303
Total	\$ 3,185	\$ 75,614	\$ 3,321	\$ 82,120	\$ 39,047	\$ 490	\$ 39,537

December 31, 2015 (in millions)	Assets				Liabilities		
	Trading assets	Loans	Other(c)	Total assets(d)	Beneficial interests in VIE assets(e)	Other(f)	Total liabilities
VIE program type(a)							
Firm-sponsored credit card trusts	\$ —	\$ 47,358	\$ 718	\$ 48,076	\$ 27,906	\$ 15	\$ 27,921
Firm-administered multi-seller conduits	—	24,388	37	24,425	8,724	19	8,743
Municipal bond vehicles	2,686	—	5	2,691	2,597	1	2,598
Mortgage securitization entities(b)	840	1,433	27	2,300	777	643	1,420
Student loan securitization entities	—	1,925	62	1,987	1,760	5	1,765
Other	210	—	1,916	2,126	115	126	241
Total	\$ 3,736	\$ 75,104	\$ 2,765	\$ 81,605	\$ 41,879	\$ 809	\$ 42,688

(a) Excludes intercompany transactions, which are eliminated in consolidation.

(b) Includes residential and commercial mortgage securitizations as well as re-securitizations.

(c) Includes assets classified as cash, AFS securities, and other assets on the Consolidated balance sheets.

(d) The assets of the consolidated VIEs included in the program types above are used to settle the liabilities of those entities. The difference between total assets and total liabilities recognized for consolidated VIEs represents the Firm's interest in the consolidated VIEs for each program type.

(e) The interest-bearing beneficial interest liabilities issued by consolidated VIEs are classified in the line item on the Consolidated balance sheets titled, "Beneficial interests issued by consolidated variable interest entities." The holders of these beneficial interests do not have recourse to the general credit of JPMorgan Chase. Included in beneficial interests in VIE assets are long-term beneficial interests of \$33.4 billion and \$30.6 billion at December 31, 2016 and 2015, respectively. The maturities of the long-term beneficial interests as of December 31, 2016, were as follows: \$11.6 billion under one year, \$19.1 billion between one and five years, and \$2.7 billion over five years.

(f) Includes liabilities classified as accounts payable and other liabilities on the Consolidated balance sheets.

Notes to consolidated financial statements

Loan securitizations

The Firm has securitized and sold a variety of loans, including residential mortgage, credit card, student and commercial (primarily related to real estate) loans, as well as debt securities. The purposes of these securitization transactions were to satisfy investor demand and to generate liquidity for the Firm.

For loan securitizations in which the Firm is not required to consolidate the trust, the Firm records the transfer of the loan receivable to the trust as a sale when all of the following accounting criteria for a sale are met: (1) the transferred financial assets are legally isolated from the Firm's creditors; (2) the transferee or beneficial interest

holder can pledge or exchange the transferred financial assets; and (3) the Firm does not maintain effective control over the transferred financial assets (e.g., the Firm cannot repurchase the transferred assets before their maturity and it does not have the ability to unilaterally cause the holder to return the transferred assets).

For loan securitizations accounted for as a sale, the Firm recognizes a gain or loss based on the difference between the value of proceeds received (including cash, beneficial interests, or servicing assets received) and the carrying value of the assets sold. Gains and losses on securitizations are reported in noninterest revenue.

Securitization activity

The following table provides information related to the Firm's securitization activities for the years ended December 31, 2016, 2015 and 2014, related to assets held in Firm-sponsored securitization entities that were not consolidated by the Firm, and where sale accounting was achieved based on the accounting rules in effect at the time of the securitization.

Year ended December 31, (in millions, except rates)	2016		2015		2014	
	Residential mortgage(c)(d)	Commercial and other(d)(e)	Residential mortgage(c)(d)	Commercial and other(d)(e)	Residential mortgage(c)(d)	Commercial and other(d)(e)
Principal securitized	\$ 1,817	\$ 8,964	\$ 3,008	\$ 11,933	\$ 2,558	\$ 11,911
All cash flows during the period:(a)						
Proceeds received from loan sales as cash	\$ —	\$ —	\$ —	\$ —	\$ —	\$ 568
Proceeds received from loan sales as securities						
Level 2	1,831	9,092	2,963	11,968	2,384	11,381
Level 3	—	2	59	43	185	130
Total proceeds received from loan sales	\$ 1,831	\$ 9,094	\$ 3,022	\$ 12,011	\$ 2,569	\$ 12,079
Servicing fees collected	477	3	528	3	557	4
Purchases of previously transferred financial assets (or the underlying collateral)(b)	37	—	3	—	121	—
Cash flows received on interests	482	1,441	407	597	179	578

(a) Excludes re-securitization transactions.

(b) Includes cash paid by the Firm to reacquire assets from off-balance sheet, nonconsolidated entities – for example, loan repurchases due to representation and warranties and servicer “clean-up” calls.

(c) Includes prime/Alt-A, subprime, and option ARMs. Excludes certain loan securitization transactions entered into with Ginnie Mae, Fannie Mae and Freddie Mac.

(d) Key assumptions used to measure residential mortgage retained interests originated during the year included weighted-average life (in years) of 4.5, 4.2 and 5.9 for the years ended December 31, 2016, 2015 and 2014, respectively, and weighted-average discount rate of 4.2%, 2.9% and 3.4% for the years ended December 31, 2016, 2015 and 2014, respectively. Key assumptions used to measure commercial and other retained interests originated during the year included weighted-average life (in years) of 6.2, 6.2 and 6.5 for the years ended December 31, 2016, 2015 and 2014, respectively, and weighted-average discount rate of 5.8%, 4.1% and 4.8% for the years ended December 31, 2016, 2015 and 2014, respectively.

(e) Includes commercial mortgage and student loan securitizations.

Loans and excess MSR sold to U.S. government-sponsored enterprises, loans in securitization transactions pursuant to Ginnie Mae guidelines, and other third-party-sponsored securitization entities

In addition to the amounts reported in the securitization activity tables above, the Firm, in the normal course of business, sells originated and purchased mortgage loans and certain originated excess MSRs on a nonrecourse basis, predominantly to U.S. government sponsored enterprises (“U.S. GSEs”). These loans and excess MSRs are sold primarily for the purpose of securitization by the U.S. GSEs, who provide certain guarantee provisions (e.g., credit enhancement of the loans). The Firm also sells loans into securitization transactions pursuant to Ginnie Mae

guidelines; these loans are typically insured or guaranteed by another U.S. government agency. The Firm does not consolidate the securitization vehicles underlying these transactions as it is not the primary beneficiary. For a limited number of loan sales, the Firm is obligated to share a portion of the credit risk associated with the sold loans with the purchaser. See Note 29 for additional information about the Firm's loan sales- and securitization-related indemnifications.

See Note 17 for additional information about the impact of the Firm's sale of certain excess MSRs.

The following table summarizes the activities related to loans sold to the U.S. GSEs, loans in securitization transactions pursuant to Ginnie Mae guidelines, and other third-party-sponsored securitization entities.

Year ended December 31, (in millions)	2016	2015	2014
Carrying value of loans sold	\$ 52,869	\$ 42,161	\$ 55,802
Proceeds received from loan sales as cash	\$ 592	\$ 313	\$ 260
Proceeds from loans sales as securities(a)	51,852	41,615	55,117
Total proceeds received from loan sales(b)	\$ 52,444	\$ 41,928	\$ 55,377
Gains on loan sales(c)(d)	\$ 222	\$ 299	\$ 316

- (a) Predominantly includes securities from U.S. GSEs and Ginnie Mae that are generally sold shortly after receipt.
(b) Excludes the value of MSRs retained upon the sale of loans.
(c) Gains on loan sales include the value of MSRs.
(d) The carrying value of the loans accounted for at fair value approximated the proceeds received upon loan sale.

Options to repurchase delinquent loans

In addition to the Firm's obligation to repurchase certain loans due to material breaches of representations and warranties as discussed in Note 29, the Firm also has the option to repurchase delinquent loans that it services for Ginnie Mae loan pools, as well as for other U.S. government agencies under certain arrangements. The Firm typically elects to repurchase delinquent loans from Ginnie Mae loan pools as it continues to service them and/or manage the foreclosure process in accordance with the applicable requirements, and such loans continue to be insured or guaranteed. When the Firm's repurchase option becomes exercisable, such loans must be reported on the Consolidated balance sheets as a loan with a corresponding liability. As of December 31, 2016 and 2015, the Firm had recorded on its Consolidated balance sheets \$9.6 billion and \$11.1 billion, respectively, of loans that either had been repurchased or for which the Firm had an option to repurchase. Predominantly all of these amounts relate to loans that have been repurchased from Ginnie Mae loan pools. Additionally, at December 31, 2016 and 2015, the Firm had real estate owned of \$142 million and \$343 million, respectively, and certain foreclosed government-guaranteed residential mortgage loans included in accrued interest and accounts receivable of \$1.0 billion and \$1.1 billion, respectively, resulting from voluntary repurchases of loans. Substantially all of these loans and real estate are insured or guaranteed by U.S. government agencies. For additional information, refer to Note 14.

Loan delinquencies and liquidation losses

The table below includes information about components of nonconsolidated securitized financial assets held in Firm-sponsored private-label securitization entities, in which the Firm has continuing involvement, and delinquencies as of December 31, 2016 and 2015.

As of or for the year ended December 31, (in millions)	Securitized assets		90 days past due		Liquidation losses	
	2016	2015	2016	2015	2016	2015
Securitized loans(a)						
Residential mortgage:						
Prime/ Alt-A & option ARMs	\$ 57,543	\$ 66,708	\$ 6,169	\$ 8,325	\$ 1,160	\$ 1,946
Subprime	19,903	22,549	4,186	5,448	1,087	1,431
Commercial and other	71,464	80,319	1,755	1,808	643	375
Total loans securitized	\$ 148,910	\$ 169,576	\$ 12,110	\$ 15,581	\$ 2,890	\$ 3,752

- (a) Total assets held in securitization-related SPEs were \$199.6 billion and \$233.6 billion, respectively, at December 31, 2016 and 2015. The \$148.9 billion and \$169.6 billion, respectively, of loans securitized at December 31, 2016 and 2015, excludes: \$46.4 billion and \$62.4 billion, respectively, of securitized loans in which the Firm has no continuing involvement, and \$4.3 billion and \$1.6 billion, respectively, of loan securitizations consolidated on the Firm's Consolidated balance sheets at December 31, 2016 and 2015.

Note 17 – Goodwill and Mortgage servicing rights**Goodwill**

Goodwill is recorded upon completion of a business combination as the difference between the purchase price and the fair value of the net assets acquired. Subsequent to initial recognition, goodwill is not amortized but is tested for impairment during the fourth quarter of each fiscal year, or more often if events or circumstances, such as adverse changes in the business climate, indicate there may be impairment.

The goodwill associated with each business combination is allocated to the related reporting units, which are determined based on how the Firm's businesses are managed and how they are reviewed by the Firm's Operating Committee. The following table presents goodwill attributed to the business segments.

December 31, (in millions)	2016	2015	2014
Consumer & Community Banking	\$ 30,797	\$ 30,769	\$ 30,941
Corporate & Investment Bank	6,772	6,772	6,780
Commercial Banking	2,861	2,861	2,861
Asset & Wealth Management	6,858	6,923	6,964
Corporate	—	—	101
Total goodwill	\$ 47,288	\$ 47,325	\$ 47,647

The following table presents changes in the carrying amount of goodwill.

Year ended December 31, (in millions)	2016	2015	2014
Balance at beginning of period	\$ 47,325	\$ 47,647	\$ 48,081
Changes during the period from:			
Business combinations	—	28	43
Dispositions(a)	(72)	(160)	(80)
Other(b)	35	(190)	(397)
Balance at December 31,	\$ 47,288	\$ 47,325	\$ 47,647

- (a) For 2016, represents AWM goodwill, which was disposed of as part of AWM sales completed in March 2016. For 2015 includes \$101 million of Private Equity goodwill, which was disposed of as part of the Private Equity sale completed in January 2015.
- (b) Includes foreign currency translation adjustments, other tax-related adjustments, and, for 2014, goodwill impairment associated with the Firm's Private Equity business of \$276 million.

Impairment testing

The Firm's goodwill was not impaired at December 31, 2016 and 2015. Further, except for goodwill related to its heritage Private Equity business of \$276 million, the Firm's goodwill was not impaired at December 31, 2014.

The goodwill impairment test is performed in two steps. In the first step, the current fair value of each reporting unit is compared with its carrying value, including goodwill. If the fair value is in excess of the carrying value (including goodwill), then the reporting unit's goodwill is considered not to be impaired. If the fair value is less than the carrying value (including goodwill), then a second step is performed. In the second step, the implied current fair value of the reporting unit's goodwill is determined by comparing the fair value of the reporting unit (as determined in step one) to the fair value of the net assets of the reporting unit, as if the reporting unit were being acquired in a business combination. The resulting implied current fair value of goodwill is then compared with the carrying value of the reporting unit's goodwill. If the carrying value of the goodwill exceeds its implied current fair value, then an impairment charge is recognized for the excess. If the carrying value of goodwill is less than its implied current fair value, then no goodwill impairment is recognized.

The Firm uses the reporting units' allocated equity plus goodwill capital as a proxy for the carrying amounts of equity for the reporting units in the goodwill impairment testing. Reporting unit equity is determined on a similar basis as the allocation of equity to the Firm's lines of business, which takes into consideration the capital the business segment would require if it were operating independently, incorporating sufficient capital to address regulatory capital requirements (including Basel III) and capital levels for similarly rated peers. Proposed line of business equity levels are incorporated into the Firm's annual budget process, which is reviewed by the Firm's Board of Directors. Allocated equity is further reviewed on a periodic basis and updated as needed.

The primary method the Firm uses to estimate the fair value of its reporting units is the income approach. This approach projects cash flows for the forecast period and uses the perpetuity growth method to calculate terminal values. These cash flows and terminal values are then discounted using an appropriate discount rate. Projections of cash flows are based on the reporting units' earnings forecasts, which include the estimated effects of regulatory and legislative changes, and which are reviewed with the senior management of the Firm. The discount rate used for each reporting unit represents an estimate of the cost of equity for that reporting unit and is determined considering the Firm's overall estimated cost of equity (estimated using the Capital Asset Pricing Model), as adjusted for the risk characteristics specific to each reporting unit (for example, for higher levels of risk or uncertainty associated with the business or management's forecasts and assumptions). To assess the reasonableness of the discount rates used for each reporting unit management compares the discount rate to the estimated cost of equity for publicly traded institutions with similar businesses and risk characteristics. In addition, the weighted average cost of equity (aggregating the various reporting units) is compared with the Firms' overall estimated cost of equity to ensure reasonableness.

The valuations derived from the discounted cash flow analysis are then compared with market-based trading and transaction multiples for relevant competitors. Trading and transaction comparables are used as general indicators to assess the general reasonableness of the estimated fair values, although precise conclusions generally cannot be drawn due to the differences that naturally exist between the Firm's businesses and competitor institutions. Management also takes into consideration a comparison between the aggregate fair values of the Firm's reporting units and JPMorgan Chase's market capitalization. In evaluating this comparison, management considers several factors, including (i) a control premium that would exist in a market transaction, (ii) factors related to the level of execution risk that would exist at the firmwide level that do not exist at the reporting unit level and (iii) short-term market volatility and other factors that do not directly affect the value of individual reporting units.

Declines in business performance, increases in credit losses, increases in equity capital requirements, as well as deterioration in economic or market conditions, estimates of adverse regulatory or legislative changes or increases in the estimated market cost of equity, could cause the estimated fair values of the Firm's reporting units or their associated goodwill to decline in the future, which could result in a material impairment charge to earnings in a future period related to some portion of the associated goodwill.

Mortgage servicing rights

MSRs represent the fair value of expected future cash flows for performing servicing activities for others. The fair value considers estimated future servicing fees and ancillary revenue, offset by estimated costs to service the loans, and generally declines over time as net servicing cash flows are received, effectively amortizing the MSR asset against contractual servicing and ancillary fee income. MSRs are either purchased from third parties or recognized upon sale or securitization of mortgage loans if servicing is retained.

As permitted by U.S. GAAP, the Firm has elected to account for its MSRs at fair value. The Firm treats its MSRs as a single class of servicing assets based on the availability of market inputs used to measure the fair value of its MSR asset and its treatment of MSRs as one aggregate pool for risk management purposes. The Firm estimates the fair value of MSRs using an option-adjusted spread ("OAS") model, which projects MSR cash flows over multiple interest rate scenarios in conjunction with the Firm's prepayment model, and then discounts these cash flows at risk-adjusted rates. The model considers portfolio characteristics, contractually specified servicing fees, prepayment assumptions, delinquency rates, costs to service, late charges and other ancillary revenue, and other economic factors. The Firm compares fair value estimates and assumptions to observable market data where available, and also considers recent market activity and actual portfolio experience.

Notes to consolidated financial statements

The fair value of MSRs is sensitive to changes in interest rates, including their effect on prepayment speeds. MSRs typically decrease in value when interest rates decline because declining interest rates tend to increase prepayments and therefore reduce the expected life of the net servicing cash flows that comprise the MSR asset. Conversely, securities (e.g., mortgage-backed securities), principal-only certificates and certain derivatives (i.e.,

those for which the Firm receives fixed-rate interest payments) increase in value when interest rates decline. JPMorgan Chase uses combinations of derivatives and securities to manage the risk of changes in the fair value of MSRs. The intent is to offset any interest-rate related changes in the fair value of MSRs with changes in the fair value of the related risk management instruments.

The following table summarizes MSR activity for the years ended December 31, 2016, 2015 and 2014.

As of or for the year ended December 31, (in millions, except where otherwise noted)	2016	2015	2014
Fair value at beginning of period	\$ 6,608	\$ 7,436	\$ 9,614
MSR activity:			
Originations of MSRs	679	550	757
Purchase of MSRs	—	435	11
Disposition of MSRs(a)	(109)	(486)	(209)
Net additions	570	499	559
Changes due to collection/realization of expected cash flows	(919)	(922)	(911)
Changes in valuation due to inputs and assumptions:			
Changes due to market interest rates and other(b)	(72)	(160)	(1,608)
Changes in valuation due to other inputs and assumptions:			
Projected cash flows (e.g., cost to service)	(35)	(112)	133
Discount rates	7	(10)	(459)
Prepayment model changes and other(c)	(63)	(123)	108
Total changes in valuation due to other inputs and assumptions	(91)	(245)	(218)
Total changes in valuation due to inputs and assumptions	(163)	(405)	(1,826)
Fair value at December 31,	\$ 6,096	\$ 6,608	\$ 7,436
Change in unrealized gains/(losses) included in income related to MSRs held at December 31,	\$ (163)	\$ (405)	\$ (1,826)
Contractual service fees, late fees and other ancillary fees included in income	2,124	2,533	2,884
Third-party mortgage loans serviced at December 31, (in billions)	593.3	677.0	756.1
Servicer advances, net of an allowance for uncollectible amounts, at December 31, (in billions)(d)	4.7	6.5	8.5

(a) Includes excess MSRs transferred to agency-sponsored trusts in exchange for stripped mortgage backed securities ("SMBS"). In each transaction, a portion of the SMBS was acquired by third parties at the transaction date; the Firm acquired the remaining balance of those SMBS as trading securities.

(b) Represents both the impact of changes in estimated future prepayments due to changes in market interest rates, and the difference between actual and expected prepayments.

(c) Represents changes in prepayments other than those attributable to changes in market interest rates.

(d) Represents amounts the Firm pays as the servicer (e.g., scheduled principal and interest, taxes and insurance), which will generally be reimbursed within a short period of time after the advance from future cash flows from the trust or the underlying loans. The Firm's credit risk associated with these servicer advances is minimal because reimbursement of the advances is typically senior to all cash payments to investors. In addition, the Firm maintains the right to stop payment to investors if the collateral is insufficient to cover the advance. However, certain of these servicer advances may not be recoverable if they were not made in accordance with applicable rules and agreements.

(e) For the year ending December 31, 2014, the negative impact was primarily related to higher capital allocated to the Mortgage Servicing business, which, in turn, resulted in an increase in the OAS. The resulting OAS assumption was consistent with capital and return requirements the Firm believed a market participant would consider, taking into account factors such as the operating risk environment and regulatory and economic capital requirements.

The following table presents the components of mortgage fees and related income (including the impact of MSR risk management activities) for the years ended December 31, 2016, 2015 and 2014.

Year ended December 31, (in millions)	2016	2015	2014
CCB mortgage fees and related income			
Net production revenue	\$ 853	\$ 769	\$ 1,190
Net mortgage servicing revenue:			
Operating revenue:			
Loan servicing revenue	2,336	2,776	3,303
Changes in MSR asset fair value due to collection/realization of expected cash flows	(916)	(917)	(905)
Total operating revenue	1,420	1,859	2,398
Risk management:			
Changes in MSR asset fair value due to market interest rates and other(a)	(72)	(160)	(1,606)
Other changes in MSR asset fair value due to other inputs and assumptions in model(b)	(91)	(245)	(218)
Change in derivative fair value and other	380	288	1,796
Total risk management	217	(117)	(28)
Total net mortgage servicing revenue	1,637	1,742	2,370
Total CCB mortgage fees and related income	2,490	2,511	3,560
All other	1	2	3
Mortgage fees and related income	\$ 2,491	\$ 2,513	\$ 3,563

(a) Represents both the impact of changes in estimated future prepayments due to changes in market interest rates, and the difference between actual and expected prepayments.

(b) Represents the aggregate impact of changes in model inputs and assumptions such as projected cash flows (e.g., cost to service), discount rates and changes in prepayments other than those attributable to changes in market interest rates (e.g., changes in prepayments due to changes in home prices).

The table below outlines the key economic assumptions used to determine the fair value of the Firm's MSRs at December 31, 2016 and 2015, and outlines the sensitivities of those fair values to immediate adverse changes in those assumptions, as defined below.

December 31, (in millions, except rates)	2016	2015
Weighted-average prepayment speed assumption ("CPR")	9.41%	9.81%
Impact on fair value of 10% adverse change	\$ (231)	\$ (275)
Impact on fair value of 20% adverse change	(445)	(529)
Weighted-average option adjusted spread	8.55%	9.54%
Impact on fair value of 100 basis points adverse change	\$ (248)	\$ (258)
Impact on fair value of 200 basis points adverse change	(477)	(498)

CPR: Constant prepayment rate.

The sensitivity analysis in the preceding table is hypothetical and should be used with caution. Changes in fair value based on variation in assumptions generally cannot be easily extrapolated, because the relationship of the change in the assumptions to the change in fair value are often highly interrelated and may not be linear. In this table, the effect that a change in a particular assumption may have on the fair value is calculated without changing any other assumption. In reality, changes in one factor may result in changes in another, which would either magnify or counteract the impact of the initial change.

Notes to consolidated financial statements

Note 18 – Premises and equipment

Premises and equipment, including leasehold improvements, are carried at cost less accumulated depreciation and amortization. JPMorgan Chase computes depreciation using the straight-line method over the estimated useful life of an asset. For leasehold improvements, the Firm uses the straight-line method computed over the lesser of the remaining term of the leased facility or the estimated useful life of the leased asset.

JPMorgan Chase capitalizes certain costs associated with the acquisition or development of internal-use software. Once the software is ready for its intended use, these costs are amortized on a straight-line basis over the software's expected useful life and reviewed for impairment on an ongoing basis.

Note 19 – Deposits

At December 31, 2016 and 2015, noninterest-bearing and interest-bearing deposits were as follows.

December 31, (in millions)	2016	2015
U.S. offices		
Noninterest-bearing	\$ 400,831	\$ 392,721
Interest-bearing (included \$12,245 and \$10,916 at fair value)(a)	737,949	663,004
Total deposits in U.S. offices	1,138,780	1,055,725
Non-U.S. offices		
Noninterest-bearing	14,764	14,489 (b)
Interest-bearing (included \$1,667 and \$1,600 at fair value)(a)	221,635	209,501 (b)
Total deposits in non-U.S. offices	236,399	223,990
Total deposits	\$ 1,375,179	\$ 1,279,715

(a) Includes structured notes classified as deposits for which the fair value option has been elected. For further discussion, see Note 4.

(b) Prior periods have been revised to conform with current period presentation.

At December 31, 2016 and 2015, time deposits in denominations of \$250,000 or more were as follows.

December 31, (in millions)	2016	2015
U.S. offices	\$ 26,180	\$ 64,519
Non-U.S. offices	55,249	48,091
Total	\$ 81,429	\$ 112,610

At December 31, 2016, the maturities of interest-bearing time deposits were as follows.

December 31, 2016 (in millions)	U.S.	Non-U.S.	Total
2017	\$ 31,531	\$ 54,846	\$ 86,377
2018	4,433	176	4,609
2019	2,066	68	2,134
2020	2,005	39	2,044
2021	3,988	188	4,176
After 5 years	3,889	—	3,889
Total	\$ 47,912	\$ 55,317	\$ 103,229

Note 20 – Accounts payable and other liabilities

Accounts payable and other liabilities consist of brokerage payables, which includes payables to customers, dealers and clearing organizations, and payables from security purchases that did not settle; income taxes payables; accrued expense, including interest-bearing liabilities; and all other liabilities, including litigation reserves and obligations to return securities received as collateral.

The following table details the components of accounts payable and other liabilities.

December 31, (in millions)	2016	2015
Brokerage payables	\$ 109,842	\$ 107,632
Accounts payable and other liabilities	80,701	70,006
Total	\$ 190,543	\$ 177,638

Note 21 – Long-term debt

JPMorgan Chase issues long-term debt denominated in various currencies, predominantly U.S. dollars, with both fixed and variable interest rates. Included in senior and subordinated debt below are various equity-linked or other indexed instruments, which the Firm has elected to measure at fair value. Changes in fair value are recorded in principal transactions revenue in the Consolidated statements of income. The following table is a summary of long-term debt carrying values (including unamortized premiums and discounts, issuance costs, valuation adjustments and fair value adjustments, where applicable) by remaining contractual maturity as of December 31, 2016.

By remaining maturity at December 31, (in millions, except rates)		2016				2015
		Under 1 year	1-5 years	After 5 years	Total	Total
Parent company						
Senior debt:	Fixed rate	\$ 12,109	\$ 57,938	\$ 58,920	\$ 128,967	\$ 117,758
	Variable rate	11,870	15,497	7,399	34,766	44,178
	Interest rates(a)	0.09-6.40%	0.17-7.25%	0.45-6.40%	0.09-7.25%	0.16-7.25%
Subordinated debt:	Fixed rate	\$ 2,096	\$ 152	\$ 14,563	\$ 16,811	\$ 16,250
	Variable rate	864	372	9	1,245	1,047
	Interest rates(a)	0.82-6.13%	1.93-8.53%	3.38-8.00%	0.82-8.53%	1.06-8.53%
	Subtotal	\$ 26,939	\$ 73,959	\$ 80,891	\$ 181,789	\$ 179,233
Subsidiaries						
Federal Home Loan Banks advances:	Fixed rate	\$ 5	\$ 31	\$ 143	\$ 179	\$ 191
	Variable rate	11,340	57,000	11,000	79,340	71,390
	Interest rates(a)	0.84-1.01%	0.83-1.21%	0.41-0.67%	0.41-1.21%	0.17-0.72%
Senior debt:	Fixed rate	\$ 339	\$ 3,100	\$ 4,890	\$ 8,329	\$ 5,550
	Variable rate	4,520	11,860	2,999	19,379	20,588
	Interest rates(a)	1.29-1.49%	0.00-7.50%	1.30-7.50%	0.00-7.50%	0.47-7.28%
Subordinated debt:	Fixed rate	\$ 3,562	\$ —	\$ 322	\$ 3,884	\$ 6,580
	Variable rate	—	—	—	—	1,150
	Interest rates(a)	6.00%	—%	8.25%	6.00-8.25%	0.83-8.25%
	Subtotal	\$ 19,766	\$ 71,991	\$ 19,354	\$ 111,111	\$ 105,449
Junior subordinated debt:	Fixed rate	\$ —	\$ —	\$ 706	\$ 706	\$ 717
	Variable rate	—	—	1,639	1,639	3,252
	Interest rates(a)	—%	—%	1.39-8.75%	1.39-8.75%	0.83-8.75%
	Subtotal	\$ —	\$ —	\$ 2,345	\$ 2,345	\$ 3,969
Total long-term debt(b)(c)(d)		\$ 46,705	\$ 145,950	\$ 102,590	\$ 295,245	\$ 288,651
Long-term beneficial interests:	Fixed rate	\$ 5,164	\$ 12,766	\$ 748	\$ 18,678	\$ 14,199
	Variable rate	6,438	6,281	1,962	14,681	16,358
	Interest rates	0.74-5.23%	0.98-7.87%	0.39-5.94%	0.39-7.87%	0.00-15.94%
Total long-term beneficial interests(e)		\$ 11,602	\$ 19,047	\$ 2,710	\$ 33,359	\$ 30,557

(a) The interest rates shown are the range of contractual rates in effect at December 31, 2016 and 2015, respectively, including non-U.S. dollar fixed- and variable-rate issuances, which excludes the effects of the associated derivative instruments used in hedge accounting relationships, if applicable. The use of these derivative instruments modifies the Firm's exposure to the contractual interest rates disclosed in the table above. Including the effects of the hedge accounting derivatives, the range of modified rates in effect at December 31, 2016, for total long-term debt was (0.18)% to 8.88%, versus the contractual range of 0.00% to 8.75% presented in the table above. The interest rate ranges shown exclude structured notes accounted for at fair value.

(b) Included long-term debt of \$82.2 billion and \$76.6 billion secured by assets totaling \$205.6 billion and \$171.6 billion at December 31, 2016 and 2015, respectively. The amount of long-term debt secured by assets does not include amounts related to hybrid instruments.

(c) Included \$37.7 billion and \$33.1 billion of long-term debt accounted for at fair value at December 31, 2016 and 2015, respectively.

(d) Included \$7.5 billion and \$5.5 billion of outstanding zero-coupon notes at December 31, 2016 and 2015, respectively. The aggregate principal amount of these notes at their respective maturities is \$25.1 billion and \$16.2 billion, respectively. The aggregate principal amount reflects the contractual principal payment at maturity, which may exceed the contractual principal payment at the Firm's next call date, if applicable.

(e) Included on the Consolidated balance sheets in beneficial interests issued by consolidated VIEs. Also included \$120 million and \$787 million accounted for at fair value at December 31, 2016 and 2015, respectively. Excluded short-term commercial paper and other short-term beneficial interests of \$5.7 billion and \$11.3 billion at December 31, 2016 and 2015, respectively.

(f) At December 31, 2016, long-term debt in the aggregate of \$81.8 billion was redeemable at the option of JPMorgan Chase, in whole or in part, prior to maturity, based on the terms specified in the respective instruments.

(g) The aggregate carrying values of debt that matures in each of the five years subsequent to 2016 is \$46.7 billion in 2017, \$49.4 billion in 2018, \$32.2 billion in 2019, \$33.8 billion in 2020 and \$30.6 billion in 2021.

Notes to consolidated financial statements

The weighted-average contractual interest rates for total long-term debt excluding structured notes accounted for at fair value were 2.49% and 2.34% as of December 31, 2016 and 2015, respectively. In order to modify exposure to interest rate and currency exchange rate movements, JPMorgan Chase utilizes derivative instruments, primarily interest rate and cross-currency interest rate swaps, in conjunction with some of its debt issues. The use of these instruments modifies the Firm's interest expense on the associated debt. The modified weighted-average interest rates for total long-term debt, including the effects of related derivative instruments, were 2.01% and 1.64% as of December 31, 2016 and 2015, respectively.

JPMorgan Chase & Co. has guaranteed certain long-term debt of its subsidiaries, including both long-term debt and structured notes. These guarantees rank on parity with the Firm's other unsecured and unsubordinated indebtedness. The amount of such guaranteed long-term debt and structured notes was \$3.9 billion and \$152 million at December 31, 2016 and 2015, respectively.

The Firm's unsecured debt does not contain requirements that would call for an acceleration of payments, maturities or changes in the structure of the existing debt, provide any limitations on future borrowings or require additional collateral, based on unfavorable changes in the Firm's credit ratings, financial ratios, earnings or stock price.

Junior subordinated deferrable interest debentures held by trusts that issued guaranteed capital debt securities

At December 31, 2016, the Firm had outstanding eight wholly-owned Delaware statutory business trusts ("issuer trusts") that had issued trust preferred securities.

The junior subordinated deferrable interest debentures issued by the Firm to the issuer trusts, totaling \$2.3 billion and \$4.0 billion at December 31, 2016 and 2015, respectively, were reflected on the Firm's Consolidated balance sheets in long-term debt, and in the table on the preceding page under the caption "Junior subordinated debt." The Firm also records the common capital securities issued by the issuer trusts in other assets in its Consolidated balance sheets at December 31, 2016 and 2015. Beginning in 2014, the debentures issued to the issuer trusts by the Firm, less the common capital securities of the issuer trusts, began being phased out from inclusion as Tier 1 capital under Basel III and they were fully phased out as of December 31, 2016. As of December 31, 2015, \$992 million of these debentures qualified as Tier 1 capital. As of December 31, 2016 and 2015, \$1.4 billion and \$3.0 billion, respectively, qualified as Tier 2 capital.

The Firm redeemed \$1.6 billion and \$1.5 billion of trust preferred securities in the years ended December 31, 2016 and 2015, respectively.

Note 22 – Preferred stock

At December 31, 2016 and 2015, JPMorgan Chase was authorized to issue 200 million shares of preferred stock, in one or more series, with a par value of \$1 per share.

In the event of a liquidation or dissolution of the Firm, JPMorgan Chase's preferred stock then outstanding takes precedence over the Firm's common stock with respect to the payment of dividends and the distribution of assets.

The following is a summary of JPMorgan Chase's non-cumulative preferred stock outstanding as of December 31, 2016 and 2015.

	Shares at December 31, 2016 and 2015(a)	Carrying value at December 31, 2016 and 2015 (in millions)	Issue date	Contractual rate in effect at December 31, 2016	Earliest redemption date	Date at which dividend rate becomes floating	Floating annual rate of three-month LIBOR plus:
Fixed-rate:							
Series O	125,750	\$ 1,258	8/27/2012	5.500%	9/1/2017	NA	NA
Series P	90,000	900	2/5/2013	5.450	3/1/2018	NA	NA
Series T	92,500	925	1/30/2014	6.700	3/1/2019	NA	NA
Series W	88,000	880	6/23/2014	6.300	9/1/2019	NA	NA
Series Y	143,000	1,430	2/12/2015	6.125	3/1/2020	NA	NA
Series AA	142,500	1,425	6/4/2015	6.100	9/1/2020	NA	NA
Series BB	115,000	1,150	7/29/2015	6.150	9/1/2020	NA	NA
Fixed-to-floating-rate:							
Series I	600,000	6,000	4/23/2008	7.900%	4/30/2018	4/30/2018	LIBOR + 3.47%
Series Q	150,000	1,500	4/23/2013	5.150	5/1/2023	5/1/2023	LIBOR + 3.25
Series R	150,000	1,500	7/29/2013	6.000	8/1/2023	8/1/2023	LIBOR + 3.30
Series S	200,000	2,000	1/22/2014	6.750	2/1/2024	2/1/2024	LIBOR + 3.78
Series U	100,000	1,000	3/10/2014	6.125	4/30/2024	4/30/2024	LIBOR + 3.33
Series V	250,000	2,500	6/9/2014	5.000	7/1/2019	7/1/2019	LIBOR + 3.32
Series X	160,000	1,600	9/23/2014	6.100	10/1/2024	10/1/2024	LIBOR + 3.33
Series Z	200,000	2,000	4/21/2015	5.300	5/1/2020	5/1/2020	LIBOR + 3.80
Total preferred stock	2,606,750	\$ 26,068					

(a) Represented by depositary shares.

Each series of preferred stock has a liquidation value and redemption price per share of \$10,000, plus accrued but unpaid dividends.

Dividends on fixed-rate preferred stock are payable quarterly. Dividends on fixed-to-floating-rate preferred stock are payable semiannually while at a fixed rate, and become payable quarterly after converting to a floating rate.

Redemption rights

Each series of the Firm's preferred stock may be redeemed on any dividend payment date on or after the earliest redemption date for that series. All outstanding preferred stock series except Series I may also be redeemed following a "capital treatment event", as described in the terms of each series. Any redemption of the Firm's preferred stock is subject to non-objection from the Board of Governors of the Federal Reserve System (the "Federal Reserve").

Note 23 – Common stock

At December 31, 2016 and 2015, JPMorgan Chase was authorized to issue 9.0 billion shares of common stock with a par value of \$1 per share.

Common shares issued (newly issued or distributed from treasury) by JPMorgan Chase during the years ended December 31, 2016, 2015 and 2014 were as follows.

Year ended December 31, (in millions)	2016	2015	2014
Total issued – balance at January 1	4,104.9	4,104.9	4,104.9
Treasury – balance at January 1	(441.4)	(390.1)	(348.8)
Purchase of treasury stock	(140.4)	(89.8)	(82.3)
Issued from treasury:			
Employee benefits and compensation plans	26.0	32.8	39.8
Warrant exercise	11.1	4.7	—
Employee stock purchase plans	1.0	1.0	1.2
Total issued from treasury	38.1	38.5	41.0
Total treasury – balance at December 31	(543.7)	(441.4)	(390.1)
Outstanding at December 31	3,561.2	3,663.5	3,714.8

Notes to consolidated financial statements

At December 31, 2016, 2015, and 2014, respectively, the Firm had 24.9 million, 47.4 million and 59.8 million warrants outstanding to purchase shares of common stock (the “Warrants”). The Warrants are currently traded on the New York Stock Exchange, and they are exercisable, in whole or in part, at any time and from time to time until October 28, 2018. The original warrant exercise price was \$42.42 per share. The number of shares issuable upon the exercise of each warrant and the warrant exercise price is subject to adjustment upon the occurrence of certain events, including, but not limited to, the extent to which regular quarterly cash dividends exceed \$0.38 per share. As a result of the Firm’s quarterly common stock dividend exceeding \$0.38 per share commencing with the second quarter of 2014, the exercise price of the Warrants has been adjusted each subsequent quarter. As of December 31, 2016 the exercise price was \$42.073 and the Warrant share number was 1.01.

On June 29, 2016, in conjunction with the Federal Reserve’s release of its 2016 CCAR results, the Firm’s Board of Directors authorized a \$10.6 billion common equity (i.e., common stock and warrants) repurchase program. As of December 31, 2016, \$6.1 billion (on a settlement-date basis) of authorized repurchase capacity remained under the program. This authorization includes shares repurchased to offset issuances under the Firm’s equity-based compensation plans.

The following table sets forth the Firm’s repurchases of common equity for the years ended December 31, 2016, 2015 and 2014, on a settlement-date basis. There were no warrants repurchased during the years ended December 31, 2016, 2015 and 2014.

Year ended December 31, (in millions)	2016	2015	2014
Total number of shares of common stock repurchased	140.4	89.8	82.3
Aggregate purchase price of common stock repurchases	\$ 9,082	\$ 5,616	\$ 4,760

The Firm may, from time to time, enter into written trading plans under Rule 10b5-1 of the Securities Exchange Act of 1934 to facilitate repurchases in accordance with the common equity repurchase program. A Rule 10b5-1 repurchase plan allows the Firm to repurchase its equity during periods when it would not otherwise be repurchasing common equity — for example, during internal trading “blackout periods.” All purchases under a Rule 10b5-1 plan must be made according to a predefined plan established when the Firm is not aware of material nonpublic information. For additional information regarding repurchases of the Firm’s equity securities, see Part II, Item 5: Market for registrant’s common equity, related stockholder matters and issuer purchases of equity securities, on page 22.

As of December 31, 2016, approximately 154 million shares of common stock were reserved for issuance under various employee incentive, compensation, option and stock purchase plans, director compensation plans, and the Warrants.

Note 24 – Earnings per share

Earnings per share (“EPS”) is calculated under the two-class method under which all earnings (distributed and undistributed) are allocated to each class of common stock and participating securities based on their respective rights to receive dividends. JPMorgan Chase grants restricted stock and RSUs to certain employees under its stock-based compensation programs, which entitle recipients to receive nonforfeitable dividends during the vesting period on a basis equivalent to the dividends paid to holders of common stock; these unvested awards meet the definition of participating securities.

The following table presents the calculation of basic and diluted EPS for the years ended December 31, 2016, 2015 and 2014.

Year ended December 31, (in millions, except per share amounts)	2016	2015	2014
Basic earnings per share			
Net income	\$ 24,733	\$ 24,442	\$ 21,745
Less: Preferred stock dividends	1,647	1,515	1,125
Net income applicable to common equity	23,086	22,927	20,620
Less: Dividends and undistributed earnings allocated to participating securities	503	521	543
Net income applicable to common stockholders	\$ 22,583	\$ 22,406	\$ 20,077
Total weighted-average basic shares outstanding			
	3,618.5	3,700.4	3,763.5
Net income per share	\$ 6.24	\$ 6.05	\$ 5.33
Diluted earnings per share			
Net income applicable to common stockholders	\$ 22,583	\$ 22,406	\$ 20,077
Total weighted-average basic shares outstanding			
	3,618.5	3,700.4	3,763.5
Add: Employee stock options, SARs, warrants and PSUs(a)	31.3	32.4	34.0
Total weighted-average diluted shares outstanding(b)	3,649.8	3,732.8	3,797.5
Net income per share	\$ 6.19	\$ 6.00	\$ 5.29

- (a) Excluded from the computation of diluted EPS (due to the antidilutive effect) were certain options issued under employee benefit plans. The aggregate number of shares issuable upon the exercise of such options was not material for the years ended December 31, 2016 and 2015 and were 1 million for the year ended December 31, 2014.
- (b) Participating securities were included in the calculation of diluted EPS using the two-class method, as this computation was more dilutive than the calculation using the treasury stock method.

Note 25 – Accumulated other comprehensive income/(loss)

AOCI includes the after-tax change in unrealized gains and losses on investment securities, foreign currency translation adjustments (including the impact of related derivatives), cash flow hedging activities, and net loss and prior service costs/(credit) related to the Firm's defined benefit pension and OPEB plans.

Effective January 1, 2016, the Firm adopted new accounting guidance related to the recognition and measurement of financial liabilities where the fair value option has been elected. This guidance requires the portion of the total change in fair value caused by changes in the Firm's own credit risk ("DVA") to be presented separately in OCI; previously these amounts were recognized in net income. The guidance was required to be applied as of the beginning of the fiscal year of adoption by means of a cumulative effect adjustment to the Consolidated balance sheets, which resulted in a reclassification from retained earnings to AOCI.

Year ended December 31, (in millions)	Unrealized gains/(losses) on investment securities ^(a)	Translation adjustments, net of hedges	Cash flow hedges	Defined benefit pension and OPEB plans	DVA on fair value option elected liabilities	Accumulated other comprehensive income/(loss)
Balance at December 31, 2013	\$ 2,798	\$ (136)	\$ (139)	\$ (1,324)	NA	\$ 1,199
Net change	1,975	(11)	44	(1,018)	NA	990
Balance at December 31, 2014	\$ 4,773	\$ (147)	\$ (95)	\$ (2,342)	NA	\$ 2,189
Net change	(2,144)	(15)	51	111	NA	(1,997)
Balance at December 31, 2015	\$ 2,629	\$ (162)	\$ (44)	\$ (2,231)	NA	\$ 192
Cumulative effect of change in accounting principle	—	—	—	—	154	154
Net change	(1,105)	(2)	(56)	(28)	(330)	(1,521)
Balance at December 31, 2016	\$ 1,524	\$ (164)	\$ (100)	\$ (2,259)	(176)	\$ (1,175)

(a) Represents the after-tax difference between the fair value and amortized cost of securities accounted for as AFS, including net unamortized unrealized gains and losses related to AFS securities transferred to HTM.

The following table presents the pre-tax and after-tax changes in the components of OCI.

Year ended December 31, (in millions)	2016			2015			2014		
	Pre-tax	Tax effect	After-tax	Pre-tax	Tax effect	After-tax	Pre-tax	Tax effect	After-tax
Unrealized gains/(losses) on investment securities:									
Net unrealized gains/(losses) arising during the period	\$ (1,628)	\$ 611	\$ (1,017)	\$ (3,315)	\$ 1,297	\$ (2,018)	\$ 3,193	\$ (1,170)	\$ 2,023
Reclassification adjustment for realized (gains)/losses included in net income ^(a)	(141)	53	(88)	(202)	76	(126)	(77)	29	(48)
Net change	(1,769)	664	(1,105)	(3,517)	1,373	(2,144)	3,116	(1,141)	1,975
Translation adjustments:									
Translation ^(b)	(261)	99	(162)	(1,876)	682	(1,194)	(1,638)	588	(1,050)
Hedges ^(b)	262	(102)	160	1,885	(706)	1,179	1,698	(659)	1,039
Net change	1	(3)	(2)	9	(24)	(15)	60	(71)	(11)
Cash flow hedges:									
Net unrealized gains/(losses) arising during the period	(450)	168	(282)	(97)	35	(62)	98	(39)	59
Reclassification adjustment for realized (gains)/losses included in net income ^{(c)(d)}	360	(134)	226	180	(67)	113	(24)	9	(15)
Net change	(90)	34	(56)	83	(32)	51	74	(30)	44
Defined benefit pension and OPEB plans:									
Prior service credits arising during the period	—	—	—	—	—	—	(53)	21	(32)
Net gains/(losses) arising during the period	(366)	145	(221)	29	(47)	(18)	(1,697)	688	(1,009)
Reclassification adjustments included in net income ^(e) :									
Amortization of net loss	257	(97)	160	282	(106)	176	72	(29)	43
Prior service costs/(credits)	(36)	14	(22)	(36)	14	(22)	(44)	17	(27)
Settlement loss/(gain)	4	(1)	3	—	—	—	—	—	—
Foreign exchange and other	77	(25)	52	33	(58)	(25)	39	(32)	7
Net change	(64)	36	(28)	308	(197)	111	(1,683)	665	(1,018)
DVA on fair value option elected liabilities, net change:	\$ (529)	\$ 199	\$ (330)	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —
Total other comprehensive income/(loss)	\$ (2,451)	\$ 930	\$ (1,521)	\$ (3,117)	\$ 1,120	\$ (1,997)	\$ 1,567	\$ (577)	\$ 990

(a) The pre-tax amount is reported in securities gains in the Consolidated statements of income.

(b) Reclassifications of pre-tax realized gains/(losses) on translation adjustments and related hedges are reported in other income/expense in the Consolidated statements of income. The amounts were not material for the periods presented.

(c) The pre-tax amounts are predominantly recorded in net interest income in the Consolidated statements of income.

(d) In 2015, the Firm reclassified approximately \$150 million of net losses from AOCI to other income because the Firm determined that it is probable that the forecasted interest payment cash flows will not occur. For additional information, see Note 6.

(e) The pre-tax amount is reported in compensation expense in the Consolidated statements of income.

Note 26 – Income taxes

JPMorgan Chase and its eligible subsidiaries file a consolidated U.S. federal income tax return. JPMorgan Chase uses the asset and liability method to provide income taxes on all transactions recorded in the Consolidated Financial Statements. This method requires that income taxes reflect the expected future tax consequences of temporary differences between the carrying amounts of assets or liabilities for book and tax purposes. Accordingly, a deferred tax asset or liability for each temporary difference is determined based on the tax rates that the Firm expects to be in effect when the underlying items of income and expense are realized. JPMorgan Chase's expense for income taxes includes the current and deferred portions of that expense. A valuation allowance is established to reduce deferred tax assets to the amount the Firm expects to realize.

Due to the inherent complexities arising from the nature of the Firm's businesses, and from conducting business and being taxed in a substantial number of jurisdictions, significant judgments and estimates are required to be made. Agreement of tax liabilities between JPMorgan Chase and the many tax jurisdictions in which the Firm files tax returns may not be finalized for several years. Thus, the Firm's final tax-related assets and liabilities may ultimately be different from those currently reported.

Effective tax rate and expense

A reconciliation of the applicable statutory U.S. income tax rate to the effective tax rate for each of the years ended December 31, 2016, 2015 and 2014, is presented in the following table.

Effective tax rate

Year ended December 31,	2016	2015	2014
Statutory U.S. federal tax rate	35.0 %	35.0 %	35.0 %
Increase/(decrease) in tax rate resulting from:			
U.S. state and local income taxes, net of U.S. federal income tax benefit	2.4	1.5	2.7
Tax-exempt income	(3.1)	(3.3)	(3.1)
Non-U.S. subsidiary earnings(a)	(1.7)	(3.9)	(2.0)
Business tax credits	(3.9)	(3.7)	(3.3)
Nondeductible legal expense	0.3	0.8	2.3
Tax audit resolutions	—	(5.7)	(1.4)
Other, net	(0.6)	(0.3)	(1.0)
Effective tax rate	28.4 %	20.4 %	29.2 %

(a) Predominantly includes earnings of U.K. subsidiaries that are deemed to be reinvested indefinitely.

The components of income tax expense/(benefit) included in the Consolidated statements of income were as follows for each of the years ended December 31, 2016, 2015, and 2014.

Income tax expense/(benefit)

Year ended December 31, (in millions)	2016	2015	2014
Current income tax expense/(benefit)			
U.S. federal	\$ 2,488	\$ 3,160	\$ 2,382
Non-U.S.	1,760	1,220	1,353
U.S. state and local	904	547	857
Total current income tax expense/(benefit)	5,152	4,927	4,592
Deferred income tax expense/(benefit)			
U.S. federal	4,364	1,213	3,890
Non-U.S.	(73)	(95)	71
U.S. state and local	360	215	401
Total deferred income tax expense/(benefit)	4,651	1,333	4,362
Total income tax expense	\$ 9,803	\$ 6,260	\$ 8,954

Total income tax expense includes \$55 million, \$2.4 billion and \$451 million of tax benefits recorded in 2016, 2015, and 2014, respectively, as a result of tax audit resolutions.

Tax effect of items recorded in stockholders' equity

The preceding table does not reflect the tax effect of certain items that are recorded each period directly in stockholders' equity. The tax effect of all items recorded directly to stockholders' equity resulted in an increase of \$925 million in 2016, an increase of \$1.5 billion in 2015, and a decrease of \$140 million in 2014. Effective January 1, 2016, the Firm adopted new accounting guidance related to employee share-based payments. As a result of the adoption of this new guidance, all excess tax benefits (including tax benefits from dividends or dividend equivalents) on share-based payment awards are recognized within income tax expense in the Consolidated statements of income. In prior years these tax benefits were recorded as increases to additional paid-in capital.

Results from Non-U.S. earnings

The following table presents the U.S. and non-U.S. components of income before income tax expense for the years ended December 31, 2016, 2015 and 2014.

Year ended December 31, (in millions)	2016	2015	2014
U.S.	\$ 26,651	\$ 23,191	\$ 23,422
Non-U.S.(a)	7,885	7,511	7,277
Income before income tax expense	\$ 34,536	\$ 30,702	\$ 30,699

(a) For purposes of this table, non-U.S. income is defined as income generated from operations located outside the U.S.

U.S. federal income taxes have not been provided on the undistributed earnings of certain non-U.S. subsidiaries, to the extent that such earnings have been reinvested abroad for an indefinite period of time. Based on JPMorgan Chase's

ongoing review of the business requirements and capital needs of its non-U.S. subsidiaries, combined with the formation of specific strategies and steps taken to fulfill these requirements and needs, the Firm has determined that the undistributed earnings of certain of its subsidiaries would be indefinitely reinvested to fund current and future growth of the related businesses. As management does not intend to use the earnings of these subsidiaries as a source of funding for its U.S. operations, such earnings will not be distributed to the U.S. in the foreseeable future. For 2016, pretax earnings of \$3.8 billion were generated and will be indefinitely reinvested in these subsidiaries. At December 31, 2016, the cumulative amount of undistributed pretax earnings in these subsidiaries were \$38.4 billion. If the Firm were to record a deferred tax liability associated with these undistributed earnings, the amount would be \$8.8 billion at December 31, 2016.

These undistributed earnings are related to subsidiaries located predominantly in the U.K. where the 2016 tax rate was 28%.

Affordable housing tax credits

The Firm recognized \$1.7 billion, \$1.6 billion and \$1.6 billion of tax credits and other tax benefits associated with investments in affordable housing projects within income tax expense for the years 2016, 2015 and 2014, respectively. The amount of amortization of such investments reported in income tax expense under the current period presentation during these years was \$1.2 billion, \$1.1 billion and \$1.1 billion, respectively. The carrying value of these investments, which are reported in other assets on the Firm's Consolidated balance sheets, was \$8.8 billion and \$7.7 billion at December 31, 2016 and 2015, respectively. The amount of commitments related to these investments, which are reported in accounts payable and other liabilities on the Firm's Consolidated balance sheets, was \$2.8 billion and \$2.0 billion at December 31, 2016 and 2015, respectively.

Deferred taxes

Deferred income tax expense/(benefit) results from differences between assets and liabilities measured for financial reporting purposes versus income tax return purposes. Deferred tax assets are recognized if, in management's judgment, their realizability is determined to be more likely than not. If a deferred tax asset is determined to be unrealizable, a valuation allowance is established. The significant components of deferred tax assets and liabilities are reflected in the following table as of December 31, 2016 and 2015.

December 31, (in millions)	2016	2015
Deferred tax assets		
Allowance for loan losses	\$ 5,534	\$ 5,343
Employee benefits	2,911	2,972
Accrued expenses and other	6,831	7,299
Non-U.S. operations	5,368	5,365
Tax attribute carryforwards	2,155	2,602
Gross deferred tax assets	22,799	23,581
Valuation allowance	(785)	(735)
Deferred tax assets, net of valuation allowance	\$ 22,014	\$ 22,846
Deferred tax liabilities		
Depreciation and amortization	\$ 3,294	\$ 3,167
Mortgage servicing rights, net of hedges	4,807	4,968
Leasing transactions	4,053	3,042
Non-U.S. operations	4,572	4,285
Other, net	5,493	4,419
Gross deferred tax liabilities	22,219	19,881
Net deferred tax (liabilities)/assets	\$ (205)	\$ 2,965

JPMorgan Chase has recorded deferred tax assets of \$2.2 billion at December 31, 2016, in connection with U.S. federal and non-U.S. NOL carryforwards and foreign tax credit carryforwards. At December 31, 2016, total U.S. federal NOL carryforwards were approximately \$3.8 billion and non-U.S. NOL carryforwards were \$142 million. If not utilized, the U.S. federal NOL carryforwards will expire between 2025 and 2036 and the non-U.S. NOL carryforwards will expire in 2017. Foreign tax credit carryforwards were \$776 million and will expire between 2022 and 2026.

The valuation allowance at December 31, 2016, was due to losses associated with non-U.S. subsidiaries.

Notes to consolidated financial statements

Unrecognized tax benefits

At December 31, 2016, 2015 and 2014, JPMorgan Chase's unrecognized tax benefits, excluding related interest expense and penalties, were \$3.5 billion, \$3.5 billion and \$4.9 billion, respectively, of which \$2.6 billion, \$2.1 billion and \$3.5 billion, respectively, if recognized, would reduce the annual effective tax rate. Included in the amount of unrecognized tax benefits are certain items that would not affect the effective tax rate if they were recognized in the Consolidated statements of income. These unrecognized items include the tax effect of certain temporary differences, the portion of gross state and local unrecognized tax benefits that would be offset by the benefit from associated U.S. federal income tax deductions, and the portion of gross non-U.S. unrecognized tax benefits that would have offsets in other jurisdictions. JPMorgan Chase is presently under audit by a number of taxing authorities, most notably by the Internal Revenue Service as summarized in the Tax examination status table below. As JPMorgan Chase is presently under audit by a number of taxing authorities, it is reasonably possible that over the next 12 months the resolution of these examinations may increase or decrease the gross balance of unrecognized tax benefits by as much as \$800 million. Upon settlement of an audit, the change in the unrecognized tax benefit would result from payment or income statement recognition.

The following table presents a reconciliation of the beginning and ending amount of unrecognized tax benefits for the years ended December 31, 2016, 2015 and 2014.

Year ended December 31, (in millions)	2016	2015	2014
Balance at January 1,	\$ 3,497	\$ 4,911	\$ 5,535
Increases based on tax positions related to the current period	262	408	810
Increases based on tax positions related to prior periods	583	1,028	477
Decreases based on tax positions related to prior periods	(785)	(2,646)	(1,902)
Decreases related to cash settlements with taxing authorities	(56)	(204)	(9)
Decreases related to a lapse of applicable statute of limitations	(51)	—	—
Balance at December 31,	\$ 3,450	\$ 3,497	\$ 4,911

After-tax interest expense/(benefit) and penalties related to income tax liabilities recognized in income tax expense were \$86 million, \$(156) million and \$17 million in 2016, 2015 and 2014, respectively.

At December 31, 2016 and 2015, in addition to the liability for unrecognized tax benefits, the Firm had accrued \$687 million and \$578 million, respectively, for income tax-related interest and penalties.

Tax examination status

JPMorgan Chase is continually under examination by the Internal Revenue Service, by taxing authorities throughout the world, and by many state and local jurisdictions throughout the U.S. The following table summarizes the status of significant income tax examinations of JPMorgan Chase and its consolidated subsidiaries as of December 31, 2016.

December 31, 2016	Periods under examination	Status
JPMorgan Chase – U.S.	2003 – 2005	At Appellate level
JPMorgan Chase – U.S.	2006 – 2010	Field examination of amended returns; certain matters at Appellate level
JPMorgan Chase – U.S.	2011 – 2013	Field Examination
JPMorgan Chase – New York State	2008 – 2011	Field Examination
JPMorgan Chase – New York City	2008 – 2011	Field Examination
JPMorgan Chase – California	2011 – 2012	Field Examination
JPMorgan Chase – U.K.	2006 – 2014	Field examination of certain select entities

Note 27 – Restrictions on cash and intercompany funds transfers

The business of JPMorgan Chase Bank, National Association (“JPMorgan Chase Bank, N.A.”) is subject to examination and regulation by the OCC. The Bank is a member of the U.S. Federal Reserve System, and its deposits in the U.S. are insured by the FDIC, subject to applicable limits.

The Federal Reserve requires depository institutions to maintain cash reserves with a Federal Reserve Bank. The average required amount of reserve balances deposited by the Firm’s bank subsidiaries with various Federal Reserve Banks was approximately \$19.3 billion and \$14.4 billion in 2016 and 2015, respectively.

Restrictions imposed by U.S. federal law prohibit JPMorgan Chase & Co. (“Parent Company”) and certain of its affiliates from borrowing from banking subsidiaries unless the loans are secured in specified amounts. Such secured loans provided by any banking subsidiary to the Parent Company or to any particular affiliate, together with certain other transactions with such affiliate, (collectively referred to as “covered transactions”), are generally limited to 10% of the banking subsidiary’s total capital, as determined by the risk-based capital guidelines; the aggregate amount of covered transactions between any banking subsidiary and all of its affiliates is limited to 20% of the banking subsidiary’s total capital.

Prior to the establishment of the IHC in the fourth quarter of 2016, the principal sources of the Parent Company’s income were dividends and interest from the various bank and non-bank subsidiaries of the Firm; the principal source of the Parent Company’s income, commencing with the fourth quarter, will be dividends from the IHC and JPMorgan Chase Bank, N.A., the two principal subsidiaries of the Parent Company. In addition to dividend restrictions set forth in statutes and regulations, the Federal Reserve, the OCC and the FDIC have authority under the Financial Institutions Supervisory Act to prohibit or to limit the payment of dividends by the banking organizations they supervise, including JPMorgan Chase and its subsidiaries that are banks or bank holding companies, if, in the banking regulator’s opinion, payment of a dividend would constitute an unsafe or unsound practice in light of the financial condition of the banking organization.

At January 1, 2017, JPMorgan Chase’s banking subsidiaries could pay, in the aggregate, approximately \$20 billion in dividends to their respective bank holding companies without the prior approval of their relevant banking regulators. The capacity to pay dividends in 2017 will be supplemented by the banking subsidiaries’ earnings during the year.

In compliance with rules and regulations established by U.S. and non-U.S. regulators, as of December 31, 2016 and 2015, cash in the amount of \$13.4 billion and \$13.2 billion, respectively, were segregated in special bank accounts for the benefit of securities and futures brokerage customers. Also, as of December 31, 2016 and 2015, the Firm had receivables within other assets of \$16.1 billion

and \$15.6 billion, respectively, consisting of cash deposited with clearing organizations for the benefit of customers. Securities with a fair value of \$19.3 billion and \$20.0 billion, respectively, were also restricted in relation to customer activity. In addition, as of December 31, 2016 and 2015, the Firm had other restricted cash of \$3.6 billion and \$3.1 billion, respectively, primarily representing cash reserves held at non-U.S. central banks and held for other general purposes. Prior period amounts for segregated cash, receivables within other assets, and other restricted cash have been revised to conform with the current period presentation.

Note 28 – Regulatory capital

The Federal Reserve establishes capital requirements, including well-capitalized standards, for the consolidated financial holding company. The OCC establishes similar minimum capital requirements and standards for the Firm’s national banks, including JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A.

Capital rules under Basel III establish minimum capital ratios and overall capital adequacy standards for large and internationally active U.S. bank holding companies and banks, including the Firm and its IDI subsidiaries. Basel III presents two comprehensive methodologies for calculating RWA: a general (standardized) approach (“Basel III Standardized”) and an advanced approach (“Basel III Advanced”). Certain of the requirements of Basel III are subject to phase-in periods that began on January 1, 2014 and continue through the end of 2018 (“transitional period”).

There are three categories of risk-based capital under the Basel III Transitional rules: CET1 capital, as well as Tier 1 capital and Tier 2 capital. CET1 capital predominantly includes common stockholders’ equity (including capital for AOCI related to debt and equity securities classified as AFS as well as for defined-benefit pension and OPEB plans), less certain deductions for goodwill, MSRs and deferred tax assets that arise from NOL and tax credit carryforwards. Tier 1 capital predominantly consists of CET1 capital as well as perpetual preferred stock. Tier 2 capital includes long-term debt qualifying as Tier 2 and qualifying allowance for credit losses. Total capital is Tier 1 capital plus Tier 2 capital.

Notes to consolidated financial statements

The following tables present the regulatory capital, assets and risk-based capital ratios for JPMorgan Chase and its significant national bank subsidiaries under both Basel III Standardized Transitional and Basel III Advanced Transitional at December 31, 2016 and 2015.

JPMorgan Chase & Co.				
	Basel III Standardized Transitional		Basel III Advanced Transitional	
(in millions, except ratios)	Dec 31, 2016	Dec 31, 2015	Dec 31, 2016	Dec 31, 2015
Regulatory capital				
CET1 capital	\$ 182,967	\$ 175,398	\$ 182,967	\$ 175,398
Tier 1 capital(a)	208,112	200,482	208,112	200,482
Total capital	239,553	234,413	228,592	224,616
Assets				
Risk-weighted	1,464,981	1,465,262	1,476,915	1,485,336
Adjusted average(b)	2,484,631	2,358,471	2,484,631	2,358,471
Capital ratios(c)				
CET1	12.5%	12.0%	12.4%	11.8%
Tier 1(a)	14.2	13.7	14.1	13.5
Total	16.4	16.0	15.5	15.1
Tier 1 leverage(d)	8.4	8.5	8.4	8.5

JPMorgan Chase Bank, N.A.				
	Basel III Standardized Transitional		Basel III Advanced Transitional	
(in millions, except ratios)	Dec 31, 2016	Dec 31, 2015	Dec 31, 2016	Dec 31, 2015
Regulatory capital				
CET1 capital	\$ 179,319	\$ 168,857	\$ 179,319	\$ 168,857
Tier 1 capital(a)	179,341	169,222	179,341	169,222
Total capital	191,662	183,262	184,637	176,423
Assets				
Risk-weighted	1,293,203	1,264,056	1,262,613	1,249,607
Adjusted average(b)	2,088,851	1,910,934	2,088,851	1,910,934
Capital ratios(c)				
CET1	13.9%	13.4%	14.2%	13.5%
Tier 1(a)	13.9	13.4	14.2	13.5
Total	14.8	14.5	14.6	14.1
Tier 1 leverage(d)	8.6	8.9	8.6	8.9

Chase Bank USA, N.A.				
	Basel III Standardized Transitional		Basel III Advanced Transitional	
(in millions, except ratios)	Dec 31, 2016	Dec 31, 2015	Dec 31, 2016	Dec 31, 2015
Regulatory capital				
CET1 capital	\$ 16,784	\$ 15,419	\$ 16,784	\$ 15,419
Tier 1 capital(a)	16,784	15,419	16,784	15,419
Total capital	22,862	21,418	21,434	20,069
Assets				
Risk-weighted	112,297	105,807	186,378	181,775
Adjusted average(b)	120,304	134,152	120,304	134,152
Capital ratios(c)				
CET1	14.9%	14.6%	9.0%	8.5%
Tier 1(a)	14.9	14.6	9.0	8.5
Total	20.4	20.2	11.5	11.0
Tier 1 leverage(d)	14.0	11.5	14.0	11.5

- (a) Includes the deduction associated with the permissible holdings of covered funds (as defined by the Volcker Rule) acquired after December 31, 2013. The deduction was not material as of December 31, 2016.
- (b) Adjusted average assets, for purposes of calculating the Tier 1 leverage ratio, includes total quarterly average assets adjusted for unrealized gains/(losses) on AFS securities, less deductions for goodwill and other intangible assets, defined benefit pension plan assets, and deferred tax assets related to NOL and tax credit carryforwards.
- (c) For each of the risk-based capital ratios, the capital adequacy of the Firm and its national bank subsidiaries are evaluated against the Basel III approach, Standardized or Advanced, resulting in the lower ratio (the "Collins Floor"), as required by the Collins Amendment of the Dodd-Frank Act.
- (d) The Tier 1 leverage ratio is not a risk-based measure of capital. This ratio is calculated by dividing Tier 1 capital by adjusted average assets.
- Note: Rating agencies allow measures of capital to be adjusted upward for deferred tax liabilities, which have resulted from both non-taxable business combinations and from tax-deductible goodwill. The Firm had deferred tax liabilities resulting from non-taxable business combinations of \$83 million and \$105 million at December 31, 2016, and 2015, respectively; and deferred tax liabilities resulting from tax-deductible goodwill of \$3.1 billion and \$3.0 billion at December 31, 2016, and 2015, respectively.

Under the risk-based capital guidelines of the Federal Reserve, JPMorgan Chase is required to maintain minimum ratios of CET1, Tier 1 and Total capital to RWA, as well as a minimum leverage ratio (which is defined as Tier 1 capital divided by adjusted quarterly average assets). Failure to meet these minimum requirements could cause the Federal Reserve to take action. National bank subsidiaries also are subject to these capital requirements by their respective primary regulators.

The following table presents the minimum ratios to which the Firm and its national bank subsidiaries are subject as of December 31, 2016.

	Minimum capital ratios		Well-capitalized ratios	
	BHC(a)	IDI(b)	BHC(c)	IDI(d)
Capital ratios				
CET1	6.25%	5.125%	—%	6.5%
Tier 1	7.75	6.625	6.0	8.0
Total	9.75	8.625	10.0	10.0
Tier 1 leverage	4.0	4.0	—	5.0

Note: The ratios presented in the table above are as defined by the regulations issued by the Federal Reserve, OCC and FDIC and to which the Firm and its national bank subsidiaries are subject.

- (a) Represents the transitional minimum capital ratios applicable to the Firm under Basel III at December 31, 2016. Commencing in the first quarter of 2016, the CET1 minimum capital ratio includes 0.625% resulting from the phase in of the Firm's 2.5% capital conservation buffer, and 1.125% resulting from the phase in of the Firm's 4.5% GSIB surcharge.
- (b) Represents requirements for JPMorgan Chase's banking subsidiaries. The CET1 minimum capital ratio includes 0.625% resulting from the phase in of the 2.5% capital conservation buffer that is applicable to the banking subsidiaries. The banking subsidiaries are not subject to the GSIB surcharge.
- (c) Represents requirements for bank holding companies pursuant to regulations issued by the Federal Reserve.
- (d) Represents requirements for bank subsidiaries pursuant to regulations issued under the FDIC Improvement Act.

As of December 31, 2016 and 2015, JPMorgan Chase and all of its banking subsidiaries were well-capitalized and met all capital requirements to which each was subject.

Note 29 – Off-balance sheet lending-related financial instruments, guarantees, and other commitments

JPMorgan Chase provides lending-related financial instruments (e.g., commitments and guarantees) to meet the financing needs of its customers. The contractual amount of these financial instruments represents the maximum possible credit risk to the Firm should the counterparty draw upon the commitment or the Firm be required to fulfill its obligation under the guarantee, and should the counterparty subsequently fail to perform according to the terms of the contract. Most of these commitments and guarantees are refinanced, extended, cancelled, or expire without being drawn or a default occurring. As a result, the total contractual amount of these instruments is not, in the Firm's view, representative of its actual future credit exposure or funding requirements.

To provide for probable credit losses inherent in wholesale and certain consumer lending-commitments, an allowance for credit losses on lending-related commitments is maintained. See Note 15 for further information regarding the allowance for credit losses on lending-related commitments. The following table summarizes the contractual amounts and carrying values of off-balance sheet lending-related financial instruments, guarantees and other commitments at December 31, 2016 and 2015. The amounts in the table below for credit card and home equity lending-related commitments represent the total available credit for these products. The Firm has not experienced, and does not anticipate, that all available lines of credit for these products will be utilized at the same time. The Firm can reduce or cancel credit card lines of credit by providing the borrower notice or, in some cases as permitted by law, without notice. In addition, the Firm typically closes credit card lines when the borrower is 60 days or more past due. The Firm may reduce or close HELOCs when there are significant decreases in the value of the underlying property, or when there has been a demonstrable decline in the creditworthiness of the borrower.

Notes to consolidated financial statements

Off-balance sheet lending-related financial instruments, guarantees and other commitments

By remaining maturity at December 31, (in millions)	Contractual amount						Carrying value(g)	
	2016					2015	2016	2015
	Expires in 1 year or less	Expires after 1 year through 3 years	Expires after 3 years through 5 years	Expires after 5 years	Total	Total		
Lending-related								
Consumer, excluding credit card:								
Home equity	\$ 4,247	\$ 3,578	\$ 1,035	\$ 12,854	\$ 21,714	\$ 22,756	\$ 12	\$ —
Residential mortgage(a)	11,745	—	—	—	11,745	12,992	—	—
Auto	7,807	461	173	27	8,468	10,237	2	2
Business banking	11,485	673	122	453	12,733	12,351	12	12
Student and other	107	1	—	29	137	142	—	—
Total consumer, excluding credit card	35,391	4,713	1,330	13,363	54,797	58,478	26	14
Credit card	553,891	—	—	—	553,891	515,518	—	—
Total consumer(b)	589,282	4,713	1,330	13,363	608,688	573,996	26	14
Wholesale:								
Other unfunded commitments to extend credit(c)	69,307	116,716	135,663	6,811	328,497	323,325	905	649
Standby letters of credit and other financial guarantees(c)	15,738	12,654	6,577	978	35,947	39,133	586	548
Other letters of credit(c)	3,354	86	129	1	3,570	3,941	2	2
Total wholesale(d)	88,399	129,456	142,369	7,790	368,014	366,399	1,493	1,199
Total lending-related	\$ 677,681	\$ 134,169	\$ 143,699	\$ 21,153	\$ 976,702	\$ 940,395	\$ 1,519	\$ 1,213
Other guarantees and commitments								
Securities lending indemnification agreements and guarantees(e)	\$ 137,209	\$ —	\$ —	\$ —	\$ 137,209	\$ 183,329	\$ —	\$ —
Derivatives qualifying as guarantees	1,061	450	10,930	39,525	51,966	53,784	80	222
Unsettled reverse repurchase and securities borrowing agreements	50,722	—	—	—	50,722	42,482	—	—
Unsettled repurchase and securities lending agreements	26,948	—	—	—	26,948	21,798	—	—
Loan sale and securitization-related indemnifications:								
Mortgage repurchase liability	NA	NA	NA	NA	NA	NA	133	148
Loans sold with recourse	NA	NA	NA	NA	2,730	4,274	64	82
Other guarantees and commitments(f)	383	2,662	1,017	1,653	5,715	5,580	(118)	(94)

(a) Includes certain commitments to purchase loans from correspondents.

(b) Predominantly all consumer lending-related commitments are in the U.S.

(c) At December 31, 2016 and 2015, reflected the contractual amount net of risk participations totaling \$328 million and \$385 million, respectively, for other unfunded commitments to extend credit; \$11.1 billion and \$11.2 billion, respectively, for standby letters of credit and other financial guarantees; and \$265 million and \$341 million, respectively, for other letters of credit. In regulatory filings with the Federal Reserve these commitments are shown gross of risk participations.

(d) At December 31, 2016 and 2015, the U.S. portion of the contractual amount of total wholesale lending-related commitments was 79% and 77%, respectively.

(e) At December 31, 2016 and 2015, collateral held by the Firm in support of securities lending indemnification agreements was \$143.2 billion and \$190.6 billion, respectively. Securities lending collateral consist of primarily cash and securities issued by governments that are members of the Organisation for Economic Co-operation and Development ("OECD") and U.S. government agencies.

(f) At December 31, 2016 and 2015, included unfunded commitments of \$48 million and \$50 million, respectively, to third-party private equity funds; and \$1.0 billion and \$871 million, respectively, to other equity investments. These commitments included \$34 million and \$73 million, respectively, related to investments that are generally fair valued at net asset value as discussed in Note 3. In addition, at December 31, 2016 and 2015, included letters of credit hedged by derivative transactions and managed on a market risk basis of \$4.6 billion and \$4.6 billion, respectively.

(g) For lending-related products, the carrying value represents the allowance for lending-related commitments and the guarantee liability; for derivative-related products, the carrying value represents the fair value.

Other unfunded commitments to extend credit

Other unfunded commitments to extend credit generally consist of commitments for working capital and general corporate purposes, extensions of credit to support commercial paper facilities and bond financings in the event that those obligations cannot be remarketed to new investors, as well as committed liquidity facilities to clearing organizations. The Firm also issues commitments under multipurpose facilities which could be drawn upon in several forms, including the issuance of a standby letter of credit.

The Firm acts as a settlement and custody bank in the U.S. tri-party repurchase transaction market. In its role as settlement and custody bank, the Firm is exposed to the intra-day credit risk of its cash borrower clients, usually broker-dealers. This exposure arises under secured clearance advance facilities that the Firm extends to its clients (i.e. cash borrowers); these facilities contractually limit the Firm's intra-day credit risk to the facility amount

and must be repaid by the end of the day. As of December 31, 2016 and 2015, the secured clearance advance facility maximum outstanding commitment amount was \$2.4 billion and \$2.9 billion, respectively.

Guarantees

U.S. GAAP requires that a guarantor recognize, at the inception of a guarantee, a liability in an amount equal to the fair value of the obligation undertaken in issuing the guarantee. U.S. GAAP defines a guarantee as a contract that contingently requires the guarantor to pay a guaranteed party based upon: (a) changes in an underlying asset, liability or equity security of the guaranteed party; or (b) a third party's failure to perform under a specified agreement. The Firm considers the following off-balance sheet lending-related arrangements to be guarantees under U.S. GAAP: standby letters of credit and other financial guarantees, securities lending indemnifications, certain indemnification agreements included within third-party contractual arrangements and certain derivative contracts.

As required by U.S. GAAP, the Firm initially records guarantees at the inception date fair value of the obligation

assumed (e.g., the amount of consideration received or the net present value of the premium receivable). For certain types of guarantees, the Firm records this fair value amount in other liabilities with an offsetting entry recorded in cash (for premiums received), or other assets (for premiums receivable). Any premium receivable recorded in other assets is reduced as cash is received under the contract, and the fair value of the liability recorded at inception is amortized into income as lending and deposit-related fees over the life of the guarantee contract. For indemnifications provided in sales agreements, a portion of the sale proceeds is allocated to the guarantee, which adjusts the gain or loss that would otherwise result from the transaction. For these indemnifications, the initial liability is amortized to income as the Firm's risk is reduced (i.e., over time or when the indemnification expires). Any contingent liability that exists as a result of issuing the guarantee or indemnification is recognized when it becomes probable and reasonably estimable. The contingent portion of the liability is not recognized if the estimated amount is less than the carrying amount of the liability recognized at inception (adjusted for any amortization). The recorded amounts of the liabilities related to guarantees and indemnifications at December 31, 2016 and 2015, excluding the allowance for credit losses on lending-related commitments, are discussed below.

Standby letters of credit and other financial guarantees

Standby letters of credit and other financial guarantees are conditional lending commitments issued by the Firm to guarantee the performance of a customer to a third party under certain arrangements, such as commercial paper facilities, bond financings, acquisition financings, trade and similar transactions. The carrying values of standby and other letters of credit were \$588 million and \$550 million at December 31, 2016 and 2015, respectively, which were classified in accounts payable and other liabilities on the Consolidated balance sheets; these carrying values included \$147 million and \$123 million, respectively, for the allowance for lending-related commitments, and \$441 million and \$427 million, respectively, for the guarantee liability and corresponding asset.

The following table summarizes the types of facilities under which standby letters of credit and other letters of credit arrangements are outstanding by the ratings profiles of the Firm's customers, as of December 31, 2016 and 2015.

Standby letters of credit, other financial guarantees and other letters of credit

December 31, (in millions)	2016		2015	
	Standby letters of credit and other financial guarantees	Other letters of credit	Standby letters of credit and other financial guarantees	Other letters of credit
Investment-grade ^(a)	\$ 28,245	\$ 2,781	\$ 31,751	\$ 3,290
Noninvestment-grade ^(a)	7,702	789	7,382	651
Total contractual amount	\$ 35,947	\$ 3,570	\$ 39,133	\$ 3,941
Allowance for lending-related commitments	\$ 145	\$ 2	\$ 121	\$ 2
Guarantee liability	441	—	427	—
Total carrying value	\$ 586	\$ 2	\$ 548	\$ 2
Commitments with collateral	\$ 19,346	\$ 940	\$ 18,825	\$ 996

(a) The ratings scale is based on the Firm's internal ratings, which generally correspond to ratings as defined by S&P and Moody's.

Securities lending indemnifications

Through the Firm's securities lending program, customers' securities, via custodial and non-custodial arrangements, may be lent to third parties. As part of this program, the Firm provides an indemnification in the lending agreements which protects the lender against the failure of the borrower to return the lent securities. To minimize its liability under these indemnification agreements, the Firm obtains cash or other highly liquid collateral with a market value exceeding 100% of the value of the securities on loan from the borrower. Collateral is marked to market daily to help assure that collateralization is adequate. Additional collateral is called from the borrower if a shortfall exists, or collateral may be released to the borrower in the event of overcollateralization. If a borrower defaults, the Firm would use the collateral held to purchase replacement securities in the market or to credit the lending customer with the cash equivalent thereof.

Derivatives qualifying as guarantees

The Firm transacts certain derivative contracts that have the characteristics of a guarantee under U.S. GAAP. These contracts include written put options that require the Firm to purchase assets upon exercise by the option holder at a specified price by a specified date in the future. The Firm may enter into written put option contracts in order to meet client needs, or for other trading purposes. The terms of written put options are typically five years or less. Derivatives deemed to be guarantees also include contracts such as stable value derivatives that require the Firm to make a payment of the difference between the market value and the book value of a counterparty's reference portfolio of assets in the event that market value is less than book value and certain other conditions have been met. Stable value derivatives, commonly referred to as "stable value wraps," are transacted in order to allow investors to realize investment returns with less volatility than an unprotected portfolio and are typically longer-term or may have no stated maturity, but allow the Firm to elect to terminate the contract under certain conditions.

Derivatives deemed to be guarantees are recorded on the Consolidated balance sheets at fair value in trading assets and trading liabilities. The total notional value of the derivatives that the Firm deems to be guarantees was \$52.0 billion and \$53.8 billion at December 31, 2016 and 2015, respectively. The notional amount generally represents the Firm's maximum exposure to derivatives qualifying as guarantees. However, exposure to certain stable value contracts is contractually limited to a substantially lower percentage of the notional amount; the notional amount on these stable value contracts was \$28.7 billion and \$28.4 billion at December 31, 2016 and 2015, respectively, and the maximum exposure to loss was \$3.0 billion at both December 31, 2016 and 2015. The fair values of the contracts reflect the probability of whether the Firm will be required to perform under the contract. The fair value related to derivatives that the Firm deems to be guarantees were derivative payables of \$96 million and \$236 million and derivative receivables of \$16 million and \$14 million at December 31, 2016 and 2015, respectively. The Firm reduces exposures to these contracts by entering

into offsetting transactions, or by entering into contracts that hedge the market risk related to the derivative guarantees.

In addition to derivative contracts that meet the characteristics of a guarantee, the Firm is both a purchaser and seller of credit protection in the credit derivatives market. For a further discussion of credit derivatives, see Note 6.

Unsettled reverse repurchase and securities borrowing agreements, and unsettled repurchase and securities lending agreements

In the normal course of business, the Firm enters into reverse repurchase agreements and securities borrowing agreements, which are secured financing agreements. Such agreements settle at a future date. At settlement, these commitments result in the Firm advancing cash to and receiving securities collateral from the counterparty. The Firm also enters into repurchase agreements and securities lending agreements. At settlement, these commitments result in the Firm receiving cash from and providing securities collateral to the counterparty. These agreements generally do not meet the definition of a derivative, and therefore, are not recorded on the Consolidated balance sheets until settlement date. These agreements predominantly consist of agreements with regular-way settlement periods. For a further discussion of securities purchased under resale agreements and securities borrowed, and securities sold under repurchase agreements and securities loaned, see Note 13.

Loan sales- and securitization-related indemnifications

Mortgage repurchase liability

In connection with the Firm's mortgage loan sale and securitization activities with GSEs, as described in Note 16, the Firm has made representations and warranties that the loans sold meet certain requirements that may require the Firm to repurchase mortgage loans and/or indemnify the loan purchaser. Further, although the Firm's securitizations are predominantly nonrecourse, the Firm does provide recourse servicing in certain limited cases where it agrees to share credit risk with the owner of the mortgage loans. To the extent that repurchase demands that are received relate to loans that the Firm purchased from third parties that remain viable, the Firm typically will have the right to seek a recovery of related repurchase losses from the third party. Generally, the maximum amount of future payments the Firm would be required to make for breaches of these representations and warranties would be equal to the unpaid principal balance of such loans that are deemed to have defects that were sold to purchasers (including securitization-related SPEs) plus, in certain circumstances, accrued interest on such loans and certain expense.

Private label securitizations

The liability related to repurchase demands associated with private label securitizations is separately evaluated by the Firm in establishing its litigation reserves.

For additional information regarding litigation, see Note 31.

Loans sold with recourse

The Firm provides servicing for mortgages and certain commercial lending products on both a recourse and nonrecourse basis. In nonrecourse servicing, the principal credit risk to the Firm is the cost of temporary servicing advances of funds (i.e., normal servicing advances). In recourse servicing, the servicer agrees to share credit risk with the owner of the mortgage loans, such as Fannie Mae or Freddie Mac or a private investor, insurer or guarantor. Losses on recourse servicing predominantly occur when foreclosure sales proceeds of the property underlying a defaulted loan are less than the sum of the outstanding principal balance, plus accrued interest on the loan and the cost of holding and disposing of the underlying property. The Firm's securitizations are predominantly nonrecourse, thereby effectively transferring the risk of future credit losses to the purchaser of the mortgage-backed securities issued by the trust. At December 31, 2016 and 2015, the unpaid principal balance of loans sold with recourse totaled \$2.7 billion and \$4.3 billion, respectively. The carrying value of the related liability that the Firm has recorded, which is representative of the Firm's view of the likelihood it will have to perform under its recourse obligations, was \$64 million and \$82 million at December 31, 2016 and 2015, respectively.

Other off-balance sheet arrangements

Indemnification agreements – general

In connection with issuing securities to investors, the Firm may enter into contractual arrangements with third parties that require the Firm to make a payment to them in the event of a change in tax law or an adverse interpretation of tax law. In certain cases, the contract also may include a termination clause, which would allow the Firm to settle the contract at its fair value in lieu of making a payment under the indemnification clause. The Firm may also enter into indemnification clauses in connection with the licensing of software to clients ("software licensees") or when it sells a business or assets to a third party ("third-party purchasers"), pursuant to which it indemnifies software licensees for claims of liability or damages that may occur subsequent to the licensing of the software, or third-party purchasers for losses they may incur due to actions taken by the Firm prior to the sale of the business or assets. It is difficult to estimate the Firm's maximum exposure under these indemnification arrangements, since this would require an assessment of future changes in tax law and future claims that may be made against the Firm that have not yet occurred. However, based on historical experience, management expects the risk of loss to be remote.

Card charge-backs

Commerce Solutions, Card's merchant services business, is a global leader in payment processing and merchant acquiring.

Under the rules of Visa USA, Inc., and MasterCard International, JPMorgan Chase Bank, N.A., is primarily liable for the amount of each processed card sales transaction that is the subject of a dispute between a cardmember and a merchant. If a dispute is resolved in the cardmember's favor, Commerce Solutions will (through the cardmember's

issuing bank) credit or refund the amount to the cardmember and will charge back the transaction to the merchant. If Commerce Solutions is unable to collect the amount from the merchant, Commerce Solutions will bear the loss for the amount credited or refunded to the cardmember. Commerce Solutions mitigates this risk by withholding future settlements, retaining cash reserve accounts or by obtaining other security. However, in the unlikely event that: (1) a merchant ceases operations and is unable to deliver products, services or a refund; (2) Commerce Solutions does not have sufficient collateral from the merchant to provide customer refunds; and (3) Commerce Solutions does not have sufficient financial resources to provide customer refunds, JPMorgan Chase Bank, N.A., would recognize the loss.

Commerce Solutions incurred aggregate losses of \$85 million, \$12 million, and \$10 million on \$1,063.4 billion, \$949.3 billion, and \$847.9 billion of aggregate volume processed for the years ended December 31, 2016, 2015 and 2014, respectively. Incurred losses from merchant charge-backs are charged to other expense, with the offset recorded in a valuation allowance against accrued interest and accounts receivable on the Consolidated balance sheets. The carrying value of the valuation allowance was \$45 million and \$20 million at December 31, 2016 and 2015, respectively, which the Firm believes, based on historical experience and the collateral held by Commerce Solutions of \$125 million and \$136 million at December 31, 2016 and 2015, respectively, is representative of the payment or performance risk to the Firm related to charge-backs.

Clearing Services – Client Credit Risk

The Firm provides clearing services for clients by entering into securities purchases and sales and derivative transactions with CCPs, including ETDs such as futures and options, as well as OTC-cleared derivative contracts. As a clearing member, the Firm stands behind the performance of its clients, collects cash and securities collateral (margin) as well as any settlement amounts due from or to clients, and remits them to the relevant CCP or client in whole or part. There are two types of margin: variation margin is posted on a daily basis based on the value of clients' derivative contracts and initial margin is posted at inception of a derivative contract, generally on the basis of the potential changes in the variation margin requirement for the contract.

As clearing member, the Firm is exposed to the risk of nonperformance by its clients, but is not liable to clients for the performance of the CCPs. Where possible, the Firm seeks to mitigate its risk to the client through the collection of appropriate amounts of margin at inception and throughout the life of the transactions. The Firm can also cease providing clearing services if clients do not adhere to their obligations under the clearing agreement. In the event of nonperformance by a client, the Firm would close out the client's positions and access available margin. The CCP would utilize any margin it holds to make itself whole, with any remaining shortfalls required to be paid by the Firm as a clearing member.

Notes to consolidated financial statements

The Firm reflects its exposure to nonperformance risk of the client through the recognition of margin payables or receivables to clients and CCPs; the clients' underlying securities or derivative contracts are not reflected in the Firm's Consolidated Financial Statements.

It is difficult to estimate the Firm's maximum possible exposure through its role as a clearing member, as this would require an assessment of transactions that clients may execute in the future. However, based upon historical experience, and the credit risk mitigants available to the Firm, management believes it is unlikely that the Firm will have to make any material payments under these arrangements and the risk of loss is expected to be remote.

For information on the derivatives that the Firm executes for its own account and records in its Consolidated Financial Statements, see Note 6.

Exchange & Clearing House Memberships

The Firm is a member of several securities and derivative exchanges and clearing houses, both in the U.S. and other countries, and it provides clearing services. Membership in some of these organizations requires the Firm to pay a pro rata share of the losses incurred by the organization as a result of the default of another member. Such obligations vary with different organizations. These obligations may be limited to members who dealt with the defaulting member or to the amount (or a multiple of the amount) of the Firm's contribution to the guarantee fund maintained by a clearing house or exchange as part of the resources available to cover any losses in the event of a member default. Alternatively, these obligations may include a pro rata share of the residual losses after applying the guarantee fund. Additionally, certain clearing houses require the Firm as a member to pay a pro rata share of losses that may result from the clearing house's investment of guarantee fund contributions and initial margin, unrelated to and independent of the default of another member. Generally a payment would only be required should such losses exceed the resources of the clearing house or exchange that are contractually required to absorb the losses in the first instance. It is difficult to estimate the Firm's maximum possible exposure under these membership agreements, since this would require an assessment of future claims that may be made against the Firm that have not yet occurred. However, based on historical experience, management expects the risk of loss to be remote.

Guarantees of subsidiaries

In the normal course of business, JPMorgan Chase & Co. ("Parent Company") may provide counterparties with guarantees of certain of the trading and other obligations of its subsidiaries on a contract-by-contract basis, as negotiated with the Firm's counterparties. The obligations of the subsidiaries are included on the Firm's Consolidated balance sheets or are reflected as off-balance sheet commitments; therefore, the Parent Company has not recognized a separate liability for these guarantees. The Firm believes that the occurrence of any event that would trigger payments by the Parent Company under these guarantees is remote.

The Parent Company has guaranteed certain long-term debt and structured notes of its subsidiaries, including JPMorgan Chase Financial Company LLC ("JPMFC"), a 100%-owned finance subsidiary. All securities issued by JPMFC are fully and unconditionally guaranteed by the Parent Company. These guarantees, which rank on a parity with the Firm's unsecured and unsubordinated indebtedness, are not included in the table on page 256 of this Note. For additional information, see Note 21.

Note 30 – Commitments, pledged assets and collateral

Lease commitments

At December 31, 2016, JPMorgan Chase and its subsidiaries were obligated under a number of noncancelable operating leases for premises and equipment used primarily for banking purposes, and for energy-related tolling service agreements. Certain leases contain renewal options or escalation clauses providing for increased rental payments based on maintenance, utility and tax increases, or they require the Firm to perform restoration work on leased premises. No lease agreement imposes restrictions on the Firm's ability to pay dividends, engage in debt or equity financing transactions or enter into further lease agreements.

The following table presents required future minimum rental payments under operating leases with noncancelable lease terms that expire after December 31, 2016.

Year ended December 31, (in millions)		
	2017 \$	1,598
	2018	1,479
	2019	1,301
	2020	1,151
	2021	885
	After 2021	3,701
Total minimum payments required		10,115
Less: Sublease rentals under noncancelable subleases		(1,379)
Net minimum payment required	\$	8,736

Total rental expense was as follows.

Year ended December 31, (in millions)	2016	2015	2014
Gross rental expense	\$ 1,860	\$ 2,015	\$ 2,255
Sublease rental income	(241)	(411)	(383)
Net rental expense	\$ 1,619	\$ 1,604	\$ 1,872

Pledged assets

The Firm may pledge financial assets that it owns to maintain potential borrowing capacity with central banks and for other purposes, including to secure borrowings and public deposits, and to collateralize repurchase and other securities financing agreements, and to cover customer short sales. Certain of these pledged assets may be sold or repledged or otherwise used by the secured parties and are identified as financial instruments owned (pledged to various parties) on the Consolidated balance sheets. At December 31, 2016 and 2015, the Firm had pledged assets of \$441.9 billion and \$385.6 billion, respectively, at Federal Reserve banks and FHLBs. In addition, as of December 31, 2016 and 2015, the Firm had pledged \$53.5 billion and \$50.7 billion, respectively, of financial assets that may not be sold or repledged or otherwise used by the secured parties. Total assets pledged do not include assets of consolidated VIEs; these assets are used to settle the liabilities of those entities. See Note 16 for additional information on assets and liabilities of consolidated VIEs. For additional information on the Firm's securities financing activities and long-term debt, see Note 13 and Note 21, respectively. The significant components of the Firm's pledged assets were as follows.

December 31, (in billions)	2016	2015
Securities	\$ 101.1	\$ 124.3
Loans	374.9	298.6
Trading assets and other	153.0	144.9
Total assets pledged	\$ 629.0	\$ 567.8

Collateral

At December 31, 2016 and 2015, the Firm had accepted financial assets as collateral that it could sell or repledge, deliver or otherwise use with a fair value of approximately \$914.1 billion and \$748.5 billion, respectively. This collateral was generally obtained under resale agreements, securities borrowing agreements, customer margin loans and derivative agreements. Of the collateral received, approximately \$746.6 billion and \$580.9 billion, respectively, were sold, repledged, delivered or otherwise used. Collateral was generally used under repurchase agreements, securities lending agreements or to cover customer short sales and to collateralize deposits and derivative agreements.

Note 31 – Litigation**Contingencies**

As of December 31, 2016, the Firm and its subsidiaries and affiliates are defendants or putative defendants in numerous legal proceedings, including private, civil litigations and regulatory/government investigations. The litigations range from individual actions involving a single plaintiff to class action lawsuits with potentially millions of class members. Investigations involve both formal and informal proceedings, by both governmental agencies and self-regulatory organizations. These legal proceedings are at varying stages of adjudication, arbitration or investigation, and involve each of the Firm's lines of business and geographies and a wide variety of claims (including common law tort and contract claims and statutory antitrust, securities and consumer protection claims), some of which present novel legal theories.

The Firm believes the estimate of the aggregate range of reasonably possible losses, in excess of reserves established, for its legal proceedings is from \$0 to approximately \$3.0 billion at December 31, 2016. This estimated aggregate range of reasonably possible losses was based upon currently available information for those proceedings in which the Firm believes that an estimate of reasonably possible loss can be made. For certain matters, the Firm does not believe that such an estimate can be made, as of that date. The Firm's estimate of the aggregate range of reasonably possible losses involves significant judgment, given the number, variety and varying stages of the proceedings (including the fact that many are in preliminary stages), the existence in many such proceedings of multiple defendants (including the Firm) whose share of liability has yet to be determined, the numerous yet-unresolved issues in many of the proceedings (including issues regarding class certification and the scope of many of the claims) and the attendant uncertainty of the various potential outcomes of such proceedings, including where the Firm has made assumptions concerning future rulings by the court or other adjudicator, or about the behavior or incentives of adverse parties or regulatory authorities, and those assumptions prove to be incorrect. In addition, the outcome of a particular proceeding may be a result which the Firm did not take into account in its estimate because the Firm had deemed the likelihood of that outcome to be remote. Accordingly, the Firm's estimate of the aggregate range of reasonably possible losses will change from time to time, and actual losses may vary significantly.

Set forth below are descriptions of the Firm's material legal proceedings.

CIO Litigation. The Firm has been sued in a consolidated shareholder class action, and in a consolidated putative class action brought under the Employee Retirement Income Security Act ("ERISA"), relating to 2012 losses in the synthetic credit portfolio formerly managed by the Firm's Chief Investment Office ("CIO"). A settlement of the

shareholder class action, under which the Firm paid \$150 million, has received full and final approval from the Court. The putative ERISA class action has been dismissed. That dismissal was affirmed by the appellate court, and a request by the plaintiffs for rehearing by the full appellate court was denied.

Foreign Exchange Investigations and Litigation. The Firm previously reported settlements with certain government authorities relating to its foreign exchange ("FX") sales and trading activities and controls related to those activities. FX-related investigations and inquiries by government authorities, including competition authorities, are ongoing, and the Firm is cooperating with those matters. In May 2015, the Firm pleaded guilty to a single violation of federal antitrust law, and in January 2017, the Firm was sentenced, with judgment entered shortly thereafter. The Department of Labor granted the Firm a temporary one-year waiver, which was effective upon entry of judgment, to allow the Firm and its affiliates to continue to qualify for the Qualified Professional Asset Manager exemption under ERISA. The Firm's application for a lengthier exemption is pending. Separately, in February 2017 the South Africa Competition Commission announced that it had referred its FX investigation of the Firm and other banks to the South Africa Competition Tribunal to commence civil proceedings.

The Firm is also one of a number of foreign exchange dealers defending a class action filed in the United States District Court for the Southern District of New York by U.S.-based plaintiffs, principally alleging violations of federal antitrust laws based on an alleged conspiracy to manipulate foreign exchange rates (the "U.S. class action"). In January 2015, the Firm entered into a settlement agreement in the U.S. class action. Following this settlement, a number of additional putative class actions were filed seeking damages for persons who transacted FX futures and options on futures (the "exchanged-based actions"), consumers who purchased foreign currencies at allegedly inflated rates (the "consumer action"), participants or beneficiaries of qualified ERISA plans (the "ERISA actions"), and purported indirect purchasers of FX instruments (the "indirect purchaser action"). Since then, the Firm has entered into a revised settlement agreement to resolve the consolidated U.S. class action, including the exchange-based actions, and that agreement has been preliminarily approved by the Court. The District Court has dismissed one of the ERISA actions, and the plaintiffs have filed an appeal. The consumer action, a second ERISA action and the indirect purchaser action remain pending in the District Court.

In September 2015, two class actions were filed in Canada against the Firm as well as a number of other FX dealers, principally for alleged violations of the Canadian Competition Act based on an alleged conspiracy to fix the prices of currency purchased in the FX market. The first action was filed in the province of Ontario, and seeks to represent all persons in Canada who transacted any FX

instrument. The second action was filed in the province of Quebec, and seeks authorization to represent only those persons in Quebec who engaged in FX transactions. In late 2016, the Firm settled the Canadian class actions; those settlements are subject to Court approval.

General Motors Litigation. JPMorgan Chase Bank, N.A. participated in, and was the Administrative Agent on behalf of a syndicate of lenders on, a \$1.5 billion syndicated Term Loan facility (“Term Loan”) for General Motors Corporation (“GM”). In July 2009, in connection with the GM bankruptcy proceedings, the Official Committee of Unsecured Creditors of Motors Liquidation Company (“Creditors Committee”) filed a lawsuit against JPMorgan Chase Bank, N.A., in its individual capacity and as Administrative Agent for other lenders on the Term Loan, seeking to hold the underlying lien invalid based on the filing of a UCC-3 termination statement relating to the Term Loan. In January 2015, following several court proceedings, the United States Court of Appeals for the Second Circuit reversed the Bankruptcy Court’s dismissal of the Creditors Committee’s claim and remanded the case to the Bankruptcy Court with instructions to enter partial summary judgment for the Creditors Committee as to the termination statement. The proceedings in the Bankruptcy Court continue with respect to, among other things, additional defenses asserted by JPMorgan Chase Bank, N.A. and the value of additional collateral on the Term Loan that was unaffected by the filing of the termination statement at issue. In addition, certain Term Loan lenders filed cross-claims against JPMorgan Chase Bank, N.A. in the Bankruptcy Court seeking indemnification and asserting various claims.

Interchange Litigation. A group of merchants and retail associations filed a series of class action complaints alleging that Visa and MasterCard, as well as certain banks, conspired to set the price of credit and debit card interchange fees, enacted respective rules in violation of antitrust laws, and engaged in tying/bundling and exclusive dealing. The parties entered into an agreement to settle the cases for a cash payment of \$6.1 billion to the class plaintiffs (of which the Firm’s share is approximately 20%) and an amount equal to ten basis points of credit card interchange for a period of eight months to be measured from a date within 60 days of the end of the opt-out period. The agreement also provided for modifications to each credit card network’s rules, including those that prohibit surcharging credit card transactions. In December 2013, the District Court granted final approval of the settlement.

A number of merchants appealed to the United States Court of Appeals for the Second Circuit, which, in June 2016, vacated the District Court’s certification of the class action and reversed the approval of the class settlement. The case has been remanded to the District Court for further proceedings consistent with the appellate decision. Both the plaintiffs and the defendants have filed petitions seeking review by the U.S. Supreme Court of the Second Circuit’s decision.

In addition, certain merchants have filed individual actions against Visa and MasterCard, as well as against the Firm and other banks, and those actions are proceeding.

Investment Management Litigation. The Firm is defending two pending cases that are coordinated for pre-trial and trial purposes, alleging that investment portfolios managed by J.P. Morgan Investment Management (“JPMIM”) were inappropriately invested in securities backed by residential real estate collateral. Plaintiffs Assured Guaranty (U.K.) and Ambac Assurance UK Limited claim that JPMIM is liable for total losses of more than \$1 billion in market value of these securities. Discovery has been completed. In January 2016, plaintiffs filed a joint partial motion for summary judgment in the coordinated actions. In February 2017, the Court ruled in plaintiffs’ favor as to the interpretation of an applicable statutory provision and the rejection of a certain defense, but otherwise preserved for trial the determination of whether JPMIM breached the governing contract and is liable for plaintiffs’ claimed losses under the standard of gross negligence. The trial is scheduled to begin in March 2017.

Lehman Brothers Bankruptcy Proceedings. In January 2016, JPMorgan Chase Bank, N.A. and Lehman Brothers Holdings Inc. (“LBHI”) and several of LBHI’s subsidiaries reached an agreement, approved by the Bankruptcy Court, resolving several disputes between the parties. The January 2016 settlement did not resolve the following remaining matters: In the Bankruptcy Court proceedings, LBHI and its Official Committee of Unsecured Creditors filed an objection to the claims asserted by JPMorgan Chase Bank, N.A. against LBHI with respect to clearing advances made to Lehman Brothers Inc., principally on the grounds that the Firm had not conducted the sale of the securities collateral held for its claims in a commercially reasonable manner. LBHI also brought two claims objections relating to securities lending claims and a group of other smaller claims. In January 2017, the Firm entered into an agreement to settle all of these remaining claims, and this settlement has been approved by the Bankruptcy Court.

LIBOR and Other Benchmark Rate Investigations and Litigation. JPMorgan Chase has received subpoenas and requests for documents and, in some cases, interviews, from federal and state agencies and entities, including the U.S. Department of Justice (“DOJ”), the U.S. Commodity Futures Trading Commission (“CFTC”), the U.S. Securities and Exchange Commission (“SEC”) and various state attorneys general, as well as the European Commission (“EC”), the U.K. Financial Conduct Authority (“FCA”), the Canadian Competition Bureau, the Swiss Competition Commission (“ComCo”) and other regulatory authorities and banking associations around the world relating primarily to the process by which interest rates were submitted to the British Bankers Association (“BBA”) in connection with the setting of the BBA’s London Interbank Offered Rate (“LIBOR”) for various currencies, principally in 2007 and 2008. Some of the inquiries also relate to similar processes by which information on rates is submitted to the European

Banking Federation (“EBF”) in connection with the setting of the EBF’s Euro Interbank Offered Rates (“EURIBOR”) and to the Japanese Bankers’ Association for the setting of Tokyo Interbank Offered Rates (“TIBOR”), as well as processes for the setting of U.S. dollar ISDAFIX rates and other reference rates in various parts of the world during similar time periods. The Firm is responding to and continuing to cooperate with these inquiries. As previously reported, the Firm has resolved EC inquiries relating to Yen LIBOR and Swiss Franc LIBOR. In December 2016, the Firm resolved ComCo inquiries relating to these same rates. ComCo’s investigation relating to EURIBOR, to which the Firm and other banks are subject, continues. In December 2016, the EC issued a decision against the Firm and other banks finding an infringement of European antitrust rules relating to EURIBOR. The Firm has filed an appeal with the European General Court. In June 2016, the DOJ informed the Firm that the DOJ had closed its inquiry into LIBOR and other benchmark rates with respect to the Firm without taking action. Other inquiries have been discontinued without any action against JPMorgan Chase, including by the SEC, FCA and the Canadian Competition Bureau.

In addition, the Firm has been named as a defendant along with other banks in a series of individual and putative class actions filed in various United States District Courts. These actions have been filed, or consolidated for pre-trial purposes, in the United States District Court for the Southern District of New York. In these actions, plaintiffs make varying allegations that in various periods, starting in 2000 or later, defendants either individually or collectively manipulated the U.S. dollar LIBOR, Yen LIBOR, Swiss franc LIBOR, Euroyen TIBOR, EURIBOR, Singapore Interbank Offered Rate (“SIBOR”), Singapore Swap Offer Rate (“SOR”) and/or the Bank Bill Swap Reference Rate (“BBSW”) by submitting rates that were artificially low or high. Plaintiffs allege that they transacted in loans, derivatives or other financial instruments whose values are affected by changes in U.S. dollar LIBOR, Yen LIBOR, Swiss franc LIBOR, Euroyen TIBOR, EURIBOR, SIBOR, SOR or BBSW and assert a variety of claims including antitrust claims seeking treble damages. These matters are in various stages of litigation.

In the U.S. dollar LIBOR-related actions, the District Court dismissed certain claims, including the antitrust claims, and permitted other claims under the Commodity Exchange Act and common law to proceed. In May 2016, the United States Court of Appeals for the Second Circuit vacated the dismissal of the antitrust claims and remanded the case to the District Court to consider, among other things, whether the plaintiffs have standing to assert antitrust claims. In July 2016, JPMorgan Chase and other defendants again moved in the District Court to dismiss the antitrust claims, and in December 2016, the District Court granted in part and denied in part defendants’ motion, finding that certain plaintiffs lacked standing to assert antitrust claims. Separately, in October 2016, JPMorgan Chase and other defendants filed a petition to the U.S. Supreme Court seeking review of the Second Circuit’s decision that vacated

the dismissal of plaintiffs’ antitrust claims. That petition was denied.

The Firm is one of the defendants in a number of putative class actions alleging that defendant banks and ICAP conspired to manipulate the U.S. dollar ISDAFIX rates. Plaintiffs primarily assert claims under the federal antitrust laws and Commodity Exchange Act. In April 2016, the Firm settled the ISDAFIX litigation, along with certain other banks. Those settlements have been preliminarily approved by the Court.

Madoff Litigation. A putative class action was filed in the United States District Court for the District of New Jersey by investors who were net winners (i.e., Madoff customers who had taken more money out of their accounts than had been invested) in Madoff’s Ponzi scheme and were not included in a prior class action settlement. These plaintiffs allege violations of the federal securities law, as well as other state and federal claims. A similar action was filed in the United States District Court for the Middle District of Florida, although it was not styled as a class action, and included claims pursuant to Florida statutes. The Florida court granted the Firm’s motion to dismiss the case, and in August 2016, the United States Court of Appeals for the Eleventh Circuit affirmed the dismissal. The plaintiffs have filed a petition for writ of certiorari with the United States Supreme Court. In addition, the same plaintiffs have re-filed their dismissed state claims in Florida state court, where the Firm’s motion to dismiss is pending. The New Jersey court granted a transfer motion to the United States District Court for the Southern District of New York, which granted the Firm’s motion to dismiss, and the plaintiffs have filed an appeal of that dismissal.

Mortgage-Backed Securities and Repurchase Litigation and Related Regulatory Investigations. The Firm and affiliates (together, “JPMC”), Bear Stearns and affiliates (together, “Bear Stearns”) and certain Washington Mutual affiliates (together, “Washington Mutual”) have been named as defendants in a number of cases in their various roles in offerings of mortgage-backed securities (“MBS”). Following the settlements referred to below, the remaining civil cases include one investor action, one action by a monoline insurer relating to Bear Stearns’ role solely as underwriter, and actions for repurchase of mortgage loans. The Firm and certain of its current and former officers and Board members have also been sued in shareholder derivative actions relating to the Firm’s MBS activities, and one action remains pending.

Issuer Litigation – Individual Purchaser Actions. With the exception of one remaining action, the Firm has settled all of the individual actions brought against JPMC, Bear Stearns and Washington Mutual as MBS issuers (and, in some cases, also as underwriters of their own MBS offerings).

Underwriter Actions. The Firm is defending one remaining action by a monoline insurer relating to Bear Stearns’ role solely as underwriter for another issuer’s MBS offering. The issuer is defunct.

Repurchase Litigation. The Firm is defending a number of actions brought by trustees, securities administrators and/or master servicers of various MBS trusts on behalf of purchasers of securities issued by those trusts. These cases generally allege breaches of various representations and warranties regarding securitized loans and seek repurchase of those loans or equivalent monetary relief, as well as indemnification of attorneys' fees and costs and other remedies. The Firm has reached a settlement with Deutsche Bank National Trust Company, acting as trustee for various MBS trusts, and the Federal Deposit Insurance Corporation (the "FDIC") in connection with the litigation related to a significant number of MBS issued by Washington Mutual; that case is described in the Washington Mutual Litigations section below. Other repurchase actions, each specific to one or more MBS transactions issued by JPMC and/or Bear Stearns, are in various stages of litigation.

In addition, the Firm and a group of 21 institutional MBS investors made a binding offer to the trustees of MBS issued by JPMC and Bear Stearns providing for the payment of \$4.5 billion and the implementation of certain servicing changes by JPMC, to resolve all repurchase and servicing claims that have been asserted or could have been asserted with respect to 330 MBS trusts created between 2005 and 2008. The offer does not resolve claims relating to Washington Mutual MBS. The trustees (or separate and successor trustees) for this group of 330 trusts have accepted the settlement for 319 trusts in whole or in part and excluded from the settlement 16 trusts in whole or in part. The trustees' acceptance has received final approval from the court.

Additional actions have been filed against third-party trustees that relate to loan repurchase and servicing claims involving trusts sponsored by JPMC, Bear Stearns and Washington Mutual.

The Firm has entered into agreements with a number of MBS trustees or entities that purchased MBS that toll applicable statute of limitations periods with respect to their claims, and has settled, and in the future may settle, tolled claims. There is no assurance that the Firm will not be named as a defendant in additional MBS-related litigation.

Derivative Actions. A shareholder derivative action against the Firm, as nominal defendant, and certain of its current and former officers and members of its Board of Directors relating to the Firm's MBS activities is pending in California federal court. Defendants have filed a motion to dismiss the action.

Government Enforcement Investigations and Litigation. The Firm is responding to an ongoing investigation being conducted by the DOJ's Criminal Division and two United States Attorney's Offices relating to MBS offerings securitized and sold by the Firm and its subsidiaries.

Mortgage-Related Investigations and Litigation. In January 2017, a Consent Judgment was entered by the United States District Court for the Southern District of New York

resolving allegations by the Civil Division of the United States Attorney's Office for the Southern District of New York that the Firm violated the Fair Housing Act and Equal Credit Opportunity Act by giving pricing discretion to independent mortgage brokers in its wholesale lending distribution channel which, according to the government's model, may have charged higher fees and interest rates to African-American and Hispanic borrowers than non-Hispanic White borrowers during the period between 2006 and 2009. The Firm denied liability but agreed to pay a total of approximately \$55 million to resolve this matter. In addition, three municipalities have commenced litigation against the Firm alleging violations of an unfair competition law or the Fair Housing Act. The municipalities seek, among other things, civil penalties for the unfair competition claim, and, for the Fair Housing Act claims, damages resulting from lost tax revenue and increased municipal costs associated with foreclosed properties. The municipal actions are stayed pending an appeal by the City of Los Angeles to the United States Court of Appeals for the Ninth Circuit, as well as the United States Supreme Court's review of decisions of the United States Court of Appeals for the Eleventh Circuit which held, among other things, that the City of Miami has standing under the Fair Housing Act to pursue similar claims against other banks.

Municipal Derivatives Litigation. Several civil actions were commenced in New York and Alabama courts against the Firm relating to certain Jefferson County, Alabama (the "County") warrant underwritings and swap transactions. The claims in the civil actions generally alleged that the Firm made payments to certain third parties in exchange for being chosen to underwrite more than \$3 billion in warrants issued by the County and to act as the counterparty for certain swaps executed by the County. The County filed for bankruptcy in November 2011. In June 2013, the County filed a Chapter 9 Plan of Adjustment, as amended (the "Plan of Adjustment"), which provided that all the above-described actions against the Firm would be released and dismissed with prejudice. In November 2013, the Bankruptcy Court confirmed the Plan of Adjustment, and in December 2013, certain sewer rate payers filed an appeal challenging the confirmation of the Plan of Adjustment. All conditions to the Plan of Adjustment's effectiveness, including the dismissal of the actions against the Firm, were satisfied or waived and the transactions contemplated by the Plan of Adjustment occurred in December 2013. Accordingly, all the above-described actions against the Firm have been dismissed pursuant to the terms of the Plan of Adjustment. The appeal of the Bankruptcy Court's order confirming the Plan of Adjustment remains pending.

Petters Bankruptcy and Related Matters. JPMorgan Chase and certain of its affiliates, including One Equity Partners ("OEP"), have been named as defendants in several actions filed in connection with the receivership and bankruptcy proceedings pertaining to Thomas J. Petters and certain affiliated entities (collectively, "Petters") and the Polaroid

Corporation. The principal actions against JPMorgan Chase and its affiliates have been brought by a court-appointed receiver for Petters and the trustees in bankruptcy proceedings for three Petters entities. These actions generally seek to avoid certain putative transfers in connection with (i) the 2005 acquisition by Petters of Polaroid, which at the time was majority-owned by OEP; (ii) two credit facilities that JPMorgan Chase and other financial institutions entered into with Polaroid; and (iii) a credit line and investment accounts held by Petters. In January 2017, the Court denied the defendants' motion to dismiss an amended complaint filed by the plaintiffs.

Proprietary Products Investigations and Litigation. In December 2015, JPMorgan Chase Bank, N.A. and J.P. Morgan Securities LLC agreed to a settlement with the SEC, and JPMorgan Chase Bank, N.A. agreed to a settlement with the CFTC, regarding disclosures to clients concerning conflicts associated with the Firm's sale and use of proprietary products, such as J.P. Morgan mutual funds, in the Firm's CCB and AWM wealth management businesses, and the U.S. Private Bank's disclosures concerning the use of hedge funds that pay placement agent fees to JPMorgan Chase broker-dealer affiliates. The Firm settled with an additional government authority in July 2016, and continues to cooperate with inquiries from other government authorities concerning disclosure of conflicts associated with the Firm's sale and use of proprietary products. A putative class action, which was filed in the United States District Court for the Northern District of Illinois on behalf of financial advisory clients from 2007 to the present whose funds were invested in proprietary funds and who were charged investment management fees, was dismissed by the Court. The dismissal has been affirmed on appeal.

Referral Hiring Practices Investigations. In November 2016, the Firm entered into settlements with DOJ, the SEC and the Board of Governors of the Federal Reserve System (the "Federal Reserve") to resolve those agencies' respective investigations relating to a former hiring program for candidates referred by clients, potential clients and government officials in the Asia Pacific region. Other related investigations are ongoing, and the Firm continues to cooperate with these investigations.

Washington Mutual Litigations. Proceedings related to Washington Mutual's failure are pending before the United States District Court for the District of Columbia and include a lawsuit brought by Deutsche Bank National Trust Company, initially against the FDIC and amended to include JPMorgan Chase Bank, N.A. as a defendant, asserting an estimated \$6 billion to \$10 billion in damages based upon alleged breaches of certain representations and warranties given by certain Washington Mutual affiliates in connection with mortgage securitization agreements. The case includes assertions that JPMorgan Chase Bank, N.A. may have assumed liabilities for the alleged breaches of representations and warranties in the mortgage securitization agreements. In June 2015, the court ruled in

favor of JPMorgan Chase Bank, N.A. on the question of whether the Firm or the FDIC bears responsibility for Washington Mutual Bank's repurchase obligations, holding that JPMorgan Chase Bank, N.A. assumed only those liabilities that were reflected on Washington Mutual Bank's financial accounting records as of September 25, 2008, and only up to the amount of the book value reflected therein. The FDIC has appealed that ruling.

JPMorgan Chase has also filed complaints in the United States District Court for the District of Columbia against the FDIC, in its corporate capacity as well as in its capacity as receiver for Washington Mutual Bank, asserting multiple claims for indemnification under the terms of the Purchase & Assumption Agreement between JPMorgan Chase Bank, N.A. and the FDIC relating to JPMorgan Chase Bank, N.A.'s purchase of substantially all of the assets and certain liabilities of Washington Mutual Bank (the "Purchase & Assumption Agreement").

The Firm, Deutsche Bank National Trust Company and the FDIC have signed a settlement agreement to resolve (i) pending litigation brought by Deutsche Bank National Trust Company against the FDIC and JPMorgan Chase Bank, N.A., as defendants, relating to alleged breaches of certain representations and warranties given by certain Washington Mutual affiliates in connection with mortgage securitization agreements and (ii) JPMorgan Chase Bank, N.A.'s outstanding indemnification claims pursuant to the terms of the Purchase & Assumption Agreement. The settlement is subject to certain judicial approval procedures, and both matters are stayed pending approval of the settlement.

Wendel. Since 2012, the French criminal authorities have been investigating a series of transactions entered into by senior managers of Wendel Investissement ("Wendel") during the period from 2004 through 2007 to restructure their shareholdings in Wendel. JPMorgan Chase Bank, N.A., Paris branch provided financing for the transactions to a number of managers of Wendel in 2007. JPMorgan Chase has cooperated with the investigation. The investigating judges issued an *ordonnance de renvoi* on November 30, 2016, referring JPMorgan Chase Bank, N.A. to the French *tribunal correctionnel* for alleged complicity in tax fraud. No date for trial has been set by the court. The Firm has been successful in legal challenges made to the Court of Cassation, France's highest court, which have been referred back to and remain pending before the Paris Court of Appeal. In addition, civil proceedings have been commenced against JPMorgan Chase Bank, N.A. by a number of the managers. The claims are separate, involve different allegations and are at various stages of proceedings.

* * *

In addition to the various legal proceedings discussed above, JPMorgan Chase and its subsidiaries are named as defendants or are otherwise involved in a substantial number of other legal proceedings. The Firm believes it has meritorious defenses to the claims asserted against it in its currently outstanding legal proceedings and it intends to

defend itself vigorously in all such matters. Additional legal proceedings may be initiated from time to time in the future.

The Firm has established reserves for several hundred of its currently outstanding legal proceedings. In accordance with the provisions of U.S. GAAP for contingencies, the Firm accrues for a litigation-related liability when it is probable that such a liability has been incurred and the amount of the loss can be reasonably estimated. The Firm evaluates its outstanding legal proceedings each quarter to assess its litigation reserves, and makes adjustments in such reserves, upwards or downward, as appropriate, based on management's best judgment after consultation with counsel. During the years ended December 31, 2016, 2015 and 2014, the Firm's legal expense was a benefit of \$(317) million and an expense of \$3.0 billion and \$2.9 billion, respectively. There is no assurance that the Firm's litigation reserves will not need to be adjusted in the future.

In view of the inherent difficulty of predicting the outcome of legal proceedings, particularly where the claimants seek very large or indeterminate damages, or where the matters present novel legal theories, involve a large number of parties or are in early stages of discovery, the Firm cannot state with confidence what will be the eventual outcomes of the currently pending matters, the timing of their ultimate resolution or the eventual losses, fines, penalties or impact related to those matters. JPMorgan Chase believes, based upon its current knowledge, after consultation with counsel and after taking into account its current litigation reserves, that the legal proceedings currently pending against it should not have a material adverse effect on the Firm's consolidated financial condition. The Firm notes, however, that in light of the uncertainties involved in such proceedings, there is no assurance that the ultimate resolution of these matters will not significantly exceed the reserves it has currently accrued or that a matter will not have material reputational consequences. As a result, the outcome of a particular matter may be material to JPMorgan Chase's operating results for a particular period, depending on, among other factors, the size of the loss or liability imposed and the level of JPMorgan Chase's income for that period.

Note 32 – International operations

The following table presents income statement- and balance sheet-related information for JPMorgan Chase by major international geographic area. The Firm defines international activities for purposes of this footnote presentation as business transactions that involve clients residing outside of the U.S., and the information presented below is based predominantly on the domicile of the client, the location from which the client relationship is managed, or the location of the trading desk. However, many of the Firm's U.S. operations serve international businesses.

As the Firm's operations are highly integrated, estimates and subjective assumptions have been made to apportion revenue and expense between U.S. and international operations. These estimates and assumptions are consistent with the allocations used for the Firm's segment reporting as set forth in Note 33.

The Firm's long-lived assets for the periods presented are not considered by management to be significant in relation to total assets. The majority of the Firm's long-lived assets are located in the U.S.

As of or for the year ended December 31, (in millions)	Revenue(b)	Expense(c)	Income before income tax expense	Net income	Total assets
2016					
Europe/Middle East and Africa	\$ 13,842	\$ 8,550	\$ 5,292	\$ 3,783	\$ 394,134 (d)
Asia and Pacific	6,112	4,213	1,899	1,212	156,946
Latin America and the Caribbean	1,959	1,632	327	208	42,971
Total international	21,913	14,395	7,518	5,203	594,051
North America(a)	73,755	46,737	27,018	19,530	1,896,921
Total	\$ 95,668	\$ 61,132	\$ 34,536	\$ 24,733	\$ 2,490,972
2015					
Europe/Middle East and Africa	\$ 14,206	\$ 8,871	\$ 5,335	\$ 4,158	\$ 347,647 (d)
Asia and Pacific	6,151	4,241	1,910	1,285	138,747
Latin America and the Caribbean	1,923	1,508	415	253	48,185
Total international	22,280	14,620	7,660	5,696	534,579
North America(a)	71,263	48,221	23,042	18,746	1,817,119
Total	\$ 93,543	\$ 62,841	\$ 30,702	\$ 24,442	\$ 2,351,698
2014					
Europe/Middle East and Africa	\$ 16,013	\$ 10,123	\$ 5,890	\$ 3,935	\$ 481,328 (d)
Asia and Pacific	6,083	4,478	1,605	1,051	147,357
Latin America and the Caribbean	2,047	1,626	421	269	44,567
Total international	24,143	16,227	7,916	5,255	673,252
North America(a)	70,969	48,186	22,783	16,490	1,899,022
Total	\$ 95,112	\$ 64,413	\$ 30,699	\$ 21,745	\$ 2,572,274

(a) Substantially reflects the U.S.

(b) Revenue is composed of net interest income and noninterest revenue.

(c) Expense is composed of noninterest expense and the provision for credit losses.

(d) Total assets for the U.K. were approximately \$310 billion, \$306 billion, and \$434 billion at December 31, 2016, 2015 and 2014, respectively.

Note 33 – Business segments

The Firm is managed on a line of business basis. There are four major reportable business segments – Consumer & Community Banking, Corporate & Investment Bank, Commercial Banking and Asset & Wealth Management. In addition, there is a Corporate segment. The business segments are determined based on the products and services provided, or the type of customer served, and they reflect the manner in which financial information is currently evaluated by management. Results of these lines of business are presented on a managed basis. For a further discussion concerning JPMorgan Chase's business segments, see Segment results of this footnote.

The following is a description of each of the Firm's business segments, and the products and services they provide to their respective client bases.

Consumer & Community Banking

CCB offers services to consumers and businesses through bank branches, ATMs, online, mobile and telephone banking. CCB is organized into Consumer & Business Banking (including Consumer Banking/Chase Wealth Management and Business Banking), Mortgage Banking (including Mortgage Production, Mortgage Servicing and Real Estate Portfolios) and Card, Commerce Solutions & Auto. Consumer & Business Banking offers deposit and investment products and services to consumers, and lending, deposit, and cash management and payment solutions to small businesses. Mortgage Banking includes mortgage origination and servicing activities, as well as portfolios consisting of residential mortgages and home equity loans. Card, Commerce Solutions & Auto issues credit cards to consumers and small businesses, offers payment processing services to merchants, originates and services auto loans and leases, and services student loans.

Corporate & Investment Bank

The CIB, which consists of Banking and Markets & Investor Services, offers a broad suite of investment banking, market-making, prime brokerage, and treasury and securities products and services to a global client base of corporations, investors, financial institutions, government and municipal entities. Banking offers a full range of investment banking products and services in all major capital markets, including advising on corporate strategy and structure, capital-raising in equity and debt markets, as well as loan origination and syndication. Banking also includes Treasury Services, which provides transaction services, consisting of cash management and liquidity solutions. Markets & Investor Services is a global market-

maker in cash securities and derivative instruments, and also offers sophisticated risk management solutions, prime brokerage, and research. Markets & Investor Services also includes Securities Services, a leading global custodian that provides custody, fund accounting and administration, and securities lending products principally for asset managers, insurance companies and public and private investment funds.

Commercial Banking

CB delivers extensive industry knowledge, local expertise and dedicated service to U.S. and U.S. multinational clients, including corporations, municipalities, financial institutions and nonprofit entities with annual revenue generally ranging from \$20 million to \$2 billion. In addition, CB provides financing to real estate investors and owners. Partnering with the Firm's other businesses, CB provides comprehensive financial solutions, including lending, treasury services, investment banking and asset management to meet its clients' domestic and international financial needs.

Asset & Wealth Management

AWM, with client assets of \$2.5 trillion, is a global leader in investment and wealth management. AWM clients include institutions, high-net-worth individuals and retail investors in many major markets throughout the world. AWM offers investment management across most major asset classes including equities, fixed income, alternatives and money market funds. AWM also offers multi-asset investment management, providing solutions for a broad range of clients' investment needs. For Wealth Management clients, AWM also provides retirement products and services, brokerage and banking services, including trusts and estates, loans, mortgages and deposits. The majority of AWM's client assets are in actively managed portfolios.

Corporate

The Corporate segment consists of Treasury and CIO and Other Corporate, which includes corporate staff units and expense that is centrally managed. Treasury and CIO are predominantly responsible for measuring, monitoring, reporting and managing the Firm's liquidity, funding and structural interest rate and foreign exchange risks, as well as executing the Firm's capital plan. The major Other Corporate units include Real Estate, Enterprise Technology, Legal, Compliance, Finance, Human Resources, Internal Audit, Risk Management, Oversight & Control, Corporate Responsibility and various Other Corporate groups.

Notes to consolidated financial statements

Segment results

The following tables provide a summary of the Firm's segment results as of or for the years ended December 31, 2016, 2015 and 2014 on a managed basis. The Firm's definition of managed basis starts with the reported U.S. GAAP results and includes certain reclassifications to present total net revenue (noninterest revenue and net interest income) for each of the reportable business segments on a FTE basis. Accordingly, revenue from

investments receiving tax credits and tax-exempt securities is presented in the managed results on a basis comparable to taxable investments and securities. This allows management to assess the comparability of revenue from year-to-year arising from both taxable and tax-exempt sources. The corresponding income tax impact related to tax-exempt items is recorded within income tax expense/(benefit).

Segment results and reconciliation

As of or for the year ended December 31, (in millions, except ratios)	Consumer & Community Banking			Corporate & Investment Bank			Commercial Banking			Asset & Wealth Management		
	2016	2015	2014	2016	2015	2014	2016	2015	2014	2016	2015	2014
Noninterest revenue	\$ 15,255	\$ 15,592	\$ 15,937	\$ 24,325	\$ 23,693	\$ 23,420	\$ 2,320	\$ 2,365	\$ 2,349	\$ 9,012	\$ 9,563	\$ 9,588
Net interest income	29,660	28,228	28,431	10,891	9,849	11,175	5,133	4,520	4,533	3,033	2,556	2,440
Total net revenue	44,915	43,820	44,368	35,216	33,542	34,595	7,453	6,885	6,882	12,045	12,119	12,028
Provision for credit losses	4,494	3,059	3,520	563	332	(161)	282	442	(189)	26	4	4
Noninterest expense	24,905	24,909	25,609	18,992	21,361	23,273	2,934	2,881	2,695	8,478	8,886	8,538
Income/(loss) before income tax expense/(benefit)	15,516	15,852	15,239	15,661	11,849	11,483	4,237	3,562	4,376	3,541	3,229	3,486
Income tax expense/(benefit)	5,802	6,063	6,054	4,846	3,759	4,575	1,580	1,371	1,741	1,290	1,294	1,333
Net income/(loss)	\$ 9,714	\$ 9,789	\$ 9,185	\$ 10,815	\$ 8,090	\$ 6,908	\$ 2,657	\$ 2,191	\$ 2,635	\$ 2,251	\$ 1,935	\$ 2,153
Average common equity	\$ 51,000	\$ 51,000	\$ 51,000	\$ 64,000	\$ 62,000	\$ 61,000	\$ 16,000	\$ 14,000	\$ 14,000	\$ 9,000	\$ 9,000	\$ 9,000
Total assets	535,310	502,652	455,634	803,511	748,691	861,466	214,341	200,700	195,267	138,384	131,451	128,701
Return on common equity	18%	18%	18%	16%	12%	10%	16%	15%	18%	24%	21%	23%
Overhead ratio	55	57	58	54	64	67	39	42	39	70	73	71

(table continued from above)

As of or for the year ended December 31, (in millions, except ratios)	Corporate			Reconciling Items(a)			Total		
	2016	2015	2014	2016	2015	2014	2016	2015	2014
Noninterest revenue	\$ 938	\$ 800	\$ 1,972	\$ (2,265)	\$ (1,980)	\$ (1,788)	\$ 49,585	\$ 50,033	\$ 51,478
Net interest income	(1,425)	(533)	(1,960)	(1,209)	(1,110)	(985)	46,083	43,510	43,634
Total net revenue	(487)	267	12	(3,474)	(3,090)	(2,773)	95,668	93,543	95,112
Provision for credit losses	(4)	(10)	(35)	—	—	—	5,361	3,827	3,139
Noninterest expense	462	977	1,159	—	—	—	55,771	59,014	61,274
Income/(loss) before income tax expense/(benefit)	(945)	(700)	(1,112)	(3,474)	(3,090)	(2,773)	34,536	30,702	30,699
Income tax expense/(benefit)	(241)	(3,137)	(1,976)	(3,474)	(3,090)	(2,773)	9,803	6,260	8,954
Net income/(loss)	\$ (704)	\$ 2,437	\$ 864	\$ —	\$ —	\$ —	\$ 24,733	\$ 24,442	\$ 21,745
Average common equity	\$ 84,631	\$ 79,690	\$ 72,400	\$ —	\$ —	\$ —	\$ 224,631	\$ 215,690	\$ 207,400
Total assets	799,426	768,204	931,206	NA	NA	NA	2,490,972	2,351,698	2,572,274
Return on common equity	NM	NM	NM	NM	NM	NM	10%	11%	10%
Overhead ratio	NM	NM	NM	NM	NM	NM	58	63	64

(a) Segment managed results reflect revenue on a FTE basis with the corresponding income tax impact recorded within income tax expense/(benefit). These adjustments are eliminated in reconciling items to arrive at the Firm's reported U.S. GAAP results.

Note 34 – Parent Company

The following tables present Parent Company-only financial statements.

Statements of income and comprehensive income^(a)

Year ended December 31, (in millions)	2016	2015	2014
Income			
Dividends from subsidiaries and affiliates:			
Bank and bank holding company	\$ 10,000	\$ 10,653	\$ —
Nonbank ^(b)	3,873	8,172	14,716
Interest income from subsidiaries	794	443	378
Other interest income	207	234	284
Other income from subsidiaries, primarily fees:			
Bank and bank holding company	852	1,438	779
Nonbank	1,165	(1,402)	52
Other income	(846)	1,773	508
Total income	16,045	21,311	16,717
Expense			
Interest expense to subsidiaries and affiliates ^(b)	105	98	169
Other interest expense	4,413	3,720	3,645
Noninterest expense	1,643	2,611	827
Total expense	6,161	6,429	4,641
Income before income tax benefit and undistributed net income of subsidiaries	9,884	14,882	12,076
Income tax benefit	876	1,640	1,430
Equity in undistributed net income of subsidiaries	13,973	7,920	8,239
Net income	\$ 24,733	\$ 24,442	\$ 21,745
Other comprehensive income, net	(1,521)	(1,997)	990
Comprehensive income	\$ 23,212	\$ 22,445	\$ 22,735

Balance sheets^(a)

December 31, (in millions)	2016	2015
Assets		
Cash and due from banks	\$ 113	\$ 74
Deposits with banking subsidiaries	5,450	65,799
Trading assets	10,326	13,830
Available-for-sale securities	2,694	3,154
Loans	77	1,887
Advances to, and receivables from, subsidiaries:		
Bank and bank holding company	524	32,454
Nonbank	46	58,674
Investments (at equity) in subsidiaries and affiliates:		
Bank and bank holding company	422,028	225,613
Nonbank ^(b)	13,103	34,205
Other assets	10,257	18,088
Total assets	\$ 464,618	\$ 453,778
Liabilities and stockholders' equity		
Borrowings from, and payables to, subsidiaries and affiliates ^(b)	\$ 13,584	\$ 11,310
Other borrowed funds	3,831	3,722
Other liabilities	11,224	11,940
Long-term debt ^{(c)(d)}	181,789	179,233
Total liabilities^(d)	210,428	206,205
Total stockholders' equity	254,190	247,573
Total liabilities and stockholders' equity	\$ 464,618	\$ 453,778

Statements of cash flows^(a)

Year ended December 31, (in millions)	2016	2015	2014
Operating activities			
Net income	\$ 24,733	\$ 24,442	\$ 21,745
Less: Net income of subsidiaries and affiliates ^(b)	27,846	26,745	22,972
Parent company net loss	(3,113)	(2,303)	(1,227)
Cash dividends from subsidiaries and affiliates ^(b)	13,873	17,023	14,714
Other operating adjustments	(18,166)	2,483	(1,681)
Net cash provided by operating activities	(7,406)	17,203	11,806
Investing activities			
Net change in:			
Deposits with banking subsidiaries	60,349	30,085	(31,040)
Available-for-sale securities:			
Proceeds from paydowns and maturities	353	120	12,076
Other changes in loans, net	1,793	321	(319)
Advances to and investments in subsidiaries and affiliates, net	(51,967)	(81)	3,306
All other investing activities, net	114	153	32
Net cash provided by/(used in) investing activities	10,642	30,598	(15,945)
Financing activities			
Net change in:			
Borrowings from subsidiaries and affiliates ^(b)	2,957	(4,062)	4,454
Other borrowed funds	109	(47,483)	(5,778)
Proceeds from the issuance of long-term debt	41,498	42,121	40,284
Payments of long-term debt	(29,298)	(30,077)	(31,050)
Proceeds from issuance of preferred stock	—	5,893	8,847
Treasury stock and warrants repurchased	(9,082)	(5,616)	(4,760)
Dividends paid	(8,476)	(7,873)	(6,990)
All other financing activities, net	(905)	(840)	(921)
Net cash provided by/(used in) financing activities	(3,197)	(47,937)	4,086
Net increase/(decrease) in cash and due from banks	39	(137)	(53)
Cash and due from banks at the beginning of the year	74	211	264
Cash and due from banks at the end of the year	\$ 113	\$ 74	\$ 211
Cash interest paid	\$ 4,550	\$ 3,873	\$ 3,921
Cash income taxes paid, net	1,053	8,251	200

- (a) On September 1, 2016, in connection with the Firm's 2016 Resolution Submission, the Parent Company established the IHC, and during the fourth quarter of 2016 contributed substantially all of its direct subsidiaries, other than JPMorgan Chase Bank, N.A. (totaling \$55.4 billion), as well as most of its other assets (totaling \$160.5 billion) and intercompany indebtedness to the IHC. Total noncash assets contributed were \$62.3 billion.
- (b) Affiliates include trusts that issued guaranteed capital debt securities ("issuer trusts"). For further discussion on these issuer trusts, see Note 21.
- (c) At December 31, 2016, long-term debt that contractually matures in 2017 through 2021 totaled \$26.9 billion, \$21.2 billion, \$13.0 billion, \$21.9 billion and \$17.9 billion, respectively.
- (d) For information regarding the Parent Company's guarantees of its subsidiaries' obligations, see Notes 21 and 29.

Supplementary information

Selected quarterly financial data (unaudited)

(Table continued on next page)

As of or for the period ended (in millions, except per share, ratio, headcount data and where otherwise noted)	2016				2015			
	4th quarter	3rd quarter	2nd quarter	1st quarter	4th quarter	3rd quarter	2nd quarter	1st quarter
Selected income statement data								
Total net revenue	\$ 23,376	\$ 24,673	\$ 24,380	\$ 23,239	\$ 22,885	\$ 22,780	\$ 23,812	\$ 24,066
Total noninterest expense	13,833	14,463	13,638	13,837	14,263	15,368	14,500	14,883
Pre-provision profit	9,543	10,210	10,742	9,402	8,622	7,412	9,312	9,183
Provision for credit losses	864	1,271	1,402	1,824	1,251	682	935	959
Income before income tax expense	8,679	8,939	9,340	7,578	7,371	6,730	8,377	8,224
Income tax expense	1,952	2,653	3,140	2,058	1,937	(74)	2,087	2,310
Net income	\$ 6,727	\$ 6,286	\$ 6,200	\$ 5,520	\$ 5,434	\$ 6,804	\$ 6,290	\$ 5,914
Per common share data								
Net income: Basic	\$ 1.73	\$ 1.60	\$ 1.56	\$ 1.36	\$ 1.34	\$ 1.70	\$ 1.56	\$ 1.46
Diluted	1.71	1.58	1.55	1.35	1.32	1.68	1.54	1.45
Average shares: Basic	3,570.7	3,597.4	3,635.8	3,669.9	3,674.2	3,694.4	3,707.8	3,725.3
Diluted	3,606.0	3,629.6	3,666.5	3,696.9	3,704.6	3,725.6	3,743.6	3,757.5
Market and per common share data								
Market capitalization	\$ 307,295	\$ 238,277	\$ 224,449	\$ 216,547	\$ 241,899	\$ 224,438	\$ 250,581	\$ 224,818
Common shares at period-end	3,561.2	3,578.3	3,612.0	3,656.7	3,663.5	3,681.1	3,698.1	3,711.1
Share price:(a)								
High	\$ 87.39	\$ 67.90	\$ 66.20	\$ 64.13	\$ 69.03	\$ 70.61	\$ 69.82	\$ 62.96
Low	66.10	58.76	57.05	52.50	58.53	50.07	59.65	54.27
Close	86.29	66.59	62.14	59.22	66.03	60.97	67.76	60.58
Book value per share	64.06	63.79	62.67	61.28	60.46	59.67	58.49	57.77
Tangible book value per share ("TBVPS")(b)	51.44	51.23	50.21	48.96	48.13	47.36	46.13	45.45
Cash dividends declared per share	0.48	0.48	0.48	0.44	0.44	0.44	0.44	0.40
Selected ratios and metrics								
Return on common equity ("ROE")	11%	10%	10%	9%	9%	12%	11%	11%
Return on tangible common equity ("ROTCE")(b)	14	13	13	12	11	15	14	14
Return on assets ("ROA")	1.06	1.01	1.02	0.93	0.90	1.11	1.01	0.94
Overhead ratio	59	59	56	60	62	67	61	62
Loans-to-deposits ratio	65	65	66	64	65	64	61	56
HQLA (in billions)(c)	\$ 524	\$ 539	\$ 516	\$ 505	\$ 496	\$ 505	\$ 532	\$ 614
CET1 capital ratio(d)	12.4%	12.0%	12.0%	11.9%	11.8%	11.5%	11.2%	10.7%
Tier 1 capital ratio(d)	14.1	13.6	13.6	13.5	13.5	13.3	12.8	12.1
Total capital ratio(d)	15.5	15.1	15.2	15.1	15.1	14.9	14.4	13.6
Tier 1 leverage ratio	8.4	8.5	8.5	8.6	8.5	8.4	8.0	7.5
Selected balance sheet data (period-end)								
Trading assets	\$ 372,130	\$ 374,837	\$ 380,793	\$ 366,153	\$ 343,839	\$ 361,708	\$ 377,870	\$ 398,981
Securities	289,059	272,401	278,610	285,323	290,827	306,660	317,795	331,136
Loans	894,765	888,054	872,804	847,313	837,299	809,457	791,247	764,185
Core loans	806,152	795,077	775,813	746,196	732,093	698,988	674,767	641,285
Average core loans	799,698	779,383	760,721	737,297	715,282	680,224	654,551	631,955
Total assets	2,490,972	2,521,029	2,466,096	2,423,808	2,351,698	2,416,635	2,449,098	2,576,619
Deposits	1,375,179	1,376,138	1,330,958	1,321,816	1,279,715	1,273,106	1,287,332	1,367,887
Long-term debt(e)	295,245	309,418	295,627	290,754	288,651	292,503	286,240	280,123
Common stockholders' equity	228,122	228,263	226,355	224,089	221,505	219,660	216,287	214,371
Total stockholders' equity	254,190	254,331	252,423	250,157	247,573	245,728	241,205	235,864
Headcount	243,355	242,315	240,046	237,420	234,598	235,678	237,459	241,145

Supplementary information

(Table continued from previous page)

As of or for the period ended (in millions, except ratio data)	2016				2015			
	4th quarter	3rd quarter	2nd quarter	1st quarter	4th quarter	3rd quarter	2nd quarter	1st quarter
Credit quality metrics								
Allowance for credit losses	\$ 14,854	\$ 15,304	\$ 15,187	\$ 15,008	\$ 14,341	\$ 14,201	\$ 14,535	\$ 14,658
Allowance for loan losses to total retained loans	1.55%	1.61%	1.64%	1.66%	1.63%	1.67%	1.78%	1.86%
Allowance for loan losses to retained loans excluding purchased credit-impaired loans ^(f)	1.34	1.37	1.40	1.40	1.37	1.40	1.45	1.52
Nonperforming assets	\$ 7,535	\$ 7,779	\$ 7,757	\$ 8,023	\$ 7,034	\$ 7,294	\$ 7,588	\$ 7,714
Net charge-offs	1,280	1,121	1,181	1,110	1,064	963	1,007	1,052
Net charge-off rate	0.58%	0.51%	0.56%	0.53%	0.52%	0.49%	0.53%	0.57%

Note: Effective January 1, 2016, the Firm adopted new accounting guidance related to (1) the recognition and measurement of DVA on financial liabilities where the fair value option has been elected, and (2) the accounting for employee stock-based incentive payments. For additional information, see Accounting and Reporting Developments on pages 135–137 and Notes 3, 4, and 25.

- (a) Share prices are from the New York Stock Exchange.
(b) TBVPS and ROTCE are non-GAAP financial measures. For further discussion of these measures, see Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures and Key Financial Performance Measures on pages 48–50.
(c) HQLA represents the amount of assets that qualify for inclusion in the liquidity coverage ratio under the U.S. rule ("U.S. LCR"). For additional information, see HQLA on page 111.
(d) Ratios presented are calculated under the Basel III Transitional rules and for the capital ratios represent the Collins Floor. See Capital Risk Management on pages 76–85 for additional information on Basel III.
(e) Included unsecured long-term debt of \$212.6 billion, \$226.8 billion, \$220.6 billion, \$216.1 billion, \$211.8 billion, \$214.6 billion, \$209.1 billion, \$209.0 billion respectively, for the periods presented.
(f) Excludes the impact of residential real estate PCI loans, a non-GAAP financial measure. For further discussion of these measures, see Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures and Key Performance Measures on pages 48–50. For further discussion, see Allowance for credit losses on pages 105–107.

Distribution of assets, liabilities and stockholders' equity; interest rates and interest differentials

Consolidated average balance sheet, interest and rates

Provided below is a summary of JPMorgan Chase's consolidated average balances, interest rates and interest differentials on a taxable-equivalent basis for the years 2014 through 2016. Income computed on a taxable-equivalent basis is the income reported in the Consolidated

statements of income, adjusted to present interest income and average rates earned on assets exempt from income taxes (primarily federal taxes) on a basis comparable with other taxable investments. The incremental tax rate used for calculating the taxable-equivalent adjustment was approximately 38% in 2016, 2015 and 2014.

(Table continued on next page)

Year ended December 31, (Taxable-equivalent interest and rates; in millions, except rates)	2016		
	Average balance	Interest ^(e)	Average rate
Assets			
Deposits with banks	\$ 392,160	\$ 1,863	0.48%
Federal funds sold and securities purchased under resale agreements	205,368	2,265	1.10
Securities borrowed	102,964	(332) ^(f)	(0.32)
Trading assets	215,565	7,373	3.42
Taxable securities	235,211	5,538	2.35
Non-taxable securities ^(a)	44,176	2,662	6.03
Total securities	279,387	8,200	2.94 ^(h)
Loans	866,378	36,866 ^(g)	4.26
Other assets ^(b)	39,782	875	2.20
Total interest-earning assets	2,101,604	57,110	2.72
Allowance for loan losses	(13,965)		
Cash and due from banks	18,660		
Trading assets – equity instruments	95,528		
Trading assets – derivative receivables	70,897		
Goodwill	47,310		
Mortgage servicing rights	5,520		
Other intangible assets:			
Purchased credit card relationships	17		
Other intangibles	905		
Other assets	135,143		
Total assets	\$ 2,461,619		
Liabilities			
Interest-bearing deposits	\$ 925,270	\$ 1,356	0.15%
Federal funds purchased and securities loaned or sold under repurchase agreements	178,720	1,089	0.61
Commercial paper	15,001	135	0.90
Trading liabilities – debt, short-term and other liabilities ^(c)	198,904	1,170	0.59
Beneficial interests issued by consolidated VIEs	40,180	504	1.25
Long-term debt	295,573	5,564	1.88
Total interest-bearing liabilities	1,653,648	9,818	0.59
Noninterest-bearing deposits	402,698		
Trading liabilities – equity instruments	20,737		
Trading liabilities – derivative payables	55,927		
All other liabilities, including the allowance for lending-related commitments	77,910		
Total liabilities	2,210,920		
Stockholders' equity			
Preferred stock	26,068		
Common stockholders' equity	224,631		
Total stockholders' equity	250,699 ^(d)		
Total liabilities and stockholders' equity	\$ 2,461,619		
Interest rate spread			2.13%
Net interest income and net yield on interest-earning assets		\$ 47,292	2.25

(a) Represents securities that are tax exempt for U.S. Federal income tax purposes.

(b) Includes margin loans.

(c) Includes brokerage customer payables.

(d) The ratio of average stockholders' equity to average assets was 10.2% for 2016, 9.7% for 2015, and 9.2% for 2014. The return on average stockholders' equity, based on net income, was 9.9% for 2016, 10.2% for 2015, and 9.7% for 2014.

(e) Interest includes the effect of related hedging derivatives. Taxable-equivalent amounts are used where applicable.

(f) Securities borrowed's negative interest income and yield, for the years ended December 31, 2016, 2015 and 2014, are a result of client-driven demand for certain securities combined with the impact of low interest rates; the offset of this stock borrow activity is reflected as lower net interest expense reported within short-term and other liabilities.

(g) Fees and commissions on loans included in loan interest amounted to \$808 million in 2016, \$936 million in 2015, and \$1.1 billion in 2014.

(h) The annualized rate for securities based on amortized cost was 2.99% in 2016, 2.94% in 2015, and 2.82% in 2014, and does not give effect to changes in fair value that are reflected in AOCI.

(i) Reflects a benefit from the favorable market environments for dollar-roll financings.

Within the Consolidated average balance sheets, interest and rates summary, the principal amounts of nonaccrual loans have been included in the average loan balances used to determine the average interest rate earned on loans. For additional information on nonaccrual loans, including interest accrued, see Note 14.

(Table continued from previous page)

2015			2014		
Average balance	Interest(e)	Average rate	Average balance	Interest(e)	Average rate
\$ 427,963	\$ 1,250	0.29 %	\$ 358,072	\$ 1,157	0.32 %
206,637	1,592	0.77	230,489	1,642	0.71
105,273	(532) (f)	(0.50)	116,540	(501) (f)	(0.43)
206,385	6,694	3.24	210,609	7,386	3.51
273,730	6,550	2.39	318,970	7,617	2.39
42,125	2,556	6.07	34,359	2,158	6.28
315,855	9,106	2.88 (h)	353,329	9,775	2.77 (h)
787,318	33,321 (g)	4.23	739,175	32,394 (g)	4.38
38,811	652	1.68	40,879	663	1.62
2,088,242	52,083	2.49	2,049,093	52,516	2.56
(13,885)			(15,418)		
22,042			25,650		
105,489			116,650		
73,290			67,123		
47,445			48,029		
6,902			8,387		
25			62		
1,067			1,316		
138,792			146,343		
\$ 2,469,409			\$ 2,447,235		
\$ 876,840	\$ 1,252	0.14 %	\$ 872,893	\$ 1,633	0.19 %
192,510	609	0.32	208,560	604 (i)	0.29 (i)
38,140	110	0.29	59,916	134	0.22
207,810	622	0.30	220,137	712	0.32
49,200	435	0.88	47,974	405	0.84
284,940	4,435	1.56	269,814	4,409	1.63
1,649,440	7,463	0.45	1,679,294	7,897	0.47
418,948			391,408		
17,282			16,246		
64,716			54,758		
79,293			81,111		
2,229,679			2,222,817		
24,040			17,018		
215,690			207,400		
239,730 (d)			224,418 (d)		
\$ 2,469,409			\$ 2,447,235		
		2.04 %			2.09 %
\$ 44,620		2.14	\$ 44,619		2.18

Interest rates and interest differential analysis of net interest income – U.S. and non-U.S.

Presented below is a summary of interest rates and interest differentials segregated between U.S. and non-U.S. operations for the years 2014 through 2016. The segregation of U.S. and non-U.S. components is based on

the location of the office recording the transaction. Intercompany funding generally consists of dollar-denominated deposits originated in various locations that are centrally managed by Treasury and CIO.

(Table continued on next page)

Year ended December 31, (Taxable-equivalent interest and rates; in millions, except rates)	2016		
	Average balance	Interest	Average rate
Interest-earning assets			
Deposits with banks:			
U.S.	\$ 328,831	\$ 1,708	0.52 %
Non-U.S.	63,329	155	0.25
Federal funds sold and securities purchased under resale agreements:			
U.S.	112,902	1,166	1.03
Non-U.S.	92,466	1,099	1.19
Securities borrowed:			
U.S.	73,297	(341) ^(c)	(0.46)
Non-U.S.	29,667	9	0.03
Trading assets – debt instruments:			
U.S.	116,211	3,825	3.29
Non-U.S.	99,354	3,548	3.57
Securities:			
U.S.	216,726	6,971	3.22
Non-U.S.	62,661	1,229	1.97
Loans:			
U.S.	788,213	35,110	4.45
Non-U.S.	78,165	1,756	2.25
Other assets, predominantly U.S.	39,782	875	2.20
Total interest-earning assets	2,101,604	57,110	2.72
Interest-bearing liabilities			
Interest-bearing deposits:			
U.S.	703,738	1,029	0.15
Non-U.S.	221,532	327	0.15
Federal funds purchased and securities loaned or sold under repurchase agreements:			
U.S.	121,945	773	0.63
Non-U.S.	56,775	316	0.56
Trading liabilities – debt, short-term and other liabilities: ^(a)			
U.S.	133,788	86 ^(c)	0.06
Non-U.S.	80,117	1,219	1.52
Beneficial interests issued by consolidated VIEs, predominantly U.S.	40,180	504	1.25
Long-term debt:			
U.S.	283,169	5,533	1.95
Non-U.S.	12,404	31	0.25
Intercompany funding:			
U.S.	(20,405)	10	—
Non-U.S.	20,405	(10)	—
Total interest-bearing liabilities	1,653,648	9,818	0.59
Noninterest-bearing liabilities ^(b)	447,956		
Total investable funds	\$ 2,101,604	\$ 9,818	0.47 %
Net interest income and net yield:		\$ 47,292	2.25 %
U.S.		40,705	2.49
Non-U.S.		6,587	1.42
Percentage of total assets and liabilities attributable to non-U.S. operations:			
Assets			23.1
Liabilities			20.7

(a) Includes commercial paper.

(b) Represents the amount of noninterest-bearing liabilities funding interest-earning assets.

(c) Securities borrowed's negative interest income and yield, for the years ended December 31, 2016, 2015 and 2014, are a result of client-driven demand for certain securities combined with the impact of low interest rates; the offset of this stock borrow activity is reflected as lower net interest expense reported within trading liabilities – debt, short-term and other liabilities.

(d) Reflects a benefit from the favorable market environments for dollar-roll financings.

For further information, see the “Net interest income” discussion in Consolidated Results of Operations on pages 40–42.

(Table continued from previous page)

2015			2014		
Average balance	Interest	Average rate	Average balance	Interest	Average rate
\$ 388,833	\$ 1,021	0.26 %	\$ 328,145	\$ 825	0.25 %
39,130	229	0.59	29,927	332	1.11
118,945	900	0.76	125,812	719	0.57
87,692	692	0.79	104,677	923	0.88
78,815	(562) (c)	(0.71)	77,228	(573) (c)	(0.74)
26,458	30	0.11	39,312	72	0.18
106,465	3,572	3.35	109,678	4,045	3.69
99,920	3,122	3.12	100,931	3,341	3.31
200,240	6,676	3.33	193,856	6,586	3.40
115,615	2,430	2.10	159,473	3,189	2.00
699,664	31,468	4.50	635,846	30,165	4.74
87,654	1,853	2.11	103,329	2,229	2.16
38,811	652	1.68	40,879	663	1.62
2,088,242	52,083	2.49	2,049,093	52,516	2.56
638,756	761	0.12	620,708	813	0.13
238,084	491	0.21	252,185	820	0.33
140,609	366	0.26	146,025	130 (d)	0.09 (d)
51,901	243	0.47	62,535	474	0.76
166,838	(394) (c)	(0.24)	194,771	(284) (c)	(0.15)
79,112	1,126	1.42	85,282	1,130	1.33
49,200	435	0.88	47,974	405	0.84
273,033	4,386	1.61	256,726	4,366	1.70
11,907	49	0.41	13,088	43	0.33
(50,517)	7	—	(122,467)	(176)	—
50,517	(7)	—	122,467	176	—
1,649,440	7,463	0.45	1,679,294	7,897	0.47
438,802			369,799		
\$ 2,088,242	\$ 7,463	0.36 %	\$ 2,049,093	\$ 7,897	0.39 %
\$	44,620	2.14 %	\$	44,619	2.18 %
	38,033	2.34		37,018	2.46
	6,587	1.42		7,601	1.39
		24.7			28.9
		21.1			22.6

Changes in net interest income, volume and rate analysis

The table below presents an analysis of the effect on net interest income from volume and rate changes for the periods 2016 versus 2015 and 2015 versus 2014. In this analysis, when the change cannot be isolated to either volume or rate, it has been allocated to volume.

Year ended December 31, (On a taxable-equivalent basis; in millions)	2016 versus 2015			2015 versus 2014		
	Increase/(decrease) due to change in:		Net change	Increase/(decrease) due to change in:		Net change
	Volume	Rate		Volume	Rate	
Interest-earning assets						
Deposits with banks:						
U.S.	\$ (324)	\$ 1,011	\$ 687	\$ 163	\$ 33	\$ 196
Non-U.S.	59	(133)	(74)	53	(156)	(103)
Federal funds sold and securities purchased under resale agreements:						
U.S.	(55)	321	266	(58)	239	181
Non-U.S.	56	351	407	(137)	(94)	(231)
Securities borrowed:						
U.S.	24	197	221	(12)	23	11
Non-U.S.	—	(21)	(21)	(14)	(28)	(42)
Trading assets – debt instruments:						
U.S.	317	(64)	253	(100)	(373)	(473)
Non-U.S.	(24)	450	426	(27)	(192)	(219)
Securities:						
U.S.	515	(220)	295	226	(136)	90
Non-U.S.	(1,051)	(150)	(1,201)	(918)	159	(759)
Loans:						
U.S.	3,992	(350)	3,642	2,829	(1,526)	1,303
Non-U.S.	(220)	123	(97)	(324)	(52)	(376)
Other assets, predominantly U.S.	21	202	223	(36)	25	(11)
Change in interest income	3,310	1,717	5,027	1,645	(2,078)	(433)
Interest-bearing liabilities						
Interest-bearing deposits:						
U.S.	76	192	268	10	(62)	(52)
Non-U.S.	(21)	(143)	(164)	(26)	(303)	(329)
Federal funds purchased and securities loaned or sold under repurchase agreements:						
U.S.	(113)	520	407	(12)	248	236
Non-U.S.	26	47	73	(50)	(181)	(231)
Trading liabilities – debt, short-term and other liabilities: (a)						
U.S.	(24)	504	480	66	(176)	(110)
Non-U.S.	14	79	93	(81)	77	(4)
Beneficial interests issued by consolidated VIEs, predominantly U.S.	(113)	182	69	11	19	30
Long-term debt:						
U.S.	219	928	1,147	251	(231)	20
Non-U.S.	1	(19)	(18)	(4)	10	6
Intercompany funding:						
U.S.	(17)	20	3	(1)	184	183
Non-U.S.	17	(20)	(3)	1	(184)	(183)
Change in interest expense	65	2,290	2,355	165	(599)	(434)
Change in net interest income	\$ 3,245	\$ (573)	\$ 2,672	\$ 1,480	\$ (1,479)	\$ 1

(a) Includes commercial paper.

Glossary of Terms and Acronyms

2016 Annual Report or 2016 Form 10-K: Annual report on Form 10-K for year ended December 31, 2016, filed with the U.S. Securities and Exchange Commission.

ABS: Asset-backed securities

Active foreclosures: Loans referred to foreclosure where formal foreclosure proceedings are ongoing. Includes both judicial and non-judicial states.

AFS: Available-for-sale

ALCO: Asset Liability Committee

Allowance for loan losses to total loans: Represents period-end allowance for loan losses divided by retained loans.

Alternative assets: The following types of assets constitute alternative investments – hedge funds, currency, real estate, private equity and other investment funds designed to focus on nontraditional strategies.

AWM: Asset & Wealth Management

AOI: Accumulated other comprehensive income/(loss)

ARM: Adjustable rate mortgage(s)

AUC: Assets under custody

AUM: “Assets under management”: Represent assets managed by AWM on behalf of its Private Banking, Institutional and Retail clients. Includes “Committed capital not Called,” on which AWM earns fees.

Auto loan and lease origination volume: Dollar amount of auto loans and leases originated.

Beneficial interests issued by consolidated VIEs: Represents the interest of third-party holders of debt, equity securities, or other obligations, issued by VIEs that JPMorgan Chase consolidates.

Benefit obligation: Refers to the projected benefit obligation for pension plans and the accumulated postretirement benefit obligation for OPEB plans.

BHC: Bank holding company

Card Services includes the Credit Card and Commerce Solutions businesses.

CB: Commercial Banking

CBB: Consumer & Business Banking

CCAR: Comprehensive Capital Analysis and Review

CCB: Consumer & Community Banking

CCO: Chief Compliance Officer

CCP: “Central counterparty” is a clearing house that interposes itself between counterparties to contracts traded in one or more financial markets, becoming the buyer to every seller and the seller to every buyer and thereby ensuring the future performance of open contracts. A CCP becomes counterparty to trades with market participants

through novation, an open offer system, or another legally binding arrangement.

CDS: Credit default swaps

CEO: Chief Executive Officer

CET1 Capital: Common Equity Tier 1 Capital

CFTC: Commodity Futures Trading Commission

CFO: Chief Financial Officer

Chase Bank USA, N.A.: Chase Bank USA, National Association

CIB: Corporate & Investment Bank

CIO: Chief Investment Office

Client assets: Represent assets under management as well as custody, brokerage, administration and deposit accounts.

Client deposits and other third-party liabilities: Deposits, as well as deposits that are swept to on-balance sheet liabilities (e.g., commercial paper, federal funds purchased and securities loaned or sold under repurchase agreements) as part of client cash management programs. During the third quarter 2015 the Firm completed the discontinuation of its commercial paper customer sweep cash management program.

CLO: Collateralized loan obligations

CLTV: Combined loan-to-value

Collateral-dependent: A loan is considered to be collateral-dependent when repayment of the loan is expected to be provided solely by the underlying collateral, rather than by cash flows from the borrower’s operations, income or other resources.

Commerce Solutions is a business that primarily processes transactions for merchants.

Commercial Card: provides a wide range of payment services to corporate and public sector clients worldwide through the commercial card products. Services include procurement, corporate travel and entertainment, expense management services, and business-to-business payment solutions.

COO: Chief Operating Officer

Core loans: Represents loans considered central to the Firm’s ongoing businesses; core loans exclude loans classified as trading assets, runoff portfolios, discontinued portfolios and portfolios the Firm has an intent to exit.

Credit cycle: A period of time over which credit quality improves, deteriorates and then improves again (or vice versa). The duration of a credit cycle can vary from a couple of years to several years.

Credit derivatives: Financial instruments whose value is derived from the credit risk associated with the debt of a third-party issuer (the reference entity) which allow one party (the protection purchaser) to transfer that risk to

Glossary of Terms and Acronyms

another party (the protection seller). Upon the occurrence of a credit event by the reference entity, which may include, among other events, the bankruptcy or failure to pay its obligations, or certain restructurings of the debt of the reference entity, neither party has recourse to the reference entity. The protection purchaser has recourse to the protection seller for the difference between the face value of the CDS contract and the fair value at the time of settling the credit derivative contract. The determination as to whether a credit event has occurred is generally made by the relevant International Swaps and Derivatives Association (“ISDA”) Determinations Committee.

Criticized: Criticized loans, lending-related commitments and derivative receivables that are classified as special mention, substandard and doubtful categories for regulatory purposes and are generally consistent with a rating of CCC+/Caa1 and below, as defined by S&P and Moody’s.

CRO: Chief Risk Officer

CTC: CIO, Treasury and Corporate

CVA: Credit valuation adjustments

Debit and credit card sales volume: Dollar amount of card member purchases, net of returns.

Deposit margin/deposit spread: Represents net interest income expressed as a percentage of average deposits.

Distributed denial-of-service attack: The use of a large number of remote computer systems to electronically send a high volume of traffic to a target website to create a service outage at the target. This is a form of cyberattack.

DFAST: Dodd-Frank Act Stress Test

Dodd-Frank Act: Wall Street Reform and Consumer Protection Act

DOJ: U.S. Department of Justice

DOL: U.S. Department of Labor

DRPC: Directors’ Risk Policy Committee

DVA: Debit valuation adjustment

E&P: Exploration & Production

EC: European Commission

Eligible LTD: Long-term debt satisfying certain eligibility criteria

Embedded derivatives: are implicit or explicit terms or features of a financial instrument that affect some or all of the cash flows or the value of the instrument in a manner similar to a derivative. An instrument containing such terms or features is referred to as a “hybrid.” The component of the hybrid that is the non-derivative instrument is referred to as the “host.” For example, callable debt is a hybrid instrument that contains a plain vanilla debt instrument (i.e., the host) and an embedded option that allows the issuer to redeem the debt issue at a specified date for a

specified amount (i.e., the embedded derivative). However, a floating rate instrument is not a hybrid composed of a fixed-rate instrument and an interest rate swap.

ERISA: Employee Retirement Income Security Act of 1974

EPS: Earnings per share

ETD: “Exchange-traded derivatives”: Derivative contracts that are executed on an exchange and settled via a central clearing house.

EU: European Union

Fannie Mae: Federal National Mortgage Association

FASB: Financial Accounting Standards Board

FCA: Financial Conduct Authority

FCC: Firmwide Control Committee

FDIA: Federal Depository Insurance Act

FDIC: Federal Deposit Insurance Corporation

Federal Reserve: The Board of the Governors of the Federal Reserve System

Fee share: Proportion of fee revenue based on estimates of investment banking fees generated across the industry from investment banking transactions in M&A, equity and debt underwriting, and loan syndications. Source: Dealogic, a third-party provider of investment banking fee competitive analysis and volume-based league tables for the above noted industry products.

FFELP: Federal Family Education Loan Program

FFIEC: Federal Financial Institutions Examination Council

FHA: Federal Housing Administration

FHLB: Federal Home Loan Bank

FICO score: A measure of consumer credit risk provided by credit bureaus, typically produced from statistical models by Fair Isaac Corporation utilizing data collected by the credit bureaus.

Firm: JPMorgan Chase & Co.

Forward points: Represents the interest rate differential between two currencies, which is either added to or subtracted from the current exchange rate (i.e., “spot rate”) to determine the forward exchange rate.

FRC: Firmwide Risk Committee

Free standing derivatives: a derivative contract entered into either separate and apart from any of the Firms other financial instruments or equity transactions. Or, in conjunction with some other transaction and is legally detachable and separately exercisable.

FSB: Financial Stability Board

FTE: Fully taxable equivalent

FVA: Funding valuation adjustment

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FX: Foreign exchange

G7: Group of Seven nations: Countries in the G7 are Canada, France, Germany, Italy, Japan, the U.K. and the U.S.

G7 government bonds: Bonds issued by the government of one of the G7 nations.

Ginnie Mae: Government National Mortgage Association

GSE: Fannie Mae and Freddie Mac

GSIB: Global systemically important banks

HAMP: Home affordable modification program

Headcount-related expense: Includes salary and benefits (excluding performance-based incentives), and other noncompensation costs related to employees.

HELOAN: Home equity loan

HELOC: Home equity line of credit

Home equity – senior lien: Represents loans and commitments where JPMorgan Chase holds the first security interest on the property.

Home equity – junior lien: Represents loans and commitments where JPMorgan Chase holds a security interest that is subordinate in rank to other liens.

Households: A household is a collection of individuals or entities aggregated together by name, address, tax identifier and phone. Reported on a one-month lag.

HQLA: High quality liquid assets

HTM: Held-to-maturity

ICAAP: Internal capital adequacy assessment process

IDI: Insured depository institutions

IHC: JPMorgan Chase Holdings LLC, an intermediate holding company

Impaired loan: Impaired loans are loans measured at amortized cost, for which it is probable that the Firm will be unable to collect all amounts due, including principal and interest, according to the contractual terms of the agreement. Impaired loans include the following:

- All wholesale nonaccrual loans
- All TDRs (both wholesale and consumer), including ones that have returned to accrual status

Interchange income: A fee paid to a credit card issuer in the clearing and settlement of a sales or cash advance transaction.

Investment-grade: An indication of credit quality based on JPMorgan Chase's internal risk assessment system. "Investment grade" generally represents a risk profile similar to a rating of a "BBB-"/"Baa3" or better, as defined by independent rating agencies.

ISDA: International Swaps and Derivatives Association

JPMorgan Chase: JPMorgan Chase & Co.

JPMorgan Chase Bank, N.A.: JPMorgan Chase Bank, National Association

JPMorgan Clearing: J.P. Morgan Clearing Corp.

JPMorgan Securities: J.P. Morgan Securities LLC

Loan-equivalent: Represents the portion of the unused commitment or other contingent exposure that is expected, based on average portfolio historical experience, to become drawn prior to an event of a default by an obligor.

LCR: Liquidity coverage ratio

LDA: Loss Distribution Approach

LGD: Loss given default

LIBOR: London Interbank Offered Rate

LLC: Limited Liability Company

LOB: Line of business

Loss emergence period: Represents the time period between the date at which the loss is estimated to have been incurred and the realization of that loss.

LTIP: Long-term incentive plan

LTV: "Loan-to-value": For residential real estate loans, the relationship, expressed as a percentage, between the principal amount of a loan and the appraised value of the collateral (i.e., residential real estate) securing the loan.

Origination date LTV ratio

The LTV ratio at the origination date of the loan. Origination date LTV ratios are calculated based on the actual appraised values of collateral (i.e., loan-level data) at the origination date.

Current estimated LTV ratio

An estimate of the LTV as of a certain date. The current estimated LTV ratios are calculated using estimated collateral values derived from a nationally recognized home price index measured at the metropolitan statistical area ("MSA") level. These MSA-level home price indices consist of actual data to the extent available and forecasted data where actual data is not available. As a result, the estimated collateral values used to calculate these ratios do not represent actual appraised loan-level collateral values; as such, the resulting LTV ratios are necessarily imprecise and should therefore be viewed as estimates.

Combined LTV ratio

The LTV ratio considering all available lien positions, as well as unused lines, related to the property. Combined LTV ratios are used for junior lien home equity products.

Managed basis: A non-GAAP presentation of financial results that includes reclassifications to present revenue on a fully taxable-equivalent basis. Management uses this non-GAAP financial measure at the segment level, because it

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believes this provides information to enable investors to understand the underlying operational performance and trends of the particular business segment and facilitates a comparison of the business segment with the performance of competitors.

Master netting agreement: An agreement between two counterparties who have multiple contracts with each other that provides for the net settlement of all contracts, as well as cash collateral, through a single payment, in a single currency, in the event of default on or termination of any one contract.

MBS: Mortgage-backed securities

MD&A: Management's discussion and analysis

MMDA: Money Market Deposit Accounts

Moody's: Moody's Investor Services

Mortgage origination channels:

Retail – Borrowers who buy or refinance a home through direct contact with a mortgage banker employed by the Firm using a branch office, the Internet or by phone. Borrowers are frequently referred to a mortgage banker by a banker in a Chase branch, real estate brokers, home builders or other third parties.

Correspondent – Banks, thrifts, other mortgage banks and other financial institutions that sell closed loans to the Firm.

Mortgage product types:

Alt-A

Alt-A loans are generally higher in credit quality than subprime loans but have characteristics that would disqualify the borrower from a traditional prime loan. Alt-A lending characteristics may include one or more of the following: (i) limited documentation; (ii) a high CLTV ratio; (iii) loans secured by non-owner occupied properties; or (iv) a debt-to-income ratio above normal limits. A substantial proportion of the Firm's Alt-A loans are those where a borrower does not provide complete documentation of his or her assets or the amount or source of his or her income.

Option ARMs

The option ARM real estate loan product is an adjustable-rate mortgage loan that provides the borrower with the option each month to make a fully amortizing, interest-only or minimum payment. The minimum payment on an option ARM loan is based on the interest rate charged during the introductory period. This introductory rate is usually significantly below the fully indexed rate. The fully indexed rate is calculated using an index rate plus a margin. Once the introductory period ends, the contractual interest rate charged on the loan increases to the fully indexed rate and adjusts monthly to reflect movements in the index. The minimum payment is typically insufficient to cover interest accrued in the prior month, and any unpaid interest is deferred and added to the principal balance of the loan.

Option ARM loans are subject to payment recast, which converts the loan to a variable-rate fully amortizing loan upon meeting specified loan balance and anniversary date triggers.

Prime

Prime mortgage loans are made to borrowers with good credit records who meet specific underwriting requirements, including prescriptive requirements related to income and overall debt levels. New prime mortgage borrowers provide full documentation and generally have reliable payment histories.

Subprime

Subprime loans are loans that, prior to mid-2008, were offered to certain customers with one or more high risk characteristics, including but not limited to: (i) unreliable or poor payment histories; (ii) a high LTV ratio of greater than 80% (without borrower-paid mortgage insurance); (iii) a high debt-to-income ratio; (iv) an occupancy type for the loan is other than the borrower's primary residence; or (v) a history of delinquencies or late payments on the loan.

MSA: Metropolitan statistical areas

MSR: Mortgage servicing rights

Multi-asset: Any fund or account that allocates assets under management to more than one asset class.

NA: Data is not applicable or available for the period presented.

NAV: Net Asset Value

Net Capital Rule: Rule 15c3-1 under the Securities Exchange Act of 1934.

Net charge-off/(recovery) rate: Represents net charge-offs/(recoveries) (annualized) divided by average retained loans for the reporting period.

Net mortgage servicing revenue includes the following components:

Operating revenue predominantly represents the return on Mortgage Servicing's MSR asset and includes:

- Actual gross income earned from servicing third-party mortgage loans, such as contractually specified servicing fees and ancillary income; and
- The change in the fair value of the MSR asset due to the collection or realization of expected cash flows.

Risk management represents the components of

Mortgage Servicing's MSR asset that are subject to ongoing risk management activities, together with derivatives and other instruments used in those risk management activities.

Net production revenue: Includes net gains or losses on originations and sales of mortgage loans, other production-related fees and losses related to the repurchase of previously sold loans.

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Net revenue rate: Represents Card Services net revenue (annualized) expressed as a percentage of average loans for the period.

Net yield on interest-earning assets: The average rate for interest-earning assets less the average rate paid for all sources of funds.

NM: Not meaningful

NOL: Net operating loss

Nonaccrual loans: Loans for which interest income is not recognized on an accrual basis. Loans (other than credit card loans and certain consumer loans insured by U.S. government agencies) are placed on nonaccrual status when full payment of principal and interest is not expected, regardless of delinquency status, or when principal and interest have been in default for a period of 90 days or more unless the loan is both well-secured and in the process of collection. Collateral-dependent loans are typically maintained on nonaccrual status.

Nonperforming assets: Nonperforming assets include nonaccrual loans, nonperforming derivatives and certain assets acquired in loan satisfaction, predominantly real estate owned and other commercial and personal property.

NOW: Negotiable Order of Withdrawal

NSFR: Net stable funding ratio

OAS: Option-adjusted spread

OCC: Office of the Comptroller of the Currency

OCI: Other comprehensive income/(loss)

OEP: One Equity Partners

OIS: Overnight index swap

OPEB: Other postretirement employee benefit

ORMF: Operational Risk Management Framework

OTTI: Other-than-temporary impairment

Over-the-counter (“OTC”) derivatives: Derivative contracts that are negotiated, executed and settled bilaterally between two derivative counterparties, where one or both counterparties is a derivatives dealer.

Over-the-counter cleared (“OTC-cleared”) derivatives: Derivative contracts that are negotiated and executed bilaterally, but subsequently settled via a central clearing house, such that each derivative counterparty is only exposed to the default of that clearing house.

Overhead ratio: Noninterest expense as a percentage of total net revenue.

Parent Company: JPMorgan Chase & Co.

Participating securities: Represents unvested stock-based compensation awards containing nonforfeitable rights to dividends or dividend equivalents (collectively, “dividends”),

which are included in the earnings per share calculation using the two-class method. JPMorgan Chase grants restricted stock and RSUs to certain employees under its stock-based compensation programs, which entitle the recipients to receive nonforfeitable dividends during the vesting period on a basis equivalent to the dividends paid to holders of common stock. These unvested awards meet the definition of participating securities. Under the two-class method, all earnings (distributed and undistributed) are allocated to each class of common stock and participating securities, based on their respective rights to receive dividends.

PCA: Prompt corrective action

PCI: “Purchased credit-impaired” loans represents loans that were acquired in the Washington Mutual transaction and deemed to be credit-impaired on the acquisition date in accordance with the guidance of the FASB. The guidance allows purchasers to aggregate credit-impaired loans acquired in the same fiscal quarter into one or more pools, provided that the loans have common risk characteristics (e.g., product type, LTV ratios, FICO scores, past due status, geographic location). A pool is then accounted for as a single asset with a single composite interest rate and an aggregate expectation of cash flows.

PD: Probability of default

PRA: Prudential Regulatory Authority

Pre-provision profit/(loss): Represents total net revenue less noninterest expense. The Firm believes that this financial measure is useful in assessing the ability of a lending institution to generate income in excess of its provision for credit losses.

Pretax margin: Represents income before income tax expense divided by total net revenue, which is, in management’s view, a comprehensive measure of pretax performance derived by measuring earnings after all costs are taken into consideration. It is one basis upon which management evaluates the performance of AWM against the performance of their respective competitors.

Principal transactions revenue: Principal transactions revenue is driven by many factors, including the bid-offer spread, which is the difference between the price at which the Firm is willing to buy a financial or other instrument and the price at which the Firm is willing to sell that instrument. It also consists of realized (as a result of closing out or termination of transactions, or interim cash payments) and unrealized (as a result of changes in valuation) gains and losses on financial and other instruments (including those accounted for under the fair value option) primarily used in client-driven market-making activities and on private equity investments. In connection with its client-driven market-making activities, the Firm transacts in debt and equity instruments, derivatives and commodities (including physical commodities inventories and financial instruments that reference commodities).

Principal transactions revenue also includes certain realized

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and unrealized gains and losses related to hedge accounting and specified risk-management activities, including: (a) certain derivatives designated in qualifying hedge accounting relationships (primarily fair value hedges of commodity and foreign exchange risk), (b) certain derivatives used for specific risk management purposes, primarily to mitigate credit risk, foreign exchange risk and commodity risk, and (c) other derivatives.

PSU(s): Performance share units

RCSA: Risk and Control Self-Assessment

Real assets: Real assets include investments in productive assets such as agriculture, energy rights, mining and timber properties and exclude raw land to be developed for real estate purposes.

REIT: “Real estate investment trust”: A special purpose investment vehicle that provides investors with the ability to participate directly in the ownership or financing of real-estate related assets by pooling their capital to purchase and manage income property (i.e., equity REIT) and/or mortgage loans (i.e., mortgage REIT). REITs can be publicly or privately held and they also qualify for certain favorable tax considerations.

Receivables from customers: Primarily represents margin loans to brokerage customers that are collateralized through assets maintained in the clients’ brokerage accounts, as such no allowance is held against these receivables. These receivables are reported within accrued interest and accounts receivable on the Firm’s Consolidated balance sheets.

Regulatory VaR: Daily aggregated VaR calculated in accordance with regulatory rules.

REO: Real estate owned

Reported basis: Financial statements prepared under U.S. GAAP, which excludes the impact of taxable-equivalent adjustments.

Retained loans: Loans that are held-for-investment (i.e., excludes loans held-for-sale and loans at fair value).

Revenue wallet: Proportion of fee revenue based on estimates of investment banking fees generated across the industry (i.e., the revenue wallet) from investment banking transactions in M&A, equity and debt underwriting, and loan syndications. Source: Dealogic, a third-party provider of investment banking competitive analysis and volume-based league tables for the above noted industry products.

RHS: Rural Housing Service of the U.S. Department of Agriculture

ROA: Return on assets

ROE: Return on equity

ROTCE: Return on tangible common equity

RSU(s): Restricted stock units

RWA: “Risk-weighted assets”: Basel III establishes two comprehensive methodologies for calculating RWA (a Standardized approach and an Advanced approach) which include capital requirements for credit risk, market risk, and in the case of Basel III Advanced, also operational risk. Key differences in the calculation of credit risk RWA between the Standardized and Advanced approaches are that for Basel III Advanced, credit risk RWA is based on risk-sensitive approaches which largely rely on the use of internal credit models and parameters, whereas for Basel III Standardized, credit risk RWA is generally based on supervisory risk-weightings which vary primarily by counterparty type and asset class. Market risk RWA is calculated on a generally consistent basis between Basel III Standardized and Basel III Advanced, both of which incorporate the requirements set forth in Basel 2.5.

S&P: Standard and Poor’s 500 Index

SAR(s): Stock appreciation rights

SCCL: single-counterparty credit limits

SEC: Securities and Exchange Commission

Seed capital: Initial JPMorgan capital invested in products, such as mutual funds, with the intention of ensuring the fund is of sufficient size to represent a viable offering to clients, enabling pricing of its shares, and allowing the manager to develop a track record. After these goals are achieved, the intent is to remove the Firm’s capital from the investment.

Short sale: A short sale is a sale of real estate in which proceeds from selling the underlying property are less than the amount owed the Firm under the terms of the related mortgage, and the related lien is released upon receipt of such proceeds.

Single-name: Single reference-entities

SLR: Supplementary leverage ratio

SMBS: Stripped mortgage-backed securities

SOA: Society of Actuaries

SPEs: Special purpose entities

Structural interest rate risk: Represents interest rate risk of the non-trading assets and liabilities of the Firm.

Structured notes: Structured notes are predominantly financial instruments containing embedded derivatives.

Suspended foreclosures: Loans referred to foreclosure where formal foreclosure proceedings have started but are currently on hold, which could be due to bankruptcy or loss mitigation. Includes both judicial and non-judicial states.

Taxable-equivalent basis: In presenting managed results, the total net revenue for each of the business segments and the Firm is presented on a tax-equivalent basis. Accordingly, revenue from investments that receive tax credits and tax-exempt securities is presented in the managed results on a basis comparable to taxable investments and securities; the

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corresponding income tax impact related to tax-exempt items is recorded within income tax expense.

TBVPS: Tangible book value per share

TCE: Tangible common equity

TDR: “Troubled debt restructuring” is deemed to occur when the Firm modifies the original terms of a loan agreement by granting a concession to a borrower that is experiencing financial difficulty.

TLAC: Total Loss Absorbing Capacity

U.K.: United Kingdom

Unaudited: Financial statements and information that have not been subjected to auditing procedures sufficient to permit an independent certified public accountant to express an opinion.

U.S.: United States of America

U.S. GAAP: Accounting principles generally accepted in the U.S.

U.S. government-sponsored enterprises (“U.S. GSEs”) and U.S. GSE obligations: In the U.S., GSEs are quasi-governmental, privately held entities established by Congress to improve the flow of credit to specific sectors of the economy and provide certain essential services to the public. U.S. GSEs include Fannie Mae and Freddie Mac, but do not include Ginnie Mae, which is directly owned by the U.S. Department of Housing and Urban Development. U.S. GSE obligations are not explicitly guaranteed as to the timely payment of principal and interest by the full faith and credit of the U.S. government.

U.S. LCR: Liquidity coverage ratio under the final U.S. rule.

U.S. Treasury: U.S. Department of the Treasury

VA: U.S. Department of Veterans Affairs

VaR: “Value-at-risk” is a measure of the dollar amount of potential loss from adverse market moves in an ordinary market environment.

VCG: Valuation Control Group

VGF: Valuation Governance Forum

VIes: Variable interest entities

Warehouse loans: Consist of prime mortgages originated with the intent to sell that are accounted for at fair value and classified as trading assets.

Washington Mutual transaction: On September 25, 2008, JPMorgan Chase acquired certain of the assets of the banking operations of Washington Mutual Bank (“Washington Mutual”) from the FDIC.

Securities portfolio

For information regarding the securities portfolio as of December 31, 2016 and 2015, and for the years ended December 31, 2016 and 2015, see Note 12. For the available-for-sale securities portfolio, at December 31, 2014, the fair value and amortized cost of U.S. Treasury and government agency obligations was \$79.0 billion and \$76.7 billion, respectively; the fair value and amortized cost of all other available-for-sale securities was \$219.8 billion and \$214.3 billion, respectively; and the total fair value and amortized cost of the total available-for-sale securities portfolio was \$298.8 billion and \$291.0 billion, respectively.

At December 31, 2014, the fair value and amortized cost of U.S. Treasury and government agency obligations in the held-to-maturity securities portfolio was \$40.3 billion and \$39.0 billion, respectively; the fair value and amortized cost of all other HTM securities was \$10.8 billion and \$10.2 billion, respectively; and the total fair value and amortized cost of the total held-to-maturity securities portfolio was \$51.2 billion and \$49.3 billion, respectively.

Loan portfolio

The table below presents loans by portfolio segment and loan class that are presented in Credit Risk Management on page 88, pages 89–95 and page 96, and in Note 14, at the periods indicated.

December 31, (in millions)	2016	2015	2014	2013	2012
U.S. consumer, excluding credit card loans					
Home equity	\$ 51,965	\$ 60,548	\$ 69,837	\$ 76,790	\$ 88,356
Residential mortgage	215,178	192,714	139,973	129,008	123,277
Auto	65,814	60,255	54,536	52,757	49,913
Other	31,687	31,304	31,028	30,508	31,074
Total U.S. consumer, excluding credit card loans	364,644	344,821	295,374	289,063	292,620
Credit card Loans					
U.S. credit card loans	141,447	131,132	129,067	125,308	125,277
Non-U.S. credit card loans	369	331	1,981	2,483	2,716
Total credit card loans	141,816	131,463	131,048	127,791	127,993
Total consumer loans	506,460	476,284	426,422	416,854	420,613
U.S. wholesale loans					
Commercial and industrial	90,542	83,739	78,664	79,436	77,900
Real estate	104,791	90,836	77,022	67,815	59,369
Financial institutions	17,416	12,708	13,743	11,087	10,708
Government agencies	12,655	9,838	7,574	8,316	7,962
Other	69,774	67,925	49,838	48,158	50,948
Total U.S. wholesale loans	295,178	265,046	226,841	214,812	206,887
Non-U.S. wholesale loans					
Commercial and industrial	31,035	30,385	34,782	36,447	36,674
Real estate	3,964	4,577	2,224	1,621	1,757
Financial institutions	14,791	17,188	21,099	22,813	26,564
Government agencies	3,726	1,788	1,122	2,146	1,586
Other	39,611	42,031	44,846	43,725	39,715
Total non-U.S. wholesale loans	93,127	95,969	104,073	106,752	106,296
Total wholesale loans					
Commercial and industrial	121,577	114,124	113,446	115,883	114,574
Real estate	108,755	95,413	79,246	69,436	61,126
Financial institutions	32,207	29,896	34,842	33,900	37,272
Government agencies	16,381	11,626	8,696	10,462	9,548
Other	109,385	109,956	94,684	91,883	90,663
Total wholesale loans	388,305	361,015	330,914	321,564	313,183
Total loans^(a)	\$ 894,765	\$ 837,299	\$ 757,336	\$ 738,418	\$ 733,796
Memo:					
Loans held-for-sale	\$ 2,628	\$ 1,646	\$ 7,217	\$ 12,230	\$ 4,406
Loans at fair value	2,230	2,861	2,611	2,011	2,555
Total loans held-for-sale and loans at fair value	\$ 4,858	\$ 4,507	\$ 9,828	\$ 14,241	\$ 6,961

(a) Loans (other than purchased credit-impaired loans and those for which the fair value option have been elected) are presented net of unearned income, unamortized discounts and premiums, and net deferred loan costs. These amounts were not material as of December 31, 2016, 2015, 2014, 2013 and 2012.

Maturities and sensitivity to changes in interest rates

The table below sets forth, at December 31, 2016, wholesale loan maturity and distribution between fixed and floating interest rates based on the stated terms of the loan agreements. The table below also presents loans by loan class that are presented in Wholesale credit portfolio on pages 96–104 and Note 14. The table does not include the impact of derivative instruments.

December 31, 2016 (in millions)	Within 1 year ^(a)		1-5 years		After 5 years		Total
U.S.							
Commercial and industrial	\$	16,774	\$	63,264	\$	10,504	\$ 90,542
Real estate		9,909		20,684		74,198	104,791
Financial institutions		10,718		6,131		567	17,416
Government agencies		1,864		4,430		6,361	12,655
Other		24,423		42,070		3,281	69,774
Total U.S.		63,688		136,579		94,911	295,178
Non-U.S.							
Commercial and industrial		9,761		17,495		3,779	31,035
Real estate		1,083		2,873		8	3,964
Financial institutions		10,406		4,347		38	14,791
Government agencies		946		2,003		777	3,726
Other		32,359		6,522		730	39,611
Total non-U.S.		54,555		33,240		5,332	93,127
Total wholesale loans	\$	118,243	\$	169,819	\$	100,243	\$ 388,305
Loans at fixed interest rates			\$	10,565	\$	74,972	
Loans at variable interest rates				159,254		25,271	
Total wholesale loans			\$	169,819	\$	100,243	

(a) Includes demand loans and overdrafts.

Risk elements

The following tables set forth nonperforming assets, contractually past-due assets, and accruing restructured loans by portfolio segment and loan class that are presented in Credit Risk Management on page 88, pages 89–90 and page 96, at the periods indicated.

December 31, (in millions)	2016	2015	2014	2013	2012
Nonperforming assets					
U.S. nonaccrual loans:					
Consumer, excluding credit card loans	\$ 4,820	\$ 5,413	\$ 6,509	\$ 7,496	\$ 9,174
Credit card loans	—	—	—	—	1
Total U.S. nonaccrual consumer loans	4,820	5,413	6,509	7,496	9,175
Wholesale:					
Commercial and industrial	1,145	315	184	317	702
Real estate	148	175	237	338	520
Financial institutions	4	4	12	19	60
Government agencies	—	—	—	1	—
Other	198	86	59	97	153
Total U.S. wholesale nonaccrual loans	1,495	580	492	772	1,435
Total U.S. nonaccrual loans	6,315	5,993	7,001	8,268	10,610
Non-U.S. nonaccrual loans:					
Consumer, excluding credit card loans	—	—	—	—	—
Credit card loans	—	—	—	—	—
Total non-U.S. nonaccrual consumer loans	—	—	—	—	—
Wholesale:					
Commercial and industrial	446	314	21	116	131
Real estate	52	63	23	88	89
Financial institutions	5	6	7	8	—
Government agencies	—	—	—	—	5
Other	65	53	81	60	57
Total non-U.S. wholesale nonaccrual loans	568	436	132	272	282
Total non-U.S. nonaccrual loans	568	436	132	272	282
Total nonaccrual loans	6,883	6,429	7,133	8,540	10,892
Derivative receivables	223	204	275	415	239
Assets acquired in loan satisfactions	429	401	559	751	775
Nonperforming assets	\$ 7,535	\$ 7,034	\$ 7,967	\$ 9,706	\$ 11,906
Memo:					
Loans held-for-sale	\$ 162	\$ 101	\$ 95	\$ 26	\$ 18
Loans at fair value	—	25	21	197	265
Total loans held-for-sale and loans at fair value	\$ 162	\$ 126	\$ 116	\$ 223	\$ 283

December 31, (in millions)	2016	2015	2014	2013	2012
Contractually past-due loans^(a)					
U.S. loans:					
Consumer, excluding credit card loans ^(b)	\$ —	\$ —	\$ —	\$ —	\$ —
Credit card loans	1,143	944	893	997	1,268
Total U.S. consumer loans	1,143	944	893	997	1,268
Wholesale:					
Commercial and industrial	86	6	14	14	19
Real estate	2	15	33	14	69
Financial institutions	12	1	—	—	6
Government agencies	4	6	—	—	—
Other	19	28	26	16	30
Total U.S. wholesale loans	123	56	73	44	124
Total U.S. loans	1,266	1,000	966	1,041	1,392
Non-U.S. loans:					
Consumer, excluding credit card loans	—	—	—	—	—
Credit card loans	2	—	2	25	34
Total non-U.S. consumer loans	2	—	2	25	34
Wholesale:					
Commercial and industrial	—	1	—	—	—
Real estate	—	—	—	—	—
Financial institutions	9	10	—	6	—
Government agencies	—	—	—	—	—
Other	—	—	3	—	14
Total non-U.S. wholesale loans	9	11	3	6	14
Total non-U.S. loans	11	11	5	31	48
Total contractually past due loans	\$ 1,277	\$ 1,011	\$ 971	\$ 1,072	\$ 1,440

- (a) Represents accruing loans past-due 90 days or more as to principal and interest, which are not characterized as nonaccrual loans. Excludes PCI loans which are accounted for on a pool basis. Since each pool is accounted for as a single asset with a single composite interest rate and an aggregate expectation of cash flows, the past-due status of the pools, or that of individual loans within the pools, is not meaningful. The Firm is recognizing interest income on each pool of loans as they are all performing.
- (b) At December 31, 2016, 2015, 2014, 2013 and 2012, excluded loans 90 or more days past due and still accruing as follows: (1) mortgage loans insured by U.S. government agencies of \$2.7 billion, \$2.8 billion, \$3.4 billion, \$3.2 billion and \$3.8 billion, respectively; and (2) student loans insured by U.S. government agencies under the FFELP of \$263 million, \$290 million, \$367 million, \$428 million and \$525 million, respectively. These amounts have been excluded from the nonaccrual loans based upon the government guarantee. Prior period amounts have been revised to conform with current period presentation.

December 31, (in millions)	2016	2015	2014	2013	2012
Accruing restructured loans^(a)					
U.S.:					
Consumer, excluding credit card loans	\$ 5,561	\$ 5,980	\$ 7,814	\$ 9,173	\$ 9,033
Credit card loans ^(b)	1,240	1,465	2,029	3,115	4,762
Total U.S. consumer loans	6,801	7,445	9,843	12,288	13,795
Wholesale:					
Commercial and industrial	35	12	10	—	29
Real estate	14	28	31	27	7
Financial institutions	—	—	—	—	—
Other	—	—	1	3	—
Total U.S. wholesale loans	49	40	42	30	36
Total U.S.	6,850	7,485	9,885	12,318	13,831
Non-U.S.:					
Consumer, excluding credit card loans	—	—	—	—	—
Credit card loans ^(b)	—	—	—	—	—
Total non-U.S. consumer loans	—	—	—	—	—
Wholesale:					
Commercial and industrial	17	—	—	—	24
Real estate	—	—	—	—	—
Other	—	—	—	—	—
Total non-U.S. wholesale loans	17	—	—	—	24
Total non-U.S.	17	—	—	—	24
Total accruing restructured notes	\$ 6,867	\$ 7,485	\$ 9,885	\$ 12,318	\$ 13,855

- (a) Represents performing loans modified in TDRs in which an economic concession was granted by the Firm and the borrower has demonstrated its ability to repay the loans according to the terms of the restructuring. As defined in U.S. GAAP, concessions include the reduction of interest rates or the deferral of interest or principal payments, resulting from deterioration in the borrowers' financial condition. Excludes nonaccrual assets and contractually past-due assets, which are included in the sections above.
- (b) Includes credit card loans that have been modified in a TDR.

For a discussion of nonaccrual loans, past-due loan accounting policies, and accruing restructured loans see Credit Risk Management on pages 86–107, and Note 14.

Impact of nonaccrual loans and accruing restructured loans on interest income

The negative impact on interest income from nonaccrual loans represents the difference between the amount of interest income that would have been recorded on such nonaccrual loans according to their original contractual terms had they been performing and the amount of interest that actually was recognized on a cash basis. The negative impact on interest income from accruing restructured loans represents the difference between the amount of interest income that would have been recorded on such loans according to their original contractual terms and the amount of interest that actually was recognized under the modified terms. The following table sets forth this data for the years specified. The change in forgone interest income from 2014 through 2016 was primarily driven by the change in the levels of nonaccrual loans.

Year ended December 31, (in millions)	2016	2015	2014
Nonaccrual loans			
U.S.:			
Consumer, excluding credit card:			
Gross amount of interest that would have been recorded at the original terms	\$ 464	\$ 513	\$ 563
Interest that was recognized in income	(207)	(225)	(268)
Total U.S. consumer, excluding credit card	257	288	295
Credit card:			
Gross amount of interest that would have been recorded at the original terms	—	—	—
Interest that was recognized in income	—	—	—
Total U.S. credit card	—	—	—
Total U.S. consumer	257	288	295
Wholesale:			
Gross amount of interest that would have been recorded at the original terms	56	24	28
Interest that was recognized in income	(5)	(10)	(9)
Total U.S. wholesale	51	14	19
Negative impact — U.S.	308	302	314
Non-U.S.:			
Consumer, excluding credit card:			
Gross amount of interest that would have been recorded at the original terms	—	—	—
Interest that was recognized in income	—	—	—
Total non-U.S. consumer, excluding credit card	—	—	—
Credit card:			
Gross amount of interest that would have been recorded at the original terms	—	—	—
Interest that was recognized in income	—	—	—
Total non-U.S. credit card	—	—	—
Total non-U.S. consumer	—	—	—
Wholesale:			
Gross amount of interest that would have been recorded at the original terms	25	13	7
Interest that was recognized in income	(2)	(6)	—
Total non-U.S. wholesale	23	7	7
Negative impact — non-U.S.	23	7	7
Total negative impact on interest income	\$ 331	\$ 309	\$ 321

Year ended December 31, (in millions)	2016	2015	2014
Accruing restructured loans			
U.S.:			
Consumer, excluding credit card:			
Gross amount of interest that would have been recorded at the original terms	\$ 451	\$ 485	\$ 629
Interest that was recognized in income	(256)	(286)	(339)
Total U.S. consumer, excluding credit card	195	199	290
Credit card:			
Gross amount of interest that would have been recorded at the original terms	207	260	377
Interest that was recognized in income	(63)	(82)	(123)
Total U.S. credit card	144	178	254
Total U.S. consumer	339	377	544
Wholesale:			
Gross amount of interest that would have been recorded at the original terms	2	2	—
Interest that was recognized in income	(2)	(2)	—
Total U.S. wholesale	—	—	—
Negative impact — U.S.	339	377	544
Non-U.S.:			
Consumer, excluding credit card:			
Gross amount of interest that would have been recorded at the original terms	—	—	—
Interest that was recognized in income	—	—	—
Total non-U.S. consumer, excluding credit card	—	—	—
Credit card:			
Gross amount of interest that would have been recorded at the original terms	—	—	—
Interest that was recognized in income	—	—	—
Total non-U.S. credit card	—	—	—
Total non-U.S. consumer	—	—	—
Wholesale:			
Gross amount of interest that would have been recorded at the original terms	—	—	—
Interest that was recognized in income	—	—	—
Total non-U.S. wholesale	—	—	—
Negative impact — non-U.S.	—	—	—
Total negative impact on interest income	\$ 339	\$ 377	\$ 544

Cross-border outstandings

Cross-border disclosure is based on the FFIEC guidelines governing the determination of cross-border risk.

The reporting of country exposure under the FFIEC bank regulatory requirements provides information on the distribution, by country and sector, of claims on, and liabilities to, foreign residents held by U.S. banks and bank holding companies and is used by the regulatory agencies to determine the presence of credit and related risks,

including transfer and country risk. Country location under the FFIEC bank regulatory reporting is based on where the entity or counterparty is legally established.

JPMorgan Chase's total cross-border exposure tends to fluctuate greatly, and the amount of exposure at year-end tends to be a function of timing rather than representing a consistent trend. For a further discussion of JPMorgan Chase's country risk exposure, see Country Risk Management on pages 108–109.

The following table lists all countries in which JPMorgan Chase's cross-border outstandings exceed 0.75% of consolidated assets as of the dates specified.

Cross-border outstandings exceeding 0.75% of total assets

(in millions)	December 31,	Governments	Banks	Other ^(a)	Net local country assets	Total cross-border outstandings ^(b)	Commitments ^(c)	Total exposure
Cayman Islands	2016	\$ 18	\$ 107	\$ 74,810	\$ 84	\$ 75,019	\$ 10,708	\$ 85,727
	2015	—	153	76,160	35	76,348	12,708	89,056
	2014	2	199	73,708	115	74,024	25,886	99,910
Japan	2016	\$ 865	\$ 16,522	\$ 5,209	\$ 48,505	\$ 71,101	\$ 52,448	\$ 123,549
	2015	367	12,556	3,972	29,348	46,243	47,069	93,312
	2014	522	11,211	3,922	24,257	39,912	67,480	107,392
Germany	2016	\$ 22,332	\$ 2,118	\$ 14,310	\$ 25,269	\$ 64,029	\$ 71,981	\$ 136,010
	2015	19,817	2,028	8,455	—	30,300	106,104	136,404
	2014	22,772	4,524	8,522	—	35,818	173,121	208,939
France	2016	\$ 10,871	\$ 4,076	\$ 26,195	\$ 3,723	\$ 44,865	\$ 88,256	\$ 133,121
	2015	9,139	5,780	21,199	2,890	39,008	127,159	166,167
	2014	13,544	8,670	23,254	2,222	47,690	188,703	236,393
Italy	2016	\$ 12,290	\$ 4,760	\$ 4,487	\$ 848	\$ 22,385	\$ 62,382	\$ 84,767
	2015	12,313	3,618	6,331	732	22,994	89,712	112,706
	2014	14,297	5,293	5,221	550	25,361	128,269	153,630
Ireland	2016	\$ 148	\$ 664	\$ 18,916	\$ —	\$ 19,728	\$ 5,469	\$ 25,197
	2015	67	952	12,436	—	13,455	8,024	21,479
	2014	131	4,007	13,613	—	17,751	12,734	30,485
Netherlands	2016	\$ 1,333	\$ 479	\$ 8,816	\$ —	\$ 10,628	\$ 35,045	\$ 45,673
	2015	1,717	1,688	10,736	—	14,141	52,029	66,170
	2014	1,551	3,157	24,792	—	29,500	86,039	115,539

(a) Consists primarily of commercial and industrial.

(b) Outstandings include loans and accrued interest receivable, interest-bearing deposits with banks, acceptances, resale agreements, other monetary assets, cross-border trading debt and equity instruments, fair value of foreign exchange and derivative contracts, and local country assets, net of local country liabilities. The amounts associated with foreign exchange and derivative contracts are presented after taking into account the impact of legally enforceable master netting agreements.

(c) Commitments include outstanding letters of credit, undrawn commitments to extend credit, and the gross notional value of credit derivatives where JPMorgan Chase is a protection seller.

The tables below summarize the changes in the allowance for loan losses and the allowance for lending-related commitments during the periods indicated. For a further discussion, see Allowance for credit losses on pages 105–107, and Note 15.

Allowance for loan losses

Year ended December 31, (in millions)	2016		2015		2014		2013		2012	
Balance at beginning of year	\$	13,555	\$	14,185	\$	16,264	\$	21,936	\$	27,609
U.S. charge-offs										
U.S. consumer, excluding credit card		1,500		1,658		2,132		2,754		4,805
U.S. credit card		3,799		3,475		3,682		4,358		5,624
Total U.S. consumer charge-offs		5,299		5,133		5,814		7,112		10,429
U.S. wholesale:										
Commercial and industrial		229		63		44		150		131
Real estate		7		6		14		51		114
Financial institutions		—		5		14		1		8
Government agencies		—		—		25		1		—
Other		24		6		22		9		56
Total U.S. wholesale charge-offs		260		80		119		212		309
Total U.S. charge-offs		5,559		5,213		5,933		7,324		10,738
Non-U.S. charge-offs										
Non-U.S. consumer, excluding credit card		—		—		—		—		—
Non-U.S. credit card		—		13		149		114		131
Total non-U.S. consumer charge-offs		—		13		149		114		131
Non-U.S. wholesale:										
Commercial and industrial		134		5		27		5		8
Real estate		1		—		4		11		6
Financial institutions		1		—		—		—		—
Government agencies		—		—		—		—		4
Other		2		10		1		13		19
Total non-U.S. wholesale charge-offs		138		15		32		29		37
Total non-U.S. charge-offs		138		28		181		143		168
Total charge-offs		5,697		5,241		6,114		7,467		10,906
U.S. recoveries										
U.S. consumer, excluding credit card		(591)		(704)		(814)		(847)		(508)
U.S. credit card		(357)		(364)		(383)		(568)		(782)
Total U.S. consumer recoveries		(948)		(1,068)		(1,197)		(1,415)		(1,290)
U.S. wholesale:										
Commercial and industrial		(10)		(32)		(49)		(27)		(335)
Real estate		(15)		(20)		(27)		(56)		(64)
Financial institutions		(3)		(8)		(12)		(90)		(37)
Government agencies		(1)		(8)		—		—		(2)
Other		(3)		(3)		(36)		(6)		(21)
Total U.S. wholesale recoveries		(32)		(71)		(124)		(179)		(459)
Total U.S. recoveries		(980)		(1,139)		(1,321)		(1,594)		(1,749)
Non-U.S. recoveries										
Non-U.S. consumer, excluding credit card		—		—		—		—		—
Non-U.S. credit card		—		(2)		(19)		(25)		(29)
Total non-U.S. consumer recoveries		—		(2)		(19)		(25)		(29)
Non-U.S. wholesale:										
Commercial and industrial		(18)		(10)		—		(29)		(16)
Real estate		—		—		—		—		(2)
Financial institutions		—		(2)		(14)		(10)		(7)
Government agencies		—		—		—		—		—
Other		(7)		(2)		(1)		(7)		(40)
Total non-U.S. wholesale recoveries		(25)		(14)		(15)		(46)		(65)
Total non-U.S. recoveries		(25)		(16)		(34)		(71)		(94)
Total recoveries		(1,005)		(1,155)		(1,355)		(1,665)		(1,843)
Net charge-offs		4,692		4,086		4,759		5,802		9,063
Write-offs of PCI loans(a)		156		208		533		53		—
Provision for loan losses		5,080		3,663		3,224		188		3,387
Other		(11)		1		(11)		(5)		3
Balance at year-end	\$	13,776	\$	13,555	\$	14,185	\$	16,264	\$	21,936

(a) Write-offs of PCI loans are recorded against the allowance for loan losses when actual losses for a pool exceed estimated losses that were recorded as purchase accounting adjustments at the time of acquisition. A write-off of a PCI loan is recognized when the underlying loan is removed from a pool (e.g., upon liquidation). During the fourth quarter of 2014, the Firm recorded a \$291 million adjustment to reduce the PCI allowance and the recorded investment in the Firm's PCI loan portfolio, primarily reflecting the cumulative effect of interest forgiveness modifications. This adjustment had no impact to the Firm's Consolidated statements of income.

Summary of loan and lending-related commitments loss experience

Allowance for lending-related commitments

Year ended December 31, (in millions)	2016	2015	2014	2013	2012
Balance at beginning of year	\$ 786	\$ 622	\$ 705	\$ 668	\$ 673
Provision for lending-related commitments	281	164	(85)	37	(2)
Net charge-offs	—	—	—	—	—
Other	11	—	2	—	(3)
Balance at year-end	\$ 1,078	\$ 786	\$ 622	\$ 705	\$ 668

Loan loss analysis

As of or for the year ended December 31, (in millions, except ratios)	2016	2015	2014	2013	2012
Balances					
Loans – average	\$ 866,378	\$ 787,318	\$ 739,175	\$ 726,450	\$ 722,384
Loans – year-end	894,765	837,299	757,336	738,418	733,796
Net charge-offs(a)	4,692	4,086	4,759	5,802	9,063
Allowance for loan losses:					
U.S.	\$ 12,738	\$ 12,704	\$ 13,472	\$ 15,382	\$ 20,946
Non-U.S.	1,038	851	713	882	990
Total allowance for loan losses	\$ 13,776	\$ 13,555	\$ 14,185	\$ 16,264	\$ 21,936
Nonaccrual loans	\$ 6,883	\$ 6,429	\$ 7,133	\$ 8,540	\$ 10,892
Ratios					
Net charge-offs to:					
Loans retained – average	0.54%	0.52%	0.65%	0.81%	1.26%
Allowance for loan losses	34.06	30.14	33.55	35.67	41.32
Allowance for loan losses to:					
Loans retained – year-end(b)	1.55	1.63	1.90	2.25	3.02
Nonaccrual loans retained	205	215	202	196	207

(a) There were no net charge-offs/(recoveries) on lending-related commitments in 2016, 2015, 2014, 2013 or 2012.

(b) The allowance for loan losses as a percentage of retained loans declined from 2012 to 2016, due to an improvement in credit quality of the consumer and wholesale credit portfolios. For a more detailed discussion of the 2014 through 2016 provision for credit losses, see Provision for credit losses on page 107.

Deposits

The following table provides a summary of the average balances and average interest rates of JPMorgan Chase's various deposits for the years indicated.

Year ended December 31, (in millions, except interest rates)	Average balances			Average interest rates		
	2016	2015	2014	2016	2015	2014
U.S. offices						
Noninterest-bearing	\$ 386,528	\$ 403,143	\$ 376,947	—%	—%	—%
Interest-bearing						
Demand	128,102	78,516	75,553	0.18	0.11	0.10
Savings	515,982	475,142	459,186	0.09	0.07	0.10
Time	59,710	85,098	86,007	0.59	0.38	0.35
Total interest-bearing deposits	703,794	638,756	620,746	0.15	0.12	0.13
Total deposits in U.S. offices	1,090,322	1,041,899	997,693	0.09	0.07	0.08
Non-U.S. offices						
Noninterest-bearing	16,170	15,805	14,461	—	—	—
Interest-bearing						
Demand(a)	167,760	192,017	214,598	0.07	0.13	0.21
Savings(a)	—	—	—	NM	NM	NM
Time	53,716	46,067	37,549	0.39	0.54	0.97
Total interest-bearing deposits	221,476	238,084	252,147	0.15	0.21	0.33
Total deposits in non-U.S. offices	237,646	253,889	266,608	0.14	0.19	0.31
Total deposits	\$ 1,327,968	\$ 1,295,788	\$ 1,264,301	0.10%	0.10%	0.13%

(a) Prior periods have been revised to conform with current period presentation.

At December 31, 2016, other U.S. time deposits in denominations of \$100,000 or more totaled \$11.8 billion, substantially all of which mature in three months or less. In addition, the table below presents the maturities for U.S. time certificates of deposit in denominations of \$100,000 or more.

By remaining maturity at December 31, 2016 (in millions)	Three months or less	Over three months but within six months	Over six months but within 12 months	Over 12 months	Total
U.S. time certificates of deposit (\$100,000 or more)	\$ 4,607	\$ 4,482	\$ 2,691	\$ 5,966	\$ 17,746

Short-term and other borrowed funds

The following table provides a summary of JPMorgan Chase's short-term and other borrowed funds for the years indicated.

As of or for the year ended December 31, (in millions, except rates)	2016	2015	2014
Federal funds purchased and securities loaned or sold under repurchase agreements:			
Balance at year-end	\$ 165,666	\$ 152,678	\$ 192,101
Average daily balance during the year	178,720	192,510	208,560
Maximum month-end balance	207,211	212,112	228,162
Weighted-average rate at December 31	0.50%	0.39%	0.27%
Weighted-average rate during the year	0.61	0.32	0.29
Commercial paper:			
Balance at year-end	\$ 11,738	\$ 15,562	\$ 66,344
Average daily balance during the year	15,001	38,140	59,916
Maximum month-end balance	19,083	64,012	66,344
Weighted-average rate at December 31	1.13%	0.55%	0.22%
Weighted-average rate during the year	0.90	0.29	0.22
Other borrowed funds:(a)			
Balance at year-end	\$ 89,154	\$ 80,126	\$ 96,455
Average daily balance during the year	93,252	93,001	100,189
Maximum month-end balance	102,310	99,226	107,950
Weighted-average rate at December 31	1.79%	1.89%	1.73%
Weighted-average rate during the year	1.93	1.84	1.89
Short-term beneficial interests:(b)			
Commercial paper and other borrowed funds:			
Balance at year-end	\$ 5,688	\$ 11,322	\$ 16,953
Average daily balance during the year	8,296	15,608	14,073
Maximum month-end balance	10,494	17,137	17,026
Weighted-average rate at December 31	0.83%	0.41%	0.23%
Weighted-average rate during the year	0.67	0.32	0.30

(a) Includes interest-bearing securities sold but not yet purchased.

(b) Included on the Consolidated balance sheets in beneficial interests issued by consolidated VIEs.

Federal funds purchased represent overnight funds. Securities loaned or sold under repurchase agreements generally mature between one day and three months. Commercial paper generally is issued in amounts not less than \$100,000, and with maturities of 270 days or less. Other borrowed funds consist of demand notes, term federal funds purchased, and various other borrowings that generally have maturities of one year or less.

NONEXCHANGE-TRADED COMMODITY DERIVATIVE CONTRACTS AT FAIR VALUE

In the normal course of business, JPMorgan Chase trades nonexchange-traded commodity derivative contracts. To determine the fair value of these contracts, the Firm uses various fair value estimation techniques, primarily based on internal models with significant observable market parameters. The Firm's nonexchange-traded commodity derivative contracts are primarily energy-related.

The following table summarizes the changes in fair value for nonexchange-traded commodity derivative contracts for the year ended December 31, 2016.

Year ended December 31, 2016 (in millions)	Asset position	Liability position
Net fair value of contracts outstanding at January 1, 2016	\$ 9,094	\$ 12,025
Effect of legally enforceable master netting agreements	6,772	6,256
Gross fair value of contracts outstanding at January 1, 2016	15,866	18,281
Contracts realized or otherwise settled	(7,678)	(7,921)
Fair value of new contracts	4,571	4,312
Changes in fair values attributable to changes in valuation techniques and assumptions	—	—
Other changes in fair value	(911)	(1,309)
Gross fair value of contracts outstanding at December 31, 2016	11,848	13,363
Effect of legally enforceable master netting agreements	(5,605)	(5,252)
Net fair value of contracts outstanding at December 31, 2016	\$ 6,243	\$ 8,111

The following table indicates the maturities of nonexchange-traded commodity derivative contracts at December 31, 2016.

December 31, 2016 (in millions)	Asset position	Liability position
Maturity less than 1 year	\$ 4,569	\$ 4,812
Maturity 1–3 years	2,626	2,451
Maturity 4–5 years	569	748
Maturity in excess of 5 years	4,084	5,352
Gross fair value of contracts outstanding at December 31, 2016	11,848	13,363
Effect of legally enforceable master netting agreements	(5,605)	(5,252)
Net fair value of contracts outstanding at December 31, 2016	\$ 6,243	\$ 8,111

Signatures

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on behalf of the undersigned, thereunto duly authorized.

JPMorgan Chase & Co.
(Registrant)
By: /s/ JAMES DIMON
(James Dimon
Chairman and Chief Executive Officer)
February 28, 2017

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacity and on the date indicated. JPMorgan Chase & Co. does not exercise the power of attorney to sign on behalf of any Director.

	Capacity	Date
<u>/s/ JAMES DIMON</u> (James Dimon)	Director, Chairman and Chief Executive Officer (Principal Executive Officer)	
<u>/s/ LINDA B. BAMMANN</u> (Linda B. Bammann)	Director	
<u>/s/ JAMES A. BELL</u> (James A. Bell)	Director	
<u>/s/ CRANDALL C. BOWLES</u> (Crandall C. Bowles)	Director	
<u>/s/ STEPHEN B. BURKE</u> (Stephen B. Burke)	Director	
<u>/s/ TODD A. COMBS</u> (Todd A. Combs)	Director	
<u>/s/ JAMES S. CROWN</u> (James S. Crown)	Director	February 28, 2017
<u>/s/ TIMOTHY P. FLYNN</u> (Timothy P. Flynn)	Director	
<u>/s/ LABAN P. JACKSON, JR.</u> (Laban P. Jackson, Jr.)	Director	
<u>/s/ MICHAEL A. NEAL</u> (Michael A. Neal)	Director	
<u>/s/ LEE R. RAYMOND</u> (Lee R. Raymond)	Director	
<u>/s/ WILLIAM C. WELDON</u> (William C. Weldon)	Director	
<u>/s/ MARIANNE LAKE</u> (Marianne Lake)	Executive Vice President and Chief Financial Officer (Principal Financial Officer)	
<u>/s/ NICOLE GILES</u> (Nicole Giles)	Managing Director and Corporate Controller (Principal Accounting Officer)	

Exhibit 10.23

JPMORGAN CHASE & CO. LONG-TERM INCENTIVE PLAN TERMS AND CONDITIONS OF JANUARY 17, 2017 PERFORMANCE SHARE UNIT AWARD OPERATING COMMITTEE (Protection-Based Vesting Provisions)

Award Agreement

These terms and conditions are made part of the Award Agreement dated as of January 17, 2017 (“Grant Date”) awarding performance share units (“PSUs”) pursuant to the terms of the JPMorgan Chase & Co. Long-Term Incentive Plan (“Plan”). To the extent the terms of the Award Agreement (all references to which will include these terms and conditions) conflict with the Plan, the Plan will govern. The Award Agreement, the Plan and Prospectus supersede any other agreement, whether written or oral, that may have been entered into by the Firm and you relating to this award.

This award was granted on the Grant Date subject to the Award Agreement and Plan. **Unless you decline by the deadline and in the manner specified in the Award Agreement, you will have agreed to be bound by these terms and conditions, effective as of the Grant Date.** If you decline the award, it will be cancelled as of the Grant Date.

Capitalized terms that are not defined in “Definitions” below or elsewhere in the Award Agreement will have the same meaning as set forth in the Plan.

JPMorgan Chase & Co. will be referred to throughout the Award Agreement as “JPMorgan Chase,” and together with its subsidiaries as the “Firm.”

Form and Purpose of Award

Each PSU represents a non-transferable right to receive one share of Common Stock as of the vesting date as set forth in your Award Agreement.

The purpose of this award is to further emphasize sustained long-term performance and to align your interests with those of the Firm and its shareholders.

Dividend Equivalents Protection-Based Vesting

If dividends are paid on Common Stock while restricted stock units under this award are outstanding, you will be paid an amount equal to the dividend paid on one share of Common Stock, multiplied by the number of restricted stock units outstanding under this award.

This award is intended and expected to vest on the vesting date, provided that you are continuously employed by the Firm through such vesting date, or you meet the requirements for continued vesting described under the subsections “--Job Elimination,” “--Full Career Eligibility,” “--Government Office” or “--Disability.” However, vesting and the number of PSUs that will vest are subject to these terms and conditions (including, but not limited to, sections captioned “Recapture Provisions,” “Number to Vest on Vesting Date,” “Remedies” and the following protection-based vesting provision).

Up to a total of fifty percent of your award (including any associated Reinvested Dividend Equivalent Share Units) that would otherwise be distributable to you on the vesting date (“At Risk PSUs”) may be cancelled if the Chief Executive Officer of JPMorgan Chase (“CEO”) determines in his or her sole discretion that cancellation of all or portion of the At Risk PSUs is appropriate in light of any one or a combination of the following factors:

- Your performance in relation to the priorities for your position, or the Firm’s performance in relation to the priorities for which you share responsibility as a member of the Operating Committee, have been unsatisfactory for a sustained period of time. Among the factors the CEO may consider in assessing performance are: net income, total net revenue, earnings per share and capital ratios of the Firm, both on an absolute basis and, as appropriate, relative to peer firms.
- For any calendar year ending during the vesting period, JPMorgan Chase’s annual pre-tax pre-provision income at the Firm level is negative.
- RSU awards granted to participants in a Line of Business for which you exercise, or during the vesting period exercised, direct or indirect responsibility, were in whole or in part cancelled because the Line of Business did not meet its annual Line of Business Financial Threshold.
- The Firm does not meet the Firmwide Financial Threshold.

For avoidance of doubt, cancellation of the At Risk PSUs, in whole or part, for one or more of the above factors may occur prior to the end of the Performance Period and the maximum number of At Risk PSUs subject to cancellation prior to the end of the Performance Period will be up to fifty percent of the Target Award Number.

In the event that your employment terminates due to “Job Elimination,” “Full Career Eligibility,” “Government Office” or “Disability” thereby entitling you to continued vesting in your award, (or potentially acceleration due to satisfaction of the Government Office Requirements), the cancellation circumstances described above will continue to apply to your At Risk PSUs pursuant to the section captioned “Accelerated Distribution for Ethics or Conflict Reasons Resulting from Employment by a Government Entity.”

Any determination above with respect to protection-based vesting provisions is subject to ratification by the Compensation and Management Development Committee of the Board of Directors of JPMorgan Chase (“Committee”). In the case of an award to the CEO, all such determinations shall be made by the Committee.

Number to Vest on the Vesting Date Subject to any cancellation in whole or part of your award pursuant to these terms and conditions:

Performance calculation: On the vesting date, you will vest in a number of PSUs derived by dividing the sum of the number of the Annual PSUs by the number of years in the Performance Period. See sections captioned, "Calculation of Performance Ranking" and "Definitions."

You will also vest in additional shares of Common Stock as calculated under the section captioned, "Reinvested Dividend Equivalent Share Units." Delivery of vested shares to your account will be made not later than the date specified in the last sentence of the subsection captioned Section 409A Compliance.

Reinvested Dividend Equivalent Share Units If dividends are paid on Common Stock during the Vesting Period while the award is outstanding, you will receive on the vesting date additional units representing shares of Common Stock as calculated in this section. The number, if any, will be based on the dividends that would have been paid during the Vesting Period as of each dividend payment date on the actual number of shares of Common Stock distributable to you resulting from the vesting of the PSUs, if any, and treated as reinvested in additional shares of Common Stock on each dividend payment based on the Fair Market Value of one share of Common Stock on each dividend payment date ("Reinvested Dividend Equivalent Share Units").

Holding Requirement As of the vesting date set forth in your Award Agreement, you shall be entitled to be issued a number of shares of the Common Stock of JPMorgan Chase equal to the number of PSUs, plus any additional Reinvested Dividend Equivalent Share Units, vesting on such date, less the number withheld to satisfy tax withholding obligations. The net number of shares issued to you will be held in an account in your name with restrictions preventing you from transferring, assigning, selling, pledging or otherwise encumbering such shares for a two year period commencing as of the vesting date and ending as of the second anniversary of the vesting date. Such restrictions shall only lapse, prior to the expiration of the two year holding period, in the event of your death or for an accelerated distribution for ethics or conflict reasons. See section captioned, "Death" and subsection captioned, "Accelerated Distribution for Ethics or Conflict Reasons Resulting From Employment by a Government Entity."

Calculation of Performance Ranking For purposes of the Performance Ranking, the Ranking of the Firm and of each Performance Company for each year in the Performance Period shall be determined and calculated by the Calculation Agent, using the definitions of "Annual PSUs," "ROTCE," "Average Tangible Common Equity," (if otherwise applicable) "Firm Reported ROTCE" and "Performance Table" (including its footnote) as set forth in the Definitions section of these terms and conditions. See section captioned, "Definitions". Except for Firm Reported ROTCE, calculations will be expressed as a decimal to the second place (i.e. xx.yy%). See section captioned, "Definitions--Performance Table" in the event of a tie. All performance based calculations as set forth herein are binding and conclusive on you and your successors.

Vesting Period The period from the Grant Date to the vesting date is the "Vesting Period." (See "Administrative Provision--Amendment" pursuant to which the Firm may extend the vesting period and "No Ownership Rights" pursuant to which the Firm may place restrictions on delivered shares of Common Stock following the vesting date and section captioned, "Holding Period" above).

Bonus Recoupment In consideration of the grant of this award, you agree that you are subject to the JPMorgan Chase Bonus Recoupment Policy (or successor policy) as in effect from time to time as it applies both to the cash incentive compensation awarded to you for performance year 2016 and to this award. You can access this policy as currently in effect through the following link:

<http://www.jpmorganchase.com/corporate/About-JPMC/corporate-governance-principles.htm#recoupment>

For the avoidance of doubt, nothing in these terms and conditions in any way limits the rights of the Firm under the JPMorgan Chase Bonus Recoupment Policy (or successor policy).

Recapture Provisions (Detrimental Conduct, Risk-Related and Other Recapture Provisions) Notwithstanding any terms of this Award Agreement to the contrary, JPMorgan Chase reserves the right in its sole discretion to cancel up to 100% of your award (for the avoidance of doubt, including any associated Reinvested Dividend Equivalent Share Units) and, to the extent set forth in "Remedies" below, to recover from you up to an amount equal to the Fair Market Value (determined as of the vesting date) of the gross number of shares of Common Stock previously distributed (including vested shares subject to the Holding Requirements and shares withheld for tax purposes) under this award if the Firm in its sole discretion determines that:

- you engaged in conduct detrimental to the Firm insofar as it causes material financial or reputational harm to the Firm or its business activities, or
 - this award was based on materially inaccurate performance metrics, whether or not you were responsible for the inaccuracy, or
 - this award was based on a material misrepresentation by you, or
 - you improperly or with gross negligence failed to identify, raise or assess, in a timely manner and as reasonably expected, risks and/or concerns with respect to risks material to the Firm or its business activities, or
 - your employment was terminated for Cause (see section captioned "Definitions" below) or, in the case of a determination after the termination of your employment, that your employment could have been terminated for Cause.
- See section captioned "Remedies" below for additional information.

JPMorgan Chase's right to cancel and/or recover the value of this award (or any cash bonus) under the JPMorgan Chase Bonus Recoupment Policy and the other provisions of this award relate to the "organizational goals" of the Firm as that term is defined by regulations issued under Section 409A of the Internal Revenue Code ("Code").

**Termination of
Employment**

Except as explicitly set forth below under the subsections captioned “--Job Elimination,” “--Full Career Eligibility,” “--Government Office” or “--Disability” or under the section captioned “Death,” this award (for avoidance of doubt, including any associated Reinvested Dividend Equivalent Share Units) will be cancelled in full effective on the date your employment with the Firm terminates for any reason.

Subject to these terms and conditions (including, but not limited to, sections captioned “Protection-Based Vesting,” “Number to Vest on Vesting Date,” “Bonus Recoupment,” “Recapture Provisions,” “Remedies,” and “Your Obligations,”) you will be eligible to continue to vest (on the original vesting schedule) with respect to your award in accordance with its terms and conditions following the termination of your employment if one of the following circumstances applies to you:

Ø Job Job Elimination:

Elimination

In the event that the Director of Human Resources or nominee in his or her sole discretion determines that

- the Firm terminated your employment because your job was eliminated, and
 - after you are notified that your job will be eliminated, you provided such services as requested by the Firm in a cooperative and professional manner, and
- you satisfied the Release/Certification Requirements set forth below.

Ø Full Full Career Eligibility:

**Career
Eligibility**

In the event that the Director of Human Resources or nominee in his or her sole discretion determines that

- you voluntarily terminated your employment with the Firm, had completed at least five years of continuous service with the Firm immediately preceding your termination date, and the sum of your age and Recognized Service (as defined below) on your date of termination equaled or exceeded 60, and
- you provided at least 90 days advance written notice to the Firm of your intention to voluntarily terminate your employment under this provision, during which notice period you provided such services as requested by the Firm in a cooperative and professional manner and you did not perform any services for any other employer, and
- continued vesting shall be appropriate, which determination shall be made prior to your termination and will be based on your performance and conduct (before and after providing notice), and
- for 36 months from the date of grant of this award, you do not either perform services in any capacity (including self-employment) for a Financial Services Company (as defined below) or work in your profession (whether or not for a Financial Services Company); provided that you may work for a government, education or Not-for-Profit Organization (as defined below), and
- you satisfy the Release/Certification Requirements set forth below.

After receipt of such advance written notice, the Firm may choose to have you continue to provide services during such 90-day period as a condition to continued vesting or shorten the length of the 90-day period at the Firm’s discretion, but to a date no earlier than the date you would otherwise meet the age and service requirements.

Additional advance notice requirements may apply for employees subject to notice period policies. (See “Notice Period” below.)

Ø Government Government Office:

Office

In the event that you voluntarily terminate your employment with the Firm to accept a Government Office or become a candidate for an elective Government Office, as described at the end of these terms and conditions under the section captioned “Government Office Requirements.” See also definition of Government Office in the section captioned “Definitions.”

Ø Disability Disability:

In the event that

- your employment with the Firm terminates because (i) you are unable to return to work while you are receiving benefits under the JPMorgan Chase Long Term Disability Plan, or for non-U.S. employees, under the equivalent JPMorgan Chase-sponsored local country plan (in either case, “LTD Plan”), or (ii) if you are not covered by a LTD Plan, you are unable to return to work due to a long-term disability that would qualify for benefits under the applicable LTD Plan, as determined by the Firm or a third-party designated by the Firm; provided that you (x) request in writing continued vesting due to such disability within 30 days of the date your employment terminates, and (y) provide any requested supporting documentation and (z) receive the Firm’s written consent to such treatment, and
- you satisfy the Release/Certification Requirements set forth below.

To qualify for continued vesting after termination of your employment under any of the foregoing circumstances:

**Release/
Certification**

- you must timely execute and deliver a release of claims in favor of the Firm, having such form and terms as the Firm shall specify,
- with respect to Full Career Eligibility, prior to the termination of your employment, you must confirm with management that you meet the eligibility criteria (including providing at least 90 days advance written notification), advise that you are seeking to be treated as an individual eligible for Full Career Eligibility, and receive written consent to such continued vesting,
- with respect to Disability, you must satisfy the notice and documentation described above and receive written consent to such continued vesting,
- with respect to “Full Career Eligibility,” it is your responsibility to take the appropriate steps to certify to the Firm prior to the vesting date while the employment restrictions are outstanding on the authorized form of the Firm that you have complied with the employment restrictions applicable to you (as described herein) from your date of termination of employment through the applicable vesting date, and in all cases, otherwise complied with all other terms of the Award Agreement. (See section captioned “Your Obligations” below.)

Death

If you die while you are eligible to vest in this award, your designated beneficiary on file with the Firm’s Stock Administration Department (or your estate or if no beneficiary has been designated or survives you) may be entitled to receive a distribution of a number of shares of Common Stock associated with your award. The Target Award Percentage in the case of death is based on the Number to Vest on the Vesting Date calculation described above for each completed calendar year in the Performance Period and using the Target Award Percentage equal to 100 percent for any remaining calendar years in the Performance Period.

In addition your beneficiary or your estate shall receive additional shares of Common Stock, i.e. Reinvested Dividend Equivalent Share Units, as set forth in the section captioned, “Reinvested Dividend Equivalent Share Units” but based on dividend equivalents up to the date of your death.

Any shares will be distributed no later than the end of the calendar year immediately following the calendar year which contains your date of death; however, our administrative practice is to register such shares in the name of your beneficiary or estate within 60 days of the Firm’s receipt of any required documentation.

Your Obligations

In consideration of the grant of this award, you agree to comply with and be bound by the obligations set forth below next to the subsections captioned “--Non-Solicitation of Employees and Customers,” “--Confidential Information,” “--Non-Disparagement,” “--Cooperation,” “--Compliance with Award Agreement,” and “--Notice Period.”

**☒ ☐ Non-
Solicitation of
Employees and
Customers**

During your employment by the Firm and for the longer of the (i) one year period following the termination of your employment or, (ii) if your award is not cancelled as of your termination date, the three year period from Grant Date, you will not directly or indirectly, whether on your own behalf or on behalf of any other party, without the prior written consent of the Director of Human Resources: (i) solicit, induce or encourage any of the Firm’s then current employees to leave the Firm or to apply for employment elsewhere, (ii) hire any employee or former employee who was employed by the Firm at the date your employment terminated, unless the individual’s employment terminated because his or her job was eliminated, or the individual’s employment with the Firm has been terminated for more than six months, (iii) to the fullest extent enforceable under applicable law, solicit or induce or attempt to induce to leave the Firm, or divert or attempt to divert from doing business with the Firm, any then current customers, suppliers or other persons or entities that were serviced by you or whose names became known to you by virtue of your employment with the Firm, or otherwise interfere with the relationship between the Firm and such customers, suppliers or other persons or entities. This does not apply to publicly known institutional customers that you service after your employment with the Firm without the use of the Firm’s confidential or proprietary information.

These restrictions do not apply to authorized actions you take in the normal course of your employment with the Firm, such as employment decisions with respect to employees you supervise or business referrals in accordance with the Firm’s policies.

**☒ ☐ Confidential
Information**

You will not, either during your employment with the Firm or thereafter, directly or indirectly (i) use or disclose to anyone any confidential information related to the Firm’s business, or (ii) communicate with the press or other media about matters related to the Firm, its customers or employees, including matters and activities relating to your employment, or the employment of others, by the Firm, in the case of either (i) or (ii), except as explicitly permitted by the JPMorgan Chase Code of Conduct and applicable policies or law or legal process. In addition, following your termination of employment, you will not, without prior written authorization, access the Firm’s private and internal information through telephonic, intranet or internet means. “Confidential information” shall have the same meaning for the Award Agreement as it has in the JPMorgan Chase Code of Conduct.

Nothing in this award precludes you from reporting to the Firm’s management or directors, the government, a regulator, a self-regulatory agency, your attorneys or a court, conduct you believe to be in violation of the law or concerns of any known or suspected Code of Conduct violation. It is also not intended to prevent you from responding truthfully to questions or requests from the government, a regulator or in a court of law.

- ☒ ☒ Non-Disparagement** You will not, either during your employment with the Firm or thereafter, make or encourage others to make any public statement or release any information in verbal, written, electronic or any other form, that is intended to, or reasonably could be foreseen to, disparage, embarrass or criticize the Firm or its employees, officers, directors or shareholders as a group. This shall not preclude you from reporting to the Firm's management or directors or to the government or a regulator conduct you believe to be in violation of the law or the Firm's Code of Conduct or responding truthfully to questions or requests for information to the government, a regulator or in a court of law in connection with a legal or regulatory investigation or proceeding.
- ☒ ☒ Cooperation** You will cooperate fully with and provide full and accurate information to the Firm and its counsel with respect to any matter (including any audit, tax proceeding, litigation, investigation or governmental proceeding) with respect to which you may have knowledge or information, subject to reimbursement for actual, appropriate and reasonable out-of-pocket expenses incurred by you.
- ☒ ☒ Compliance with Award Agreement** You will provide the Firm with any information reasonably requested to determine compliance with the Award Agreement, and you authorize the Firm to disclose the terms of the Award Agreement to any third party who might be affected thereby, including your prospective employer.
- ☒ ☒ Notice Period** If you are subject to a notice period or become subject to a notice period after the Grant Date, whether by contract or by policy, that requires you to provide advance written notice of your intention to terminate your employment ("Notice Period"), then as consideration for this award and continued employment, you will provide the Firm with the necessary advance written notice that applies to you, as specified by such contract or policy.

After receipt of your notice, the Firm may choose to have you continue to provide services during the applicable Notice Period or may place you on a paid leave for all or part of the applicable Notice Period. During the Notice Period, you shall continue to devote your full time and loyalty to the Firm by providing services in a cooperative and professional manner and not perform any services for any other employer and shall receive your base salary and certain benefits until your employment terminates. You and the Firm may mutually agree to waive or modify the length of the Notice Period.

Regardless of whether a Notice Period applies to you, you must comply with the 90-day advance notice period described under the subsection captioned "-- Full Career Eligibility" in the event you wish to terminate employment under that same subsection.

Remedies

☒ Cancellation In addition to the cancellation provisions described under the sections captioned "Bonus Recoupment," "Protection-Based Vesting," "Termination of Employment" and "Recapture Provisions," your outstanding PSUs under this award may be cancelled if the Firm in its sole discretion determines that:

- you have failed to comply with any of the advance notice/cooperation requirements or employment restrictions applicable to your termination of employment, or
- you have failed to return the required forms specified under the section captioned "Release/Certification" by the specified deadline, or
- you have violated any of the provisions as set forth above in the section captioned "Your Obligations."

To the extent provided under the subsection captioned "--Amendment" below, JPMorgan Chase reserves the right to suspend vesting of this award and/or distribution of shares under this award, including, without limitation, during any period that JPMorgan Chase is evaluating whether this award is subject to cancellation and/or recovery and/or whether the conditions for distributions of shares under this award are satisfied. The Firm is not responsible for any price fluctuations during any period of suspension and, if applicable, suspended units will be reinstated consistent with Plan administration procedures. See also "Administrative Provisions-No Ownership Rights."

In addition, you may be required to pay the Firm up to an amount equal to the Fair Market Value (determined as of the applicable vesting date or acceleration date) of the gross number of shares of Common Stock previously distributed, including vested shares subject to the Holding Requirements, under this award as follows:

- Payment may be required with respect to any shares of Common Stock distributed within the three year period prior to a notice-of-recovery under this section, if the Firm in its sole discretion determines that:
 - you committed a fraudulent act, or engaged in knowing and willful misconduct related to your employment;
 - you violated any of the provisions as set forth above in the section captioned “Your Obligations,” or
 - you violated the employment restrictions set forth in the subsection Full Career Eligibility following the termination of your employment.

- In addition, payment may be required with respect to any shares distributed within the one year period prior to notice-of-recovery under this section, if the Firm in its sole discretion determines appropriate pursuant to the provisions in the subsection captioned “Recapture Provisions.” Notice-of-recovery under this subsection is a written (including electronic) notice from the Firm to you either requiring payment under this subsection or stating that JPMorgan Chase is evaluating requiring payment under this subsection. Without limiting the foregoing, notice-of-recovery will be deemed provided if the Firm makes a good faith attempt to provide written (including electronic) notice at your last known address maintained in the Firm’s employment records. For the avoidance of doubt, a notice-of-recovery that the Firm is evaluating requiring payment under this section shall preserve JPMorgan Chase’s rights to require payment as set forth above in all respects and the Firm shall be under no obligation to complete its evaluation other than as the Firm may determine in its sole discretion.

For purposes of this section, shares distributed under this award include shares withheld for tax purposes. However, it is the Firm’s intention that you only be required to pay the amounts under this section with respect to shares that are or may be retained by you following a determination of tax liability and that you will not be required to pay amounts with respect to shares representing irrevocable tax withholdings or tax payments previously made (whether by you or the Firm) that you will not be able to recover, recapture or reclaim (including as a tax credit, refund or other benefit). Accordingly, JPMorgan Chase will not require you to pay any amount that the Firm or its nominee in his or her sole discretion determines is represented by such withholdings or tax payments.

Payment may be made in shares of Common Stock or in cash. You agree that any repayment will be a recovery of shares to which you were not entitled under the terms and conditions of your Award Agreement and is not to be construed in any manner as a penalty. You also acknowledge that a violation or attempted violation of the obligations set forth herein will cause immediate and irreparable damage to the Firm, and therefore agree that the Firm shall be entitled as a matter of right to an injunction, from any court of competent jurisdiction, restraining any violation or further violation of such obligations; such right to an injunction, however, shall be cumulative and in addition to whatever other remedies the Firm may have under law or equity.

Nothing in the section in any way limits your obligations under “Bonus Recoupment.”

Administrative Provisions

Withholding Taxes: The Firm, in its sole discretion, may (i) retain from each distribution the number of shares of Common Stock required to satisfy applicable tax obligations or (ii) implement any other desirable or necessary procedures, so that appropriate withholding and other taxes are paid to the competent authorities with respect to the vested shares and the award. This may include but is not limited to (i) a market sale of a number of such shares on your behalf substantially equal to the withholding or other taxes, (ii) to the extent required by law, withhold from cash compensation, an amount equal to any withholding obligation with respect to the award and shares that vest under this award, and (iii) retaining shares that vest under this award until you pay any taxes associated with the award and vested shares directly to the competent authorities.

Right to Set Off: The Firm may, to the maximum extent permitted by applicable law (including Section 409A of the Code to the extent it is applicable to you), retain for itself funds or the shares of Common Stock resulting from any vesting of this award to satisfy any obligation or debt that you owe to the Firm. Notwithstanding any account agreement with the Firm to the contrary, the Firm will not recoup or recover any amount owed from any funds or unrestricted securities held in your name and maintained at the Firm pursuant to such account agreement to satisfy any obligation or debt or obligation owed by you under this award without your consent. This restriction on the Firm does not apply to accounts described and authorized in “No Ownership Rights” described below.

No Ownership Rights: PSUs do not convey the rights of ownership of Common Stock and do not carry voting rights. No shares of Common Stock will be issued to you until after the number of PSUs have been determined, if any, and have vested and any applicable restrictions (other than Holding Requirement) have lapsed. Shares will be issued in accordance with JPMorgan Chase’s procedures for issuing stock. By accepting this award, you authorize the Firm, in its discretion, to establish on your behalf a brokerage account in your name with the Firm or book-entry account with our stock administrator and/or transfer agent and deliver to that account any vested shares derived from the award.

With respect to any applicable vesting date, JPMorgan Chase may impose for any reason, as of such vesting date for such period as it may specify in its sole discretion, such restrictions on the Common Stock to be issued to you as it may deem appropriate, including, but not limited to, restricting the sale, transfer, pledge, assignment or encumbrance of such shares of Common Stock. By accepting this award, you acknowledge that during such specified period should there be a determination that the cancellation or recovery provisions of this Award apply, then you agree that any shares subject to such restrictions (notwithstanding the limitation set forth in the Right to Set Off section above) may be cancelled in whole or part. (See sections captioned “Protection-Based Vesting,” “Bonus Recoupment,” “Recapture Provisions,” “Termination of Employment” and “Remedies”, as well as the subsection captioned “-Amendment” permitting suspension of vesting.)

Binding Agreement: The Award Agreement will be binding upon any successor in interest to JPMorgan Chase, by merger or otherwise.

Not a Contract of Employment: Nothing contained in the Award Agreement constitutes a contract of employment or continued employment. Employment is “at-will” and may be terminated by either you or JPMorgan Chase for any reason at any time. This award does not confer any right or entitlement to, nor does the award impose any obligation on the Firm to provide, the same or any similar award in the future and its value is not compensation for purposes of determining severance.

Section 409A Compliance: To the extent that Section 409A of the Code is applicable to this award, distributions of shares and cash hereunder are intended to comply with Section 409A of the Code, and the Award Agreement, including these terms and conditions, shall be interpreted in a manner consistent with such intent.

Notwithstanding anything herein to the contrary, if you (i) are subject to taxation under the Code, (ii) are a specified employee as defined in the JPMorgan Chase 2005 Deferred Compensation Plan and (iii) have incurred a separation from service (as defined in that Plan with the exception of death) and if any units/shares under this award represent deferred compensation as defined in Section 409A and such shares are distributable (under the terms of this award) within six months following, and as a result of your separation from service, then those shares will be delivered during the first calendar month after the expiration of six full months from date of your separation from service. Further, if your award is not subject to a substantial risk of forfeiture as defined by regulations issued under Section 409A of the Code, then the remainder of each calendar year immediately following vesting date set forth in your Award Agreement shall be a payment date for purposes of distributing the vested portion of the award.

Change in Outstanding Shares: In the event of any change in the outstanding shares of Common Stock by reason of any stock dividend or split, recapitalization, issuance of a new class of common stock, merger, consolidation, spin-off, combination or exchange of shares or other similar corporate change, or any distributions to stockholders of Common Stock other than regular cash dividends, the Committee will make an equitable substitution or proportionate adjustment, in the number or kind of shares of Common Stock or other securities issued or reserved for issuance pursuant to the Plan and to any PSUs outstanding under this award for such corporate events.

Other Equitable Adjustments: The Committee may make adjustments (up or down) to the award as it deems to be equitable, to maintain the intended economics of the award in light of changed circumstances, which may include unusual or non-recurring events affecting the Firm (or the Performance Companies) or its financial statements in each case resulting from changes in accounting methods, practices or policies, changes in capital structure by reason of legal or regulatory requirements and such other changed circumstances, as the Committee may deem appropriate.

Interpretation/Administration: The Committee has sole and complete authority to interpret and administer this Award Agreement, including, without limitation, the power to (i) interpret the Plan and the terms of this Award Agreement; (ii) determine the reason for termination of employment; (iii) determine application of the post-employment obligations and cancellation and recovery provisions; (iv) decide all claims arising with respect to this award; and (v) delegate such authority as it deems appropriate. Any determination contemplated hereunder by the Committee, the Firm, the Director of Human Resources or their respective delegates or nominees shall be binding on all parties.

Notwithstanding anything herein to the contrary, the determinations of the Director of Human Resources, the Firm, the Committee and their respective delegates and nominees under the Plan and the Award Agreements are not required to be uniform. By way of clarification, the Committee, the Firm, the Director of Human Resources and their respective delegates and nominees shall be entitled to make non-uniform and selective determinations and modifications under Award Agreements and the Plan.

Amendment: The Committee or its nominee reserves the right to amend this Award Agreement in any manner, at any time and for any reason; provided, however, that no such amendment shall materially adversely affect your rights under this Award Agreement without your consent except to the extent that the Committee or its delegate considers advisable to (x) comply with applicable laws or changes in or interpretation of applicable laws, regulatory requirements and accounting rules or standards and/or (y) make a change in a scheduled vesting date or impose the restrictions described above under “No Ownership Rights,” in either case, to the extent permitted by Section 409A of the Code if it is applicable to you. This Award Agreement may not be amended except in writing signed by the Director of Human Resources of JPMorgan Chase.

Severability: If any portion of the Award Agreement is determined by the Firm to be unenforceable in any jurisdiction, any court or arbitrator of competent jurisdiction or the Director of Human Resources may reform the relevant provisions (e.g., as to length of service, time, geographical area or scope) to the extent the Firm (or court/arbitrator) considers necessary to make the provision enforceable under applicable law.

Accelerated Distribution for Ethics or Conflict Reasons Resulting From Employment by a Government Entity: Upon receipt of satisfactory evidence that applicable United States federal, state, local, foreign or supranational ethics or conflict of interest laws or regulations require you to divest your interest in JPMorgan Chase PSUs, the Firm may accelerate the distribution of all or part of your outstanding award, including Reinvested Dividend Equivalent Share Units, effective on or before the required divestiture date and waive the Holding Requirement; provided that no accelerated distribution shall occur if the Firm determines that such acceleration will violate Section 409A of the Code.

If you have voluntarily terminated your employment and have satisfied the requirements of the section captioned “Government Office Requirements”, acceleration shall apply (to extent required) to the percentage of your outstanding award that would continue to vest under that section. In the case of a termination of employment where the award is outstanding as a result of the subsections entitled “Job Elimination” or “Full Career Eligibility,” then acceleration shall apply, to the extent required, to the full outstanding award. Subject to the two foregoing sections, the number of shares of Common Stock to be received on acceleration shall be determined using the methodology set forth under the section captioned “Death.”

To the extent you have vested shares under this award subject to the Holding Requirement and become subject to divestiture requirement as forth herein, the Firm may waive the holding period to the extent required.

Notwithstanding an accelerated distribution or waiver of the Holding Requirement pursuant to the foregoing, you will remain subject to the applicable terms of your Award Agreement as if your award had remained outstanding for the duration of the original vesting period and shares had been distributed as scheduled as of the vesting date, including, but not limited to, repayment obligations set forth in the section captioned “Remedies” and the employment restrictions in the sections captioned “Protection-Based Vesting” and “Government Office Requirements” and the subsection “Full Career Eligibility.”

Use of Personal Data: By accepting this award, you have acknowledged that the Firm may process your personal data (including sensitive personal data) for purposes, including but not limited to (i) determining your compensation, (ii) payroll activities, including, but not limited to, tax withholding and regulatory reporting, which tax and regulatory reporting and withholding may include, but is not limited to, the United States and its political subdivisions, (if not the United States) your work country and its political subdivisions (including countries to which you travel on Firm business) and your country of residence or nationality, (iii) registration of shares, (iv) establishing brokerage account on your behalf, and (v) all other lawful purposes related to your employment and this award, and that the Firm may provide such data to third party vendors with whom it has contracted to provide such services and/or other bodies, including regulators, supervisory bodies, law enforcement and other government agencies. You are acknowledging and agreeing that your personal data will be transferred to and processed in countries and locations that do not have the same data privacy laws and statutory protection for personal data as your work country, country of residence, or country of nationality. If your personal data is subject to data privacy laws or statutory protection for personal data and they so provide for termination of the foregoing authorization, you may terminate the authorization at any time except with respect to tax and regulatory reporting and subject always to the Firm's legal and regulatory obligations. In the event you terminate this authorization, your award will be cancelled.

Governing Law: This award shall be governed by and construed in accordance with the laws of the State of New York, without regard to conflict of law principles.

Choice of Forum: By accepting this award under the Plan, you agree (and have agreed) that to the extent not otherwise subject to arbitration under an arbitration agreement between you and the Firm, any dispute arising directly or indirectly in connection with this award or the Plan shall be submitted to arbitration in accordance with the rules of the American Arbitration Association if so elected by the Firm in its sole discretion. In the event such a dispute is not subject to arbitration for any reason, you agree to accept the exclusive jurisdiction and venue of the United States District Court for the Southern District of New York with respect to any judicial proceeding in connection with this award or the Plan. You waive, to the fullest extent permitted by law, any objection to personal jurisdiction or to the laying of venue of such dispute and further agree not to commence any action arising out of or relating to this award or the Plan in any other forum.

Waiver of Jury Trial/Class Claims: By accepting this award, you agree, with respect to any claim brought in connection with your employment with the Firm in any forum (i) to waive the right to a jury trial and (ii) that any judicial proceeding or arbitration claim will be brought on an individual basis, and you hereby waive any right to submit, initiate, or participate in a representative capacity or as a plaintiff, claimant or member in a class action, collective action, or other representative or joint action.

Litigation: By accepting any award under the Plan, you agree (and have agreed) that in any action or proceeding by the Firm (other than a derivative suit in the right of the Firm) to enforce the terms and conditions of this Award Agreement or any other Award Agreement where the Firm is the prevailing party, the Firm shall be entitled to recover from you its reasonable attorney fees and expenses incurred in such action or proceeding. In addition, you agree that you are not entitled to, and agree not to seek, advancement of attorney fees and indemnification under the Firm's By-Laws in the event of such a suit by the Firm.

Nontransferability: Neither this award or any other outstanding awards of restricted stock units or of performance based share units, nor your interests or rights in any such awards, shall be assigned, pledged, transferred, hypothecated or subject to any lien. An award may be transferred following your death by will, the laws of descent or by a beneficiary designation on file with the Firm.

Notwithstanding anything herein to the contrary, the Firm's and the Committee's determinations under the Plan and the Award Agreements are not required to be uniform. By way of clarification, the Committee and the Firm shall be entitled to make non-uniform and selective determinations and modifications under Award Agreements and the Plan.

Amendment: The Committee or its delegate reserves the right to amend this Award Agreement in any manner, at any time and for any reason; provided, however, that no such amendment shall materially adversely affect your rights under this Award Agreement without your consent except to the extent that the Committee or its delegate considers advisable to (x) comply with applicable laws or changes in or interpretation of applicable laws, regulatory requirements and accounting rules or standards and (y) make a change in a scheduled vesting date or impose the restrictions described above under "No Ownership Rights," in either case, to the extent permitted by Section 409A of the Code. This Award Agreement may not be amended except in writing signed by the Director Human Resources of JPMorgan Chase.

Severability: If any portion of the Award Agreement is determined by the Firm to be unenforceable in any jurisdiction, any court or arbitrator of competent jurisdiction or the Director Human Resources may reform the relevant provisions (e.g., as to length of service, time, geographical area or scope) to the extent the Firm (or court/arbitrator) considers necessary to make the provision enforceable under applicable law.

Definitions

“Annual PSUs” means the number of PSUs determined by multiplying the Target Award Number (after giving effect to any cancellation thereof, in whole or in part) by the Target Award Percentage corresponding to the Firm’s Performance Ranking for each applicable performance year (both percentage and ranking, as set forth in the footnote to the Performance Table); provided that if the Firm Reported ROTCE for any completed calendar year in the Performance Period either equals or exceeds 14% or is less than 6%, one hundred fifty percent or zero, respectively as the case may be, shall be substituted for that year’s Target Award Percentage in calculating the number of Annual PSUs for that year. For avoidance of doubt, any cancellation of this award (in whole or in part) during the Performance Period will reduce the Target Award Number.

“Average Tangible Common Equity” means annual average common stockholders’ equity less annual average goodwill and annual average identifiable intangible assets. Annual averages of the components of Average Tangible Common Equity will be calculated using quarterly balances as reported in publicly available financial disclosures. In the event that quarterly balances are not available, annual year end balances will be used. **This calculation is used solely for purposes of the Performance Ranking.**

“Calculation Agent” means a third party entity not owned or controlled by the Firm, such as an accounting or consulting firm, retained from time to time by the Director of Human Resources or his/her delegate.

“Cause” means a determination by the Firm that your employment terminated as a result of your (i) violation of any law, rule or regulation (including rules of self-regulatory bodies) related to the Firm’s business, (ii) indictment or conviction of a felony, (iii) commission of a fraudulent act, (iv) violation of the JPMorgan Code of Conduct or other Firm policies or misconduct related to your duties to the Firm (other than immaterial and inadvertent violations or misconduct), (v) grossly inadequate performance of the duties associated with your position or job function or failure to follow reasonable directives of your manager, or (vi) any act or failure to act that is injurious to the interests of the Firm or its relationship with a customer, client or an employee.

“Financial Services Company” means a business enterprise that employs you in any capacity (such as an employee, contractor, consultant, advisor, or self-employed individual, whether paid or unpaid) and engages in:

- commercial or retail banking, including, but not limited to, commercial, institutional and personal trust, custody and/or lending and processing services, originating and servicing mortgages, issuing and servicing credit cards, payment servicing or processing or merchant services,
- insurance, including but not limited to, guaranteeing against loss, harm, damage, illness, disability or death, providing and issuing annuities, acting as principal, agent or broker for purpose of the forgoing,
- financial, investment or economic advisory services, including but not limited to, investment banking services (such as advising on mergers or dispositions, underwriting, dealing in, or making a market in securities or other similar activities), brokerage services, investment management services, asset management services, and hedge funds,
- issuing, trading or selling instruments representing interests in pools of assets or in derivatives instruments,
- advising on, or investing in, private equity or real estate, or
- any similar activities that the Director of Human Resources or nominee determines in his or her sole discretion constitute financial services.

“Firmwide Financial Threshold” means a cumulative return on tangible common equity for calendar years 2017, 2018 and 2019 of not less than 15%. Cumulative return on tangible common equity means (i) the sum of the Firm’s reported net income for all three calendar years, divided by (ii) reported year-end tangible equity averaged over the three years.

“Firm Reported ROTCE” means the Firm’s percentage return on tangible common equity for each year in the Performance Period (as calculated for use in its publicly available year-end financial disclosures without taking into account any rounding conventions used for financial reporting purposes).

“Government Office” means (i) a full-time position in an elected or appointed office in local, state, or federal government (including equivalent positions outside the U.S. or in a supranational organization), not reasonably anticipated to be a full-career position, or (ii) conducting a bona fide full-time campaign for such an elective public office after formally filing for candidacy, where it is customary and reasonably necessary to campaign full-time for the office.

“Line of Business” means a business unit of the Firm (or one or more business units designated below under the definition “Line of Business Financial Threshold” of the Corporate Investment Bank). All Corporate Functions (including the functions of the Chief Investment Office) are considered a single Line of Business.

“Line of Business Financial Threshold” means the financial threshold set forth below: for the following Lines of Business based on the Firm’s management reporting system:

Asset & Wealth Management	Annual negative pre-provision net income ¹
Card, Commerce Solutions, Auto Finance and Student	Annual negative pre-tax, pre-loan loss reserve income ²
Commercial Banking	Annual negative pre-provision net income including loan charge-offs
Corporate Investment Bank	Annual negative pre-provision net income for CIB overall and/or annual negative allocated product revenues (excluding DVA) for: <ul style="list-style-type: none"> • Macro products: <ul style="list-style-type: none"> • Currency and Emerging Markets • Rates • Commodities • Spread Products <ul style="list-style-type: none"> • Credit • SPG • Public Finance • Equities • Investor Services • Global Banking
Consumer Banking Business, CWM and Business Banking	Annual negative pre-provision net income ²
Corporate Functions (including Chief Investment Office)	Annual negative pre-provision net income ¹ reported at the Firm level
Mortgage Banking	Annual negative pre-tax, pre-loan loss reserve income ²
¹ Pre-tax pre-provision income means Revenue less Expenses	
² Pre-tax pre-loan loss reserve income means Revenue less (Expenses plus Net Charge-offs)	

“Not-for-Profit Organization” means an entity exempt from tax under state law and under Section 501(c)(3) of the Code. Section 501(c)(3) only includes entities organized and operated exclusively for religious, charitable, scientific, testing for public safety, literary or educational purposes, or to foster national or international amateur sports competition or for the prevention of cruelty to children or animals. Not-for-Profit Organization shall also mean entities outside the United States exempt from local and national tax laws because they are organized and operated exclusively for purposes identical to those applicable to Section 501(c)(3) organization.

“Performance Companies” mean the following institutions which have business activities that overlap with a significant portion of the Firm’s revenue mix: Bank of America Corporation, Barclays PLC, Capital One Financial Corporation, Citigroup Inc., Credit Suisse Group AG, Deutsche Bank AG, Goldman Sachs Group, Inc., HSBC Holdings PLC, Morgan Stanley, Wells Fargo & Company, and UBS Group AG.

If, during the Performance Period, one or more Performance Companies shall merge, engage in a spin-off or otherwise experience a material change in its revenue mix or business activities or its existence or its primary businesses shall terminate or cease due to receivership, bankruptcy, sale, or otherwise, then the Committee may eliminate such institution from the list of Performance Companies or make such other equitable adjustments, such as adding an acquirer or a new company to the list of Performance Companies, as it deems appropriate, with any such changes having effect for purposes of all calculations hereunder on a prospective basis from the date the applicable change is made.

“Performance Period” means calendar years 2017, 2018 and 2019.

“Performance Table” means the table used in the calculation of Annual PSUs for each year in the Performance Period as set forth below:

Firm Reported ROTCE	Target Award Percentage	Performance Ranking ¹ (annual performance)	Target Award Percentage ¹
≥14%	150%	1st Quartile	150%
16% to <14%	Pay by ROTCE scale	2nd Quartile	100% to 125%
<6%	—%	3rd Quartile	70% to 100%
		4th Quartile	25% to 55%

1. The following sets forth the precise Target Award Percentage corresponding to the Firm’s performance ranking (when compared to Performance Companies): Top 3 = 150%; #4 = 125%; #5 = 112.5%; #6 = 100%; #7 = 100%; #8 = 85%; #9 = 70%; #10 = 55%; #11 = 40%; and #12 = 25%.

If, after the calculation of the Performance Ranking, there is a tie, the tie shall be disregarded for purposes of determining the Target Award Percentage. For example, in the case of a tie for the fourth ranking between the Firm and a Performance Company, the Firm shall be treated as having satisfied that ranking. In the case of that same tie among Performance Companies, the fourth and fifth rankings will be deemed to have been satisfied.

“Recognized Service” means the period of service as an employee set forth in the Firm’s applicable service-related policies.

“Performance Ranking” means the ranking of the ROTCE of the Firm as compared to the ranking of the ROTCE of the Performance Companies as specified in the footnote to the Performance Table for each year in the Performance Period.

“ROTCE” means for the Firm and each of the Performance Companies a percentage derived by, for each year in the Performance Period, dividing (i) annual earnings from continuing operations less dividends on preferred stock as set forth in published financial disclosures by (ii) the Average Tangible Common Equity for the year. **If, prior to the end of the vesting period, the Firm or any Performance Company restates its published financial statements for any year in the Performance Period, ROTCE for that year shall be recalculated for the Firm or Performance Company with the Performance Ranking adjusted, if necessary. This calculation is used solely for purposes of the Performance Ranking.**

“Target Award Number” means the number of PSUs designated as such in the Award Agreement.

“Target Award Percentage” means the applicable percentage specified in the footnote to the Performance Table for each year in the Performance Period.

Government Office Requirements

You may be eligible to continue vesting in all or part of your award if you voluntarily resign to accept a Government Office (as defined above) or to become a candidate for an elective Government Office.

Full Career Eligibility:

“Government Office Requirements” does not apply to you if you satisfy the subsection captioned “--Full Career Eligibility” as of the date that you voluntarily terminate your employment with the Firm.

Eligibility:

Eligibility for continued vesting is conditioned on your providing the Firm:

- At least 60 days’ advance written notice of your intention to resign to accept or pursue a Government Office (see section captioned “Definitions”), during which period you must perform in a cooperative and professional manner services requested by the Firm and not provide services for any other employer. The Firm may elect to shorten this notice period at the Firm’s discretion.
- Confirmation, in a form satisfactory to the Firm, that vesting in this award pursuant to this provision would not violate any applicable law, regulation or rule.
- Documentation in a form satisfactory to the Firm that your resignation is for the purpose of accepting a Government Office or becoming a candidate for a Government Office. (See section captioned “Definitions.”)

Portion of Your Award Subject to Continued vesting:

Subject to the conditions below, the percentage of this award that will continue to vest in accordance with this award’s original schedule will be based on your years of continuous service completed with the Firm immediately preceding your termination date, as follows:

- 50% if you have at least 3 but less than 4 years of continuous service,
- 75% if you have at least 4 but less than 5 years of continuous service, or
- 100% if you have 5 or more years of continuous service.

The portion of this award subject to continued vesting above is referred to as the “CV Award” and the portion not subject to continued vesting will be cancelled as of the date your employment terminates.

Conditions for Continued Vesting of Award:

- You must remain in a non-elective Government Office for two or more years after your employment with the Firm terminates to be eligible to receive the CV Award; provided that if your non-elective Government Office is for a period less than two years, you will be eligible to receive the CV Award if it has a vesting date during your period of Government Service; or

In the case of resignation from the Firm to campaign for an elective Government Office, your name must be on the primary or final public ballot for the election. (If you are not elected, see below for employment restrictions.)

For avoidance of doubt, the performance criteria and protection based vesting set forth in these terms and conditions continue to apply to a CV Award.

Satisfaction of Conditions:

If your service in a Government Office ends two years or more after your employment with the Firm terminates, or in the case of resignation from the Firm to campaign for a Government Office, your name is on the primary or final public ballot for the election and you are not elected, any CV Awards then outstanding and any such awards that would have then been outstanding but for an accelerated distribution of shares (as described in the subsection captioned “--Accelerated Distribution for Ethics or Conflict Reasons Resulting From Employment by a Government Entity”) will be subject for the remainder of the applicable vesting period to the same terms and conditions of this Award Agreement, including employment restrictions during the vesting period, as if you had resigned from the Firm having met the requirements for Full Career Eligibility.

Failure to Satisfy Conditions:

If you do not satisfy the above “Conditions for Continued Vesting of Awards,” any outstanding PSUs under the CV Award will be cancelled. You also will be required to repay the Fair Market Value of the number of shares (before tax and other withholdings) of Common Stock distributed to you that would have been outstanding as PSUs on the date you failed to satisfy the “Conditions for Continued Vesting of Award” but for their accelerated distribution (as described in subsection captioned, “Accelerated Distribution for Ethics or Conflict Reasons Resulting From Employment by a Government Entity”). Fair Market Value for this purpose will be determined as the date that the shares were distributed.

Exhibit 10.23 (U.S.)

JPMORGAN CHASE & CO. LONG-TERM INCENTIVE PLAN TERMS AND CONDITIONS OF JANUARY 17, 2017 RESTRICTED STOCK UNIT AWARD OPERATING COMMITTEE (Protection-Based Vesting Provisions)

Award Agreement	<p>These terms and conditions are made part of the Award Agreement dated as of January 17, 2017 (“Grant Date”) awarding restricted stock units pursuant to the terms of the JPMorgan Chase & Co. Long-Term Incentive Plan (“Plan”). To the extent the terms of the Award Agreement (all references to which will include these terms and conditions) conflict with the Plan, the Plan will govern. The Award Agreement, the Plan and Prospectus supersede any other agreement, whether written or oral, that may have been entered into by the Firm and you relating to this award.</p> <p>This award was granted on the Grant Date subject to the Award Agreement. Unless you decline by the deadline and in the manner specified in the Award Agreement, you will have agreed to be bound by these terms and conditions, effective as of the Grant Date. If you decline the award, it will be cancelled as of the Grant Date.</p> <p>Capitalized terms that are not defined in “<u>Definitions</u>” below or elsewhere in the Award Agreement will have the same meaning as set forth in the Plan.</p> <p>JPMorgan Chase & Co. will be referred to throughout the Award Agreement as “JPMorgan Chase,” and together with its subsidiaries as the “Firm.”</p>
Form and Purpose of Award	<p>Each restricted stock unit represents a non-transferable right to receive one share of Common Stock as of the applicable vesting date as set forth in your Award Agreement.</p> <p>The purpose of this award is to motivate your future performance for services to be provided during the vesting period and to align your interests with those of the Firm and its shareholders.</p>
Dividend Equivalents	<p>If dividends are paid on Common Stock while restricted stock units under this award are outstanding, you will be paid an amount equal to the dividend paid on one share of Common Stock, multiplied by the number of restricted stock units outstanding under this award as of the dividend record date.</p>

Protection-Based Vesting	<p>This award is intended and expected to vest on the vesting date(s), provided that you are continuously employed by the Firm through such vesting date, or you meet the requirements for continued vesting described under the subsections “--Job Elimination,” “--Full Career Eligibility,” “--Government Office” or “--Disability.” However, vesting and the number of restricted stock units in which you vest are subject to these terms and conditions (including, but not limited to, sections captioned “<u>Recapture Provisions</u>,” “<u>Remedies</u>” and the following protection-based vesting provision.)</p> <p>Up to a total of fifty percent of your award that would otherwise be distributable to you during the vesting period (“At Risk restricted stock units”) may be cancelled if the Chief Executive Officer of JPMorgan Chase (“CEO”) determines in his or her sole discretion that cancellation of all or portion of the At Risk restricted stock units is appropriate in light of any one or a combination of the following factors:</p> <ul style="list-style-type: none"> • Your performance in relation to the priorities for your position, or the Firm’s performance in relation to the priorities for which you share responsibility as a member of the Operating Committee, have been unsatisfactory for a sustained period of time. Among the factors the CEO may consider in assessing performance are net income, total net revenue, return on equity, earnings per share and capital ratios of the Firm, both on an absolute basis and, as appropriate, relative to peer firms. • For any calendar year ending during the vesting period, JPMorgan Chase’s annual pre-tax pre-provision income at the Firm level is negative. • Awards granted to participants in a Line of Business for which you exercise, or during the vesting period exercised, direct or indirect responsibility, were in whole or in part cancelled because the Line of Business did not meet its annual Line of Business Financial Threshold. • The Firm does not meet the Firmwide Financial Threshold. <p>In the event that your employment terminates due to “Job Elimination,” “Full Career Eligibility,” “Government Office” or “Disability” thereby entitling you to continued vesting in your award (or potentially acceleration due to satisfaction of the Government Office Requirements), the cancellation circumstances described above will continue to apply to your At Risk restricted stock units pursuant to the section captioned “<u>Accelerated Distribution for Ethics or Conflict Reasons Resulting From Employment by a Government Entity</u>.”</p> <p>Any determination above with respect to protection-based vesting provisions is subject to ratification by the Compensation and Management Development Committee of the Board of Directors of JPMorgan Chase (“Committee”). In the case of an award to the CEO, all such determinations shall be made by the Committee.</p>
Vest Period	<p>The period from the Grant Date to the last vesting date is the “vesting period.” (See subsections captioned “--<u>Amendment</u>” pursuant to which the Firm may extend the vesting period and “--<u>No Ownership Rights</u>” pursuant to which the Firm may place restrictions on delivered shares of Common Stock following a vesting date.)</p>
Holding Requirement	<p>As of each vesting date, you shall be entitled to a distribution equal to the Fair Market Value of the number of restricted stock units vesting on such date, less the number being withheld to satisfy tax withholding obligations. You agree that the distribution made to you will be held in an account in your name with restrictions preventing you from transferring, assigning, selling, pledging or otherwise encumbering such distribution for a six month period commencing with the vesting date. Such restrictions shall lapse in event of your death.</p>
Bonus Recoupment	<p>In consideration of the grant of this award, you agree that you are subject to the JPMorgan Chase Bonus Recoupment Policy (or successor policy) as in effect from time to time as it applies both to the cash incentive compensation awarded to you for performance year 2016 and to this award. You can access this policy as currently in effect through the following link:</p> <p>http://www.jpmorganchase.com/corporate/About-JPMC/corporate-governance-principles.htm#recoupment</p> <p>For the avoidance of doubt, nothing in these terms and conditions in any way limits the rights of the Firm under the JPMorgan Chase Bonus Recoupment Policy (or successor policy).</p>
UK Clawback Policy for Identified Staff	<p>In consideration of grant of this award, and without prejudice to any other provision of this Award Agreement, you agree that you are subject to the JPMorgan Chase Clawback Policy for Identified Staff or successor policy as in effect from time to time as it applies both to the cash incentive compensation awarded to you for performance year 2016 and to this award. You can access this policy as currently in effect in My Rewards through the following link: https://myrewards.jpmchase.net/myrewards</p>

Recapture Provisions (Detrimental Conduct, Risk-Related and Other Recapture Provisions) Notwithstanding any terms of this Award Agreement to the contrary, JPMorgan Chase reserves the right in its sole discretion to cancel up to 100% of your outstanding restricted stock units under this award and, to the extent set forth in “Remedies” below, to recover from you up to an amount equal to the Fair Market Value (determined as of the applicable vesting date) of the gross number of shares of Common Stock previously distributed (including shares withheld for tax purposes) under this award if the Firm in its sole discretion determines that:

- you engaged in conduct detrimental to the Firm insofar as it causes material financial or reputational harm to the Firm or its business activities, or
- this award was based on materially inaccurate performance metrics, whether or not you were responsible for the inaccuracy, or
- this award was based on a material misrepresentation by you, or
- you improperly or with gross negligence failed to identify, raise or assess, in a timely manner and as reasonably expected, risks and/or concerns with respect to risks material to the Firm or its business activities, or
- your employment was terminated for Cause (see section captioned “Definitions” below) or, in the case of a determination after the termination of your employment, that your employment could have been terminated for Cause.

See section captioned “Remedies” for additional information.

JPMorgan Chase’s right to cancel and/or recover the value of this award (or any cash bonus) under the JPMorgan Chase Bonus Recoupment Policy and the other provisions of this award relate to the “organizational goals” of the Firm as that term is defined by regulations issued under Section 409A of the Internal Revenue Code (“Code”).

Termination of Employment Except as explicitly set forth below under the subsections captioned “--Job Elimination,” “--Full Career Eligibility,” “--Government Office” or “--Disability” below or under the section captioned “Death,” any restricted stock units outstanding under this award will be cancelled effective on the date your employment with the Firm terminates for any reason.

Subject to these terms and conditions (including, but not limited to, sections captioned “Protection-Based Vesting,” “Bonus Recoupment,” “Recapture Provisions,” “Your Obligations” and “Remedies”), you will be eligible to continue to vest (on the original vesting schedule) with respect to your award in accordance with its terms and conditions following the termination of your employment if one of the following circumstances applies to you:

Ø Job Job Elimination:

Elimination In the event that the Director of Human Resources or nominee in his or her sole discretion determines that

- the Firm terminated your employment because your job was eliminated, and
 - after you are notified that your job will be eliminated, you provided such services as requested by the Firm in a cooperative and professional manner, and
- you satisfied the Release/Certification Requirements set forth below.

Ø Full Full Career Eligibility:

Career Eligibility In the event that the Director of Human Resources or nominee in his or her sole discretion determines that

- you voluntarily terminated your employment with the Firm, had completed at least five years of continuous service with the Firm immediately preceding your termination date, and
- your Recognized Service (as defined below) on your date of termination equaled or exceeded 15 years, or your combined Recognized Service with the Firm and external professional experience (as attested by you to the Firm) equaled or exceeded 30 years, and
- you provided at least 90 days advance written notice to the Firm of your intention to voluntarily terminate your employment under this provision, during which notice period you provided such services as requested by the Firm in a cooperative and professional manner and you did not perform any services for any other employer, and
- continued vesting shall be appropriate, which determination shall be made prior to your termination and will be based on your performance and conduct (before and after providing notice), and
- for 36 months from the date of grant of this award you do not either perform services in any capacity (including self-employment) for a Financial Services Company (as defined below) or work in your profession (whether or not for a Financial Services Company); provided that you may work for a government, education or Not-for-Profit Organization (as defined below), and
- you satisfy the Release/Certification Requirements set forth below.

After receipt of such advance written notice, the Firm may choose to have you continue to provide services during such 90-day period as a condition to continued vesting or shorten the length of the 90-day period at the Firm’s discretion, but to a date no earlier than the date you would otherwise meet the service requirement.

Additional advance notice requirements may apply for employees subject to notice period policies. (See “Notice Period” below.)

☒ ☐ Government Government Office:

Office In the event that you voluntarily terminate your employment with the Firm to accept a Government Office or become a candidate for an elective Government Office, as described at the end of these terms and conditions under the section captioned “Government Office Requirements.” See also definition of Government Office in the section captioned “Definitions.”

☒ ☐ Disability Disability:

In the event that

- your employment with the Firm terminates because (i) you are unable to return to work while you are receiving benefits under the JPMorgan Chase Long Term Disability Plan, or for non-U.S. employees, under the equivalent JPMorgan Chase-sponsored local country plan (in either case, “LTD Plan”), or (ii) if you are not covered by a LTD Plan, you are unable to return to work due to a long-term disability that would qualify for benefits under the applicable LTD Plan, as determined by the Firm or a third-party designated by the Firm; provided that you (x) request in writing continued vesting due to such disability within 30 days of the date your employment terminates, and (y) provide any requested supporting documentation and (z) receive the Firm’s written consent to such treatment, and
- you satisfy the Release/Certification Requirements set forth below.

To qualify for continued vesting after termination of your employment under any of the foregoing circumstances:

- Release/
Certification**
- you must timely execute and deliver a release of claims in favor of the Firm, having such form and terms as the Firm shall specify,
 - with respect to “Full Career Eligibility,” prior to the termination of your employment, you must confirm with management that you meet the eligibility criteria (including providing at least 90 days advance written notification), advise that you are seeking to be treated as an individual eligible for “Full Career Eligibility,” and receive written consent to such continued vesting,
 - with respect to “Disability,” you must satisfy the notice and documentation described above and receive written consent to such continued vesting,
 - with respect to “Full Career Eligibility,” it is your responsibility to take the appropriate steps to certify to the Firm prior to each vesting date while the employment restrictions are outstanding on the authorized form of the Firm that you have complied with the employment restrictions applicable to you (as described herein) from your date of termination of employment through the applicable vesting date, and in all cases, complied with all other terms of the Award Agreement. (See section captioned “Your Obligations”).

Death If you die while you are eligible to vest in restricted stock units under this award, the restricted stock units will immediately vest and will be distributed in shares of Common Stock (after applicable tax withholding) to your designated beneficiary on file with the Firm’s Stock Administration Department, or if no beneficiary has been designated or survives you, then to your estate. Any shares will be distributed no later than the end of the calendar year immediately following the calendar year which contains your date of death; however, our administrative practice is to register such shares in the name of your beneficiary or estate within 60 days of the Firm’s receipt of any required documentation.

Your Obligations In consideration of the grant of this award, you agree to comply with and be bound by the obligations set forth below next to the subsections captioned “--Non-Solicitation of Employees and Customers,” “--Confidential Information,” “--Non-Disparagement,” “--Cooperation,” “--Compliance with Award Agreement,” and “--Notice Period.”

☒ ☐ Non-Solicitation of Employees and Customers

During your employment by the Firm and for the longer of the (i) one year period following the termination of your employment or, (ii) if your award is not cancelled as of your termination date, the three year period from Grant Date, you will not directly or indirectly, whether on your own behalf or on behalf of any other party, without the prior written consent of the Director of Human Resources: (i) solicit, induce or encourage any of the Firm’s then current employees to leave the Firm or to apply for employment elsewhere, (ii) hire any employee or former employee who was employed by the Firm at the date your employment terminated, unless the individual’s employment terminated because his or her job was eliminated, or the individual’s employment with the Firm has been terminated for more than six months, (iii) to the fullest extent enforceable under applicable law, solicit or induce or attempt to induce to leave the Firm, or divert or attempt to divert from doing business with the Firm, any then current customers, suppliers or other persons or entities that were serviced by you or whose names became known to you by virtue of your employment with the Firm, or otherwise interfere with the relationship between the Firm and such customers, suppliers or other persons or entities. This does not apply to publicly known institutional customers that you service after your employment with the Firm without the use of the Firm’s confidential or proprietary information.

These restrictions do not apply to authorized actions you take in the normal course of your employment with the Firm, such as employment decisions with respect to employees you supervise or business referrals in accordance with the Firm’s policies.

Ø Confidential Information You will not, either during your employment with the Firm or thereafter, directly or indirectly (i) use or disclose to anyone any confidential information related to the Firm's business, or (ii) communicate with the press or other media about matters related to the Firm, its customers or employees, including matters and activities relating to your employment, or the employment of others, by the Firm, in the case of either (i) or (ii), except as explicitly permitted by the JPMorgan Chase Code of Conduct and applicable policies or law or legal process. In addition, following your termination of employment, you will not, without prior written authorization, access the Firm's private and internal information through telephonic, intranet or internet means. "Confidential information" shall have the same meaning for the Award Agreement as it has in the JPMorgan Chase Code of Conduct.

Nothing in this award precludes you from reporting to the Firm's management or directors, the government, a regulator, a self-regulatory agency, your attorneys or a court, conduct you believe to be in violation of the law or concerns of any known or suspected Code of Conduct violation. It is also not intended to prevent you from responding truthfully to questions or requests from the government, a regulator or in a court of law.

Ø Non-Disparagement You will not, either during your employment with the Firm or thereafter, make or encourage others to make any public statement or release any information in verbal, written, electronic or any other form, that is intended to, or reasonably could be foreseen to, disparage, embarrass or criticize the Firm or its employees, officers, directors or shareholders as a group. This shall not preclude you from reporting to the Firm's management or directors or to the government or a regulator conduct you believe to be in violation of the law or the Firm's Code of Conduct or responding truthfully to questions or requests for information to the government, a regulator or in a court of law in connection with a legal or regulatory investigation or proceeding.

Ø Cooperation You will cooperate fully with and provide full and accurate information to the Firm and its counsel with respect to any matter (including any audit, tax proceeding, litigation, investigation or governmental proceeding) with respect to which you may have knowledge or information, subject to reimbursement for actual, appropriate and reasonable out-of-pocket expenses incurred by you.

Ø Compliance with Award Agreement You will provide the Firm with any information reasonably requested to determine compliance with the Award Agreement, and you authorize the Firm to disclose the terms of the Award Agreement to any third party who might be affected thereby, including your prospective employer.

Ø Notice Period If you are subject to a notice period or become subject to a notice period after the Grant Date, whether by contract or by policy, that requires you to provide advance written notice of your intention to terminate your employment ("Notice Period"), then as consideration for this award and continued employment, you will provide the Firm with the necessary advance written notice that applies to you, as specified by such contract or policy.

After receipt of your notice, the Firm may choose to have you continue to provide services during the applicable Notice Period or may place you on a paid leave for all or part of the applicable Notice Period. During the Notice Period, you shall continue to devote your full time and loyalty to the Firm by providing services in a cooperative and professional manner and not perform any services for any other employer and shall receive your base salary and certain benefits until your employment terminates. You and the Firm may mutually agree to waive or modify the length of the Notice Period.

Regardless of whether a Notice Period applies to you, you must comply with the 90-day advance notice period described under the subsection captioned "--Full Career Eligibility," in the event you wish to terminate employment under that same subsection.

Remedies

Ø Cancellation Provisions In addition to the cancellation provisions described under the sections captioned "Protection-Based Vesting," "Bonus Recoupment," "Recapture Provisions" and "Termination of Employment," your outstanding restricted stock units under this award may be cancelled if the Firm in its sole discretion determines that:

- you have failed to comply with any of the advance notice/cooperation requirements or employment restrictions applicable to your termination of employment, or
- you have failed to return the required forms specified under the section captioned "Release/Certification" by the specified deadline, , or
- you have violated any of the provisions as set forth above in the section captioned "Your Obligations."

To the extent provided under the subsection captioned "--Amendment" below, JPMorgan Chase reserves the right to suspend vesting of this award and/or distribution of shares under this award, including, without limitation, during any period that JPMorgan Chase is evaluating whether this award is subject to cancellation and/or recovery and/or whether the conditions for distributions of shares under this award are satisfied. JPMorgan Chase is not responsible for any price fluctuations during any period of suspension and, if applicable, suspended units will be reinstated consistent with Plan administration procedures. See also "subsection captioned "--No Ownership Rights."

In addition, you may be required to pay the Firm up to an amount equal to the Fair Market Value (determined as of the applicable vesting date) of the gross number of shares of Common Stock previously distributed under this award as follows:

Recovery

- Payment may be required with respect to any shares of Common Stock distributed within the three year period prior to a notice-of-recovery under this section, if the Firm in its sole discretion determines that:
 - you committed a fraudulent act, or engaged in knowing and willful misconduct related to your employment,
 - you violated any of the provisions as set forth above in the section captioned “Your Obligations,” or
 - you violated the employment restrictions set forth in the subsection “--Full Career Eligibility,” following the termination of your employment.
- In addition, payment may be required with respect to any shares distributed within the one year period prior to notice-of-recovery under this section, if the Firm in its sole discretion determines appropriate pursuant to the provisions in the subsection captioned “Recapture Provisions.” Notice-of-recovery under this subsection is a written (including electronic) notice from the Firm to you either requiring payment under this subsection or stating that JPMorgan Chase is evaluating requiring payment under this subsection. Without limiting the foregoing, notice-of-recovery will be deemed provided if the Firm makes a good faith attempt to provide written (including electronic) notice at your last known address maintained in the Firm’s employment records. For the avoidance of doubt, a notice-of-recovery that the Firm is evaluating requiring payment under this section shall preserve JPMorgan Chase’s rights to require payment as set forth above in all respects and the Firm shall be under no obligation to complete its evaluation other than as the Firm may determine in its sole discretion.

For purposes of this section, shares distributed under this award include shares withheld for tax purposes. However, it is the Firm’s intention that you only be required to pay the amounts under this section with respect to shares that are or may be retained by you following a determination of tax liability and that you will not be required to pay amounts with respect to shares representing irrevocable tax withholdings or tax payments previously made (whether by you or the Firm) that you will not be able to recover, recapture or reclaim (including as a tax credit, refund or other benefit). Accordingly, JPMorgan Chase will not require you to pay any amount that the Firm or its nominee in his or her sole discretion determines is represented by such withholdings or tax payments.

Payment may be made in shares of Common Stock or in cash. You agree that any repayment will be a recovery of shares to which you were not entitled under the terms and conditions of your Award Agreement and is not to be construed in any manner as a penalty. You also acknowledge that a violation or attempted violation of the obligations set forth herein will cause immediate and irreparable damage to the Firm, and therefore agree that the Firm shall be entitled as a matter of right to an injunction, from any court of competent jurisdiction, restraining any violation or further violation of such obligations; such right to an injunction, however, shall be cumulative and in addition to whatever other remedies the Firm may have under law or equity.

Nothing in the section in any way limits your obligations under “Bonus Recoupment.”

Administrative Provisions

Withholding Taxes: The Firm, in its sole discretion, may (i) retain from each distribution the number of shares of Common Stock required to satisfy applicable tax obligations or (ii) implement any other desirable or necessary procedures, so that appropriate withholding and other taxes are paid to the competent authorities with respect to the vested shares, dividend equivalents and the award. This may include but is not limited to (i) a market sale of a number of such shares on your behalf substantially equal to the withholding or other taxes, (ii) to the extent required by law, withhold from cash compensation, an amount equal to any withholding obligation with respect to the award, shares that vest under this award, and/or dividend equivalents, and (iii) retaining shares that vest under this award or dividend equivalents until you pay any taxes associated with the award, vested shares and/or the dividend equivalents directly to the competent authorities

Right to Set Off: The Firm may, to the maximum extent permitted by applicable law (including Section 409A of the Code to the extent it is applicable to you), retain for itself funds or the Common Stock resulting from any vesting of this award to satisfy any obligation or debt that you owe to the Firm. Notwithstanding any account agreement with the Firm to the contrary, the Firm will not recoup or recover any amount owed from any funds or unrestricted securities held in your name and maintained at the Firm pursuant to such account agreement to satisfy any obligation or debt or obligation owed by you under this award without your consent. This restriction on the Firm does not apply to accounts described and authorized in “No Ownership Rights” described below

No Ownership Rights: Restricted stock units do not convey the rights of ownership of Common Stock and do not carry voting rights. No shares of Common Stock will be issued to you until after the restricted stock units have vested and any applicable restrictions have lapsed. Shares will be issued in accordance with JPMorgan Chase's procedures for issuing stock. By accepting this award, you authorize the Firm, in its discretion, to establish on your behalf a brokerage account in your name with the Firm or book-entry account with our stock plan administrator and/or transfer agent and deliver to that account any vested shares derived from the award.

With respect to any applicable vesting date, JPMorgan Chase may impose for any reason, as of such vesting date for such period as it may specify in its sole discretion, such restrictions on the Common Stock to be issued to you as it may deem appropriate, including, but not limited to, restricting the sale, transfer, pledge, assignment or encumbrance of such shares of Common Stock. By accepting this award, you acknowledge that during such specified period should there be a determination that the cancellation or recovery provisions of this award apply, then you agree that any shares subject to such restrictions (notwithstanding the limitation set forth set forth in the Right to Set Off section above) may be cancelled in whole or part. (See sections captioned "Protection-Based Vesting," "Bonus Recoupment," "Recapture Provisions," "Termination of Employment" and "Remedies," as well as the subsection captioned "--Amendment" permitting suspension of vesting.)

Binding Agreement: The Award Agreement will be binding upon any successor in interest to JPMorgan Chase, by merger or otherwise.

Not a Contract of Employment: Nothing contained in the Award Agreement constitutes a contract of employment or continued employment. Employment is "at-will" and may be terminated by either you or JPMorgan Chase for any reason at any time. This award does not confer any right or entitlement to, nor does the award impose any obligation on the Firm to provide, the same or any similar award in the future and its value is not compensation for purposes of determining severance.

Section 409A Compliance: To the extent that Section 409A of the Code is applicable to this award, distributions of shares and cash hereunder are intended to comply with Section 409A of the Code, and the Award Agreement, including these terms and conditions, shall be interpreted in a manner consistent with such intent.

Notwithstanding anything herein to the contrary, if you (i) are subject to taxation under the Code, (ii) are a specified employee as defined in the JPMorgan Chase 2005 Deferred Compensation Plan and (iii) have incurred a separation from service (as defined in that Plan with the exception of death) and if any units/shares under this award represent deferred compensation as defined in Section 409A and such shares are distributable (under the terms of this award) within six months following, and as a result of your separation from service, then those shares will be delivered to during the first calendar month after the expiration of six full months from date of your separation from service. Further, if your award is not subject to a substantial risk of forfeiture as defined by regulations issued under Section 409A of the Code, then the remainder of each calendar year immediately following (i) each applicable vesting date set forth in your Award Agreement shall be a payment date for purposes of distributing the vested portion of the award and (ii) each date that JPMorgan Chase specifies for payment of dividends declared on its Common Stock, shall be the payment date(s) for purposes of distributing dividend equivalent payments.

Change in Outstanding Shares: In the event of any change in the outstanding shares of Common Stock by reason of any stock dividend or split, recapitalization, issuance of a new class of common stock, merger, consolidation, spin-off, combination or exchange of shares or other similar corporate change, or any distributions to stockholders of Common Stock other than regular cash dividends, the Committee will make an equitable substitution or proportionate adjustment, in the number or kind of shares of Common Stock or other securities issued or reserved for issuance pursuant to the Plan and to any restricted stock units outstanding under this award for such corporate events.

Interpretation/Administration: The Committee has sole and complete authority to interpret and administer this Award Agreement, including, without limitation, the power to (i) interpret the Plan and the terms of this Award Agreement; (ii) determine the reason for termination of employment; (iii) determine application of the post-employment obligations and cancellation and recovery provisions; (iv) decide all claims arising with respect to this award; and (v) delegate such authority as it deems appropriate. Any determination contemplated hereunder by the Committee, the Firm, the Director of Human Resources or their respective delegates or nominees shall be binding on all parties.

Notwithstanding anything herein to the contrary, the determinations of the Director of Human Resources, the Firm, the Committee and their respective delegates and nominees under the Plan and the Award Agreements are not required to be uniform. By way of clarification, the Committee, the Firm, the Director of Human Resources and their respective delegates and nominees shall be entitled to make non-uniform and selective determinations and modifications under Award Agreements and the Plan.

Amendment: The Committee or its nominee reserves the right to amend this Award Agreement in any manner, at any time and for any reason; provided, however, that no such amendment shall materially adversely affect your rights under this Award Agreement without your consent except to the extent that the Committee or its delegate considers advisable to (x) comply with applicable laws or changes in or interpretation of applicable laws, regulatory requirements and accounting rules or standards and/or (y) make a change in a scheduled vesting date or impose the restrictions described above under “No Ownership Rights,” in either case, to the extent permitted by Section 409A of the Code if it is applicable you. This Award Agreement may not be amended except in writing signed by the Director of Human Resources of JPMorgan Chase.

Severability: If any portion of the Award Agreement is determined by the Firm to be unenforceable in any jurisdiction, any court or arbitrator of competent jurisdiction or the Director of Human Resources may reform the relevant provisions (e.g., as to length of service, time, geographical area or scope) to the extent the Firm (or court/arbitrator) considers necessary to make the provision enforceable under applicable law.

Accelerated Distribution for Ethics or Conflict Reasons Resulting From Employment by a Government Entity: Upon receipt of satisfactory evidence that applicable United States federal, state, local, foreign or supranational ethics or conflict of interest laws or regulations require you to divest your interest in JPMorgan Chase restricted stock units, the Firm may accelerate the distribution of all or part of your outstanding award effective on or before the required divestiture date; provided that no accelerated distribution shall occur if the Firm determines that such acceleration will violate Section 409A of the Code.

If you have voluntarily terminated your employment and have satisfied the requirements of the section captioned “Government Office Requirements,” acceleration shall apply (to extent required) to the percentage of your outstanding award that would continue to vest under that section. In the case of a termination of employment where the award is outstanding as a result of the subsections entitled “Job Elimination” or “Full Career Eligibility,” then acceleration shall apply, to the extent required, to the full outstanding award.

Notwithstanding accelerated distribution pursuant to the foregoing, you will remain subject to the applicable terms of your Award Agreement as if your award had remained outstanding for the duration of the original vesting period and shares had been distributed as scheduled as of each applicable vesting date, including, but not limited to, repayment obligations set forth in the section captioned “Remedies” and the employment restrictions in the sections captioned “Protection-Based Vesting” and “Government Office Requirements” and the subsection “Full Career Eligibility.”

Use of Personal Data: By accepting this award, you have acknowledged that the Firm may process your personal data (including sensitive personal data) for purposes, including but not limited to (i) determining your compensation, (ii) payroll activities, including, but not limited to, tax withholding and regulatory reporting, which tax and regulatory reporting and withholding may include, but is not limited to, the United States, your work country (including countries to which you travel on Firm business) and country of residence, (iii) registration of shares and units, (iv) establishing brokerage account on your behalf, and (v) all other lawful purposes related to your employment and this award and that the Firm may provide such data to third party vendors with whom it has contracted to provide such services and/or other bodies, including regulators, supervisory bodies, law enforcement and other government agencies. You are acknowledging and agreeing that your personal data will be transferred to, and processed in, countries and locations that do not have the same data privacy laws and statutory protection for personal data as your work country, country of residence, or country of nationality. If your personal data is subject to data privacy laws or statutory protection for personal data and they so provide for termination of the foregoing authorization, you may terminate the authorization at any time except with respect to tax and regulatory reporting and subject always to the Firm’s legal and regulatory obligations. In the event you terminate this authorization, your award will be cancelled.

Governing Law: This award shall be governed by and construed in accordance with the laws of the State of New York, without regard to conflict of law principles.

Choice of Forum: By accepting this award under the Plan, you agree (and have agreed) that to the extent not otherwise subject to arbitration under an arbitration agreement between you and the Firm, any dispute arising directly or indirectly in connection with this award or the Plan shall be submitted to arbitration in accordance with the rules of the American Arbitration Association if so elected by the Firm in its sole discretion. In the event such a dispute is not subject to arbitration for any reason, you agree to accept the exclusive jurisdiction and venue of the United States District Court for the Southern District of New York with respect to any judicial proceeding in connection with this award or the Plan. You waive, to the fullest extent permitted by law, any objection to personal jurisdiction or to the laying of venue of such dispute and further agree not to commence any action arising out of or relating to this award or the Plan in any other forum.

Waiver of Jury Trial/Class Claims: By accepting this award, you agree, with respect to any claim brought in connection with your employment with the Firm in any forum (i) to waive the right to a jury trial and (ii) that any judicial proceeding or arbitration claim will be brought on an individual basis, and you hereby waive any right to submit, initiate, or participate in a representative capacity or as a plaintiff, claimant or member in a class action, collective action, or other representative or joint action.

Litigation: By accepting any award under the Plan, you agree (and have agreed) that in any action or proceeding by the Firm (other than a derivative suit in the right of the Firm) to enforce the terms and conditions of this Award Agreement or any other Award Agreement where the Firm is the prevailing party, the Firm shall be entitled to recover from you its reasonable attorney fees and expenses incurred in such action or proceeding. In addition, you agree that you are not entitled to, and agree not to seek, advancement of attorney fees and indemnification under the Firm's By-Laws in the event of such a suit by the Firm.

Nontransferability: Neither this award or any other outstanding awards of restricted stock units, nor your interests or rights in any such awards, shall be assigned, pledged, transferred, hypothecated or subject to any lien. An award may be transferred following your death by will, the laws of descent or by a beneficiary designation on file with the Firm.

Outstanding Awards: The Administrative provisions set forth above shall apply to any award of restricted stock units outstanding as of the date hereof, and such awards are hereby amended.

Definitions

"Cause" means a determination by the Firm that your employment terminated as a result of your (i) violation of any law, rule or regulation (including rules of self-regulatory bodies) related to the Firm's business, (ii) indictment or conviction of a felony, (iii) commission of a fraudulent act, (iv) violation of the JPMorgan Code of Conduct or other Firm policies or misconduct related to your duties to the Firm (other than immaterial and inadvertent violations or misconduct), (v) grossly inadequate performance of the duties associated with your position or job function or failure to follow reasonable directives of your manager, or (vi) any act or failure to act that is injurious to the interests of the Firm or its relationship with a customer, client or an employee

"Financial Services Company" means a business enterprise that employs you in any capacity (such as an employee, contractor, consultant, advisor, or self-employed individual, whether paid or unpaid) and engages in:

- commercial or retail banking, including, but not limited to, commercial, institutional and personal trust, custody and/or lending and processing services, originating and servicing mortgages, issuing and servicing credit cards, payment servicing or processing or merchant services,
- insurance, including but not limited to, guaranteeing against loss, harm, damage, illness, disability or death, providing and issuing annuities, acting as principal, agent or broker for purpose of the forgoing,
- financial, investment or economic advisory services, including but not limited to, investment banking services (such as advising on mergers or dispositions, underwriting, dealing in, or making a market in securities or other similar activities), brokerage services, investment management services, asset management services, and hedge funds,
- issuing, trading or selling instruments representing interests in pools of assets or in derivatives instruments,
- advising on, or investing in, private equity or real estate, or
- any similar activities that the Director of Human Resources or nominee determines in his or her sole discretion constitute financial services.

"Firmwide Financial Threshold" means a cumulative return on tangible common equity for calendar years 2017 2018, and 2019 of not less than 15%. Cumulative return on tangible common equity means (i) the sum of the Firm's reported net income for all three calendar years, divided by (ii) reported year-end tangible equity averaged over the three years.

"Government Office" means (i) a full-time position in an elected or appointed office in local, state, or federal government (including equivalent positions outside the U.S. or in a supranational organization), not reasonably anticipated to be a full-career position, or (ii) conducting a bona fide full-time campaign for such an elective public office after formally filing for candidacy, where it is customary and reasonably necessary to campaign full-time for the office.

"Line of Business" means a business unit of the Firm (or one or more business units designated below under the definition "Line of Business Financial Threshold" of the Corporate Investment Bank). All Corporate Functions (including the functions of the Chief Investment Office) are considered a single Line of Business.

"Line of Business Financial Threshold" means the financial threshold set forth below for the following Lines of Business based on the Firm's management reporting system:

Asset & Wealth Management	Annual negative pre-provision net income ¹
Card, Commerce Solutions, Auto Finance and Student	Annual negative pre-tax, pre-loan loss reserve income ²
Commercial Banking	Annual negative pre-provision net income including loan charge-offs
Corporate Investment Bank	Annual negative pre-provision net income for CIB overall and/or annual negative allocated product revenues (excluding DVA) for: <ul style="list-style-type: none"> • Macro products: <ul style="list-style-type: none"> • Currency and Emerging Markets • Rates • Commodities • Spread Products <ul style="list-style-type: none"> • Credit • SPG • Public Finance • Equities • Investor Services • Global Banking
Consumer Banking Business, CWM and Business Banking	Annual negative pre-provision net income ²
Corporate Functions (including Chief Investment Office)	Annual negative pre-provision net income ¹ reported at the Firm level
Mortgage Banking	Annual negative pre-tax, pre-loan loss reserve income ²
¹ Pre-tax pre-provision income means Revenue less Expenses	
² Pre-tax pre-loan loss reserve income means Revenue less (Expenses plus Net Charge-offs)	

“Not-for-Profit Organization” means an entity exempt from tax under state law and under Section 501(c)(3) of the Code. Section 501(c)(3) only includes entities organized and operated exclusively for religious, charitable, scientific, testing for public safety, literary or educational purposes, or to foster national or international amateur sports competition or for the prevention of cruelty to children or animals. Not-for-Profit Organization shall also mean entities outside the United States exempt from local and national tax laws because they are organized and operated exclusively for religious, charitable, scientific, testing for public safety, literary or educational purposes, or to foster national or international amateur sports competition or for the prevention of cruelty to children or animals

“Recognized Service” means the period of service as an employee set forth in the Firm’s applicable service-related policies.

Government Office Requirements

You may be eligible to continue vesting in all or part of your award if you voluntarily resign to accept a Government Office (as defined above) or to become a candidate for an elective Government Office.

Full Career Eligibility:

“Government Office Requirements” does not apply to you if you satisfy the subsection captioned “--Full Career Eligibility” as of the date that you voluntarily terminate your employment with the Firm.

Eligibility:

Eligibility for continued vesting is conditioned on your providing the Firm:

- At least 60 days’ advance written notice of your intention to resign to accept or pursue a Government Office (see section captioned “Definitions”), during which period you must perform in a cooperative and professional manner services requested by the Firm and not provide services for any other employer. The Firm may elect to shorten this notice period at the Firm’s discretion.
- Confirmation, in a form satisfactory to the Firm, that vesting in this award pursuant to this provision would not violate any applicable law, regulation or rule.
- Documentation in a form satisfactory to the Firm that your resignation is for the purpose of accepting a Government Office or becoming a candidate for a Government Office. (See section captioned “Definitions.”)

Portion of Your Awards Subject to Continued vesting:

Subject to the conditions below, the percentage of your outstanding awards that will continue to vest in accordance with this award’s original schedule will be based on your years of continuous service completed with the Firm immediately preceding your termination date, as follows:

- 50% if you have at least 3 but less than 4 years of continuous service,
- 75% if you have at least 4 but less than 5 years of continuous service, or
- 100% if you have 5 or more years of continuous service.

The portion of each award subject to continued vesting above is referred to as the “CV Award” and the portion not subject to continued vesting will be cancelled on the date your employment terminates.

Conditions for Continued Vesting of Awards:

- You must remain in a non-elective Government Office for two or more years after your employment with the Firm terminates to receive in full your CV Award; provided that if your non-elective Government Office is for a period less than two years, you will be entitled to retain any portion of the CV Award with a vesting date during your period of Government Service; or
- In the case of resignation from the Firm to campaign for an elective Government Office, your name must be on the primary or final public ballot for the election. (If you are not elected, see below for employment restrictions.)

Satisfaction of Conditions:

If your service in a Government Office ends two years or more after your employment with the Firm terminates, or in the case of resignation from the Firm to campaign for a Government Office, your name is on the primary or final public ballot for the election and you are not elected, any CV Awards then outstanding and any such awards that would have then been outstanding but for an accelerated distribution of shares (as described in the subsection captioned “--Accelerated Distribution for Ethics or Conflict Reasons Resulting From Employment by a Government Entity”) will be subject for the remainder of the applicable vesting period to the same terms and conditions of this Award Agreement, including employment restrictions during the vesting period, as if you had resigned from the Firm having met the requirements for Full Career Eligibility.

Failure to Satisfy Conditions:

If you do not satisfy the above “Conditions for Continued Vesting of Awards,” any outstanding restricted stock units under each CV Award will be cancelled. You also will be required to repay the Fair Market Value of the number of shares (before tax and other withholdings) of Common Stock distributed to you that would have been outstanding as restricted stock units on the date you failed to satisfy the “Condition for Continued Vesting of Awards” but for their accelerated distribution (as described in the subsection captioned “Accelerated Distribution for Ethics or Conflict Reasons Resulting From Employment by a Government Entity”). Fair Market Value for this purpose will be determined as the date that the shares were distributed.

Exhibit 10.23 (U.K.)

JPMORGAN CHASE & CO. LONG-TERM INCENTIVE PLAN TERMS AND CONDITIONS OF JANUARY 17, 2017 RESTRICTED STOCK UNIT AWARD OPERATING COMMITTEE (Protection-Based Vesting Provisions)

Award Agreement	<p>These terms and conditions are made part of the Award Agreement dated as of January 17, 2017 (“Grant Date”) awarding restricted stock units pursuant to the terms of the JPMorgan Chase & Co. Long-Term Incentive Plan (“Plan”). To the extent the terms of the Award Agreement (all references to which will include these terms and conditions) conflict with the Plan, the Plan will govern. The Award Agreement, the Plan and Prospectus supersede any other agreement, whether written or oral, that may have been entered into by the Firm and you relating to this award.</p> <p>This award was granted on the Grant Date subject to the Award Agreement. Unless you decline by the deadline and in the manner specified in the Award Agreement, you will have agreed to be bound by these terms and conditions, effective as of the Grant Date. If you decline the award, it will be cancelled as of the Grant Date.</p> <p>Capitalized terms that are not defined in “<u>Definitions</u>” below or elsewhere in the Award Agreement will have the same meaning as set forth in the Plan.</p> <p>JPMorgan Chase & Co. will be referred to throughout the Award Agreement as “JPMorgan Chase,” and together with its subsidiaries as the “Firm.”</p>
Form and Purpose of Award	<p>Each restricted stock unit represents a non-transferable right to receive one share of Common Stock as of the applicable vesting date as set forth in your Award Agreement.</p> <p>The purpose of this award is to motivate your future performance for services to be provided during the vesting period and to align your interests with those of the Firm and its shareholders.</p>
Dividend Equivalents	<p>If dividends are paid on Common Stock while restricted stock units under this award are outstanding, you will be paid an amount equal to the dividend paid on one share of Common Stock, multiplied by the number of restricted stock units outstanding under this award as of the dividend record date</p>

Protection-Based Vesting	<p>This award is intended and expected to vest on the vesting date(s), provided that you are continuously employed by the Firm through such vesting date, or you meet the requirements for continued vesting described under the subsections “--Job Elimination,” “--Full Career Eligibility,” “--Government Office” or “--Disability.” However, vesting and the number of restricted stock units in which you vest are subject to these terms and conditions (including, but not limited to, sections captioned “<u>Recapture Provisions</u>,” “<u>Remedies</u>” and the following protection-based vesting provision.)</p> <p>Up to a total of fifty percent of your award that would otherwise be distributable to you during the vesting period (“At Risk restricted stock units”) may be cancelled if the Chief Executive Officer of JPMorgan Chase (“CEO”) determines in his or her sole discretion that cancellation of all or portion of the At Risk restricted stock units is appropriate in light of any one or a combination of the following factors:</p> <ul style="list-style-type: none"> • Your performance in relation to the priorities for your position, or the Firm’s performance in relation to the priorities for which you share responsibility as a member of the Operating Committee, have been unsatisfactory for a sustained period of time. Among the factors the CEO may consider in assessing performance are net income, total net revenue, return on equity, earnings per share and capital ratios of the Firm, both on an absolute basis and, as appropriate, relative to peer firms. • For any calendar year ending during the vesting period, JPMorgan Chase’s annual pre-tax pre-provision income at the Firm level is negative. • Awards granted to participants in a Line of Business for which you exercise, or during the vesting period exercised, direct or indirect responsibility, were in whole or in part cancelled because the Line of Business did not meet its annual Line of Business Financial Threshold. • The Firm does not meet the Firmwide Financial Threshold. <p>In the event that your employment terminates due to “Job Elimination,” “Full Career Eligibility,” “Government Office” or “Disability” thereby entitling you to continued vesting in your award (or potentially acceleration due to satisfaction of the Government Office Requirements), the cancellation circumstances described above will continue to apply to your At Risk restricted stock units pursuant to the section captioned “<u>Accelerated Distribution for Ethics or Conflict Reasons Resulting From Employment by a Government Entity</u>.”</p> <p>Any determination above with respect to protection-based vesting provisions is subject to ratification by the Compensation and Management Development Committee of the Board of Directors of JPMorgan Chase (“Committee”). In the case of an award to the CEO, all such determinations shall be made by the Committee</p>
Vest Period	<p>The period from the Grant Date to the last vesting date is the “vesting period.” (See subsections captioned “--<u>Amendment</u>” pursuant to which the Firm may extend the vesting period and “--<u>No Ownership Rights</u>” pursuant to which the Firm may place restrictions on delivered shares of Common Stock following a vesting date.)</p>
Holding Requirement	<p>As of each vesting date, you shall be entitled to a distribution equal to the Fair Market Value of the number of restricted stock units vesting on such date, less the number being withheld to satisfy tax withholding obligations. You agree that the distribution made to you will be held in an account in your name with restrictions preventing you from transferring, assigning, selling, pledging or otherwise encumbering such distribution for a six month period commencing with the vesting date. Such restrictions shall lapse in event of your death.</p>
Bonus Recoupment	<p>In consideration of the grant of this award, you agree that you are subject to the JPMorgan Chase Bonus Recoupment Policy (or successor policy) as in effect from time to time as it applies both to the cash incentive compensation awarded to you for performance year 2016 and to this award. You can access this policy as currently in effect through the following link:</p> <p>http://www.jpmorganchase.com/corporate/About-JPMC/corporate-governance-principles.htm#recoupment</p> <p>For the avoidance of doubt, nothing in these terms and conditions in any way limits the rights of the Firm under the JPMorgan Chase Bonus Recoupment Policy (or successor policy).</p>
UK Clawback Policy for Identified Staff	<p>In consideration of grant of this award, and without prejudice to any other provision of this Award Agreement, you agree that you are subject to the JPMorgan Chase Clawback Policy for Identified Staff or successor policy as in effect from time to time as it applies both to the cash incentive compensation awarded to you for performance year 2016 and to this award. You can access this policy as currently in effect in My Rewards through the following link: https://myrewards.jpmchase.net/myrewards</p>

Recapture Provisions (Detrimental Conduct, Risk-Related and Other Recapture Provisions)

Notwithstanding any terms of this Award Agreement to the contrary, JPMorgan Chase reserves the right in its sole discretion to cancel up to 100% of your outstanding restricted stock units under this award and, to the extent set forth in “Remedies” below, to recover from you up to an amount equal to the Fair Market Value (determined as of the applicable vesting date) of the gross number of shares of Common Stock previously distributed (including shares withheld for tax purposes) under this award if the Firm in its sole discretion determines that:

- you engaged in conduct detrimental to the Firm insofar as it causes material financial or reputational harm to the Firm or its business activities, or
 - this award was based on materially inaccurate performance metrics, whether or not you were responsible for the inaccuracy, or
 - this award was based on a material misrepresentation by you, or
 - you improperly or with gross negligence failed to identify, raise or assess, in a timely manner and as reasonably expected, risks and/or concerns with respect to risks material to the Firm or its business activities, or
 - your employment was terminated for Cause (see section captioned “Definitions” below) or, in the case of a determination after the termination of your employment, that your employment could have been terminated for Cause.
- See section captioned “Remedies” for additional information.

JPMorgan Chase’s right to cancel and/or recover the value of this award (or any cash bonus) under the JPMorgan Chase Bonus Recoupment Policy and the other provisions of this award relate to the “organizational goals” of the Firm as that term is defined by regulations issued under Section 409A of the Internal Revenue Code (“Code”).

Termination of Employment

Except as explicitly set forth below under the subsections captioned “--Job Elimination,” “--Full Career Eligibility,” “--Government Office” or “--Disability” below or under the section captioned “Death,” any restricted stock units outstanding under this award will be cancelled effective on the date your employment with the Firm terminates for any reason.

Subject to these terms and conditions (including, but not limited to, sections captioned “Protection-Based Vesting,” “Bonus Recoupment,” “Recapture Provisions,” “Your Obligations” and “Remedies”), you will be eligible to continue to vest (on the original vesting schedule) with respect to your award in accordance with its terms and conditions following the termination of your employment if one of the following circumstances applies to you:

Ø Job Job Elimination:

Elimination

In the event that the Director of Human Resources or nominee in his or her sole discretion determines that

- the Firm terminated your employment because your job was eliminated, and
 - after you are notified that your job will be eliminated, you provided such services as requested by the Firm in a cooperative and professional manner, and
- you satisfied the Release/Certification Requirements set forth below.

Ø Full Career Eligibility:

Career Eligibility

In the event that the Director of Human Resources or nominee in his or her sole discretion determines that

- you voluntarily terminated your employment with the Firm, had completed at least five years of continuous service with the Firm immediately preceding your termination date, and
- your Recognized Service (as defined below) on your date of termination equaled or exceeded 15 years, or your combined Recognized Service with the Firm and external professional experience (as attested by you to the Firm) equaled or exceeded 30 years, and
- you provided at least 90 days advance written notice to the Firm of your intention to voluntarily terminate your employment under this provision, during which notice period you provided such services as requested by the Firm in a cooperative and professional manner and you did not perform any services for any other employer, and
- continued vesting shall be appropriate, which determination shall be made prior to your termination and will be based on your performance and conduct (before and after providing notice), and
- for 36 months from the date of grant of this award you do not either perform services in any capacity (including self-employment) for a Financial Services Company (as defined below) or work in your profession (whether or not for a Financial Services Company); provided that you may work for a government, education or Not-for-Profit Organization (as defined below), and
- you satisfy the Release/Certification Requirements set forth below.

After receipt of such advance written notice, the Firm may choose to have you continue to provide services during such 90-day period as a condition to continued vesting or shorten the length of the 90-day period at the Firm's discretion, but to a date no earlier than the date you would otherwise meet the service requirement.

Additional advance notice requirements may apply for employees subject to notice period policies. (See "Notice Period" below.)

Ø Government Government Office:

Office

In the event that you voluntarily terminate your employment with the Firm to accept a Government Office or become a candidate for an elective Government Office, as described at the end of these terms and conditions under the section captioned "Government Office Requirements." See also definition of Government Office in the section captioned "Definitions."

Ø Disability Disability:

In the event that

- your employment with the Firm terminates because (i) you are unable to return to work while you are receiving benefits under the JPMorgan Chase Long Term Disability Plan, or for non-U.S. employees, under the equivalent JPMorgan Chase-sponsored local country plan (in either case, "LTD Plan"), or (ii) if you are not covered by a LTD Plan, you are unable to return to work due to a long-term disability that would qualify for benefits under the applicable LTD Plan, as determined by the Firm or a third-party designated by the Firm; provided that you (x) request in writing continued vesting due to such disability within 30 days of the date your employment terminates, and (y) provide any requested supporting documentation and (z) receive the Firm's written consent to such treatment, and
- you satisfy the Release/Certification Requirements set forth below.

To qualify for continued vesting after termination of your employment under any of the foregoing circumstances:

- you must timely execute and deliver a release of claims in favor of the Firm, having such form and terms as the Firm shall specify,
- with respect to "Full Career Eligibility," prior to the termination of your employment, you must confirm with management that you meet the eligibility criteria (including providing at least 90 days advance written notification), advise that you are seeking to be treated as an individual eligible for "Full Career Eligibility," and receive written consent to such continued vesting,
- with respect to "Disability," you must satisfy the notice and documentation described above and receive written consent to such continued vesting,
- with respect to "Full Career Eligibility," it is your responsibility to take the appropriate steps to certify to the Firm prior to each vesting date while the employment restrictions are outstanding on the authorized form of the Firm that you have complied with the employment restrictions applicable to you (as described herein) from your date of termination of employment through the applicable vesting date, and in all cases, complied with all other terms of the Award Agreement. (See section captioned "Your Obligations".)

**Release/
Certification**

Death	<p>If you die while you are eligible to vest in restricted stock units under this award, the restricted stock units will immediately vest and will be distributed in shares of Common Stock (after applicable tax withholding) to your designated beneficiary on file with the Firm's Stock Administration Department, or if no beneficiary has been designated or survives you, then to your estate. Any shares will be distributed no later than the end of the calendar year immediately following the calendar year which contains your date of death; however, our administrative practice is to register such shares in the name of your beneficiary or estate within 60 days of the Firm's receipt of any required documentation.</p>
Your Obligations	<p>In consideration of the grant of this award, you agree to comply with and be bound by the obligations set forth below next to the subsections captioned "<u>--Non-Solicitation of Employees and Customers,</u>" "<u>--Confidential Information,</u>" "<u>--Non-Disparagement,</u>" "<u>--Cooperation,</u>" "<u>--Compliance with Award Agreement,</u>" and "<u>--Notice Period.</u>"</p>
<input checked="" type="checkbox"/> Non-Solicitation of Employees and Customers	<p>During your employment by the Firm and for the longer of the (i) one year period following the termination of your employment or, (ii) if your award is not cancelled as of your termination date, the three year period from Grant Date, you will not directly or indirectly, whether on your own behalf or on behalf of any other party, without the prior written consent of the Director of Human Resources: (i) solicit, induce or encourage any of the Firm's then current employees to leave the Firm or to apply for employment elsewhere, (ii) hire any employee or former employee who was employed by the Firm at the date your employment terminated, unless the individual's employment terminated because his or her job was eliminated, or the individual's employment with the Firm has been terminated for more than six months, (iii) to the fullest extent enforceable under applicable law, solicit or induce or attempt to induce to leave the Firm, or divert or attempt to divert from doing business with the Firm, any then current customers, suppliers or other persons or entities that were serviced by you or whose names became known to you by virtue of your employment with the Firm, or otherwise interfere with the relationship between the Firm and such customers, suppliers or other persons or entities. This does not apply to publicly known institutional customers that you service after your employment with the Firm without the use of the Firm's confidential or proprietary information.</p> <p>These restrictions do not apply to authorized actions you take in the normal course of your employment with the Firm, such as employment decisions with respect to employees you supervise or business referrals in accordance with the Firm's policies.</p>
<input checked="" type="checkbox"/> Confidential Information	<p>You will not, either during your employment with the Firm or thereafter, directly or indirectly (i) use or disclose to anyone any confidential information related to the Firm's business, or (ii) communicate with the press or other media about matters related to the Firm, its customers or employees, including matters and activities relating to your employment, or the employment of others, by the Firm, in the case of either (i) or (ii), except as explicitly permitted by the JPMorgan Chase Code of Conduct and applicable policies or law or legal process. In addition, following your termination of employment, you will not, without prior written authorization, access the Firm's private and internal information through telephonic, intranet or internet means. "Confidential information" shall have the same meaning for the Award Agreement as it has in the JPMorgan Chase Code of Conduct.</p> <p>Nothing in this award precludes you from reporting to the Firm's management or directors, the government, a regulator, a self-regulatory agency, your attorneys or a court, conduct you believe to be in violation of the law or concerns of any known or suspected Code of Conduct violation. It is also not intended to prevent you from responding truthfully to questions or requests from the government, a regulator or in a court of law.</p>
<input checked="" type="checkbox"/> Non-Disparagement	<p>You will not, either during your employment with the Firm or thereafter, make or encourage others to make any public statement or release any information in verbal, written, electronic or any other form, that is intended to, or reasonably could be foreseen to, disparage, embarrass or criticize the Firm or its employees, officers, directors or shareholders as a group. This shall not preclude you from reporting to the Firm's management or directors or to the government or a regulator conduct you believe to be in violation of the law or the Firm's Code of Conduct or responding truthfully to questions or requests for information to the government, a regulator or in a court of law in connection with a legal or regulatory investigation or proceeding.</p>
<input checked="" type="checkbox"/> Cooperation	<p>You will cooperate fully with and provide full and accurate information to the Firm and its counsel with respect to any matter (including any audit, tax proceeding, litigation, investigation or governmental proceeding) with respect to which you may have knowledge or information, subject to reimbursement for actual, appropriate and reasonable out-of-pocket expenses incurred by you.</p>
<input checked="" type="checkbox"/> Compliance with Award Agreement	<p>You will provide the Firm with any information reasonably requested to determine compliance with the Award Agreement, and you authorize the Firm to disclose the terms of the Award Agreement to any third party who might be affected thereby, including your prospective employer.</p>

Ø Notice Period

If you are subject to a notice period or become subject to a notice period after the Grant Date, whether by contract or by policy, that requires you to provide advance written notice of your intention to terminate your employment ("Notice Period"), then as consideration for this award and continued employment, you will provide the Firm with the necessary advance written notice that applies to you, as specified by such contract or policy.

After receipt of your notice, the Firm may choose to have you continue to provide services during the applicable Notice Period or may place you on a paid leave for all or part of the applicable Notice Period. During the Notice Period, you shall continue to devote your full time and loyalty to the Firm by providing services in a cooperative and professional manner and not perform any services for any other employer and shall receive your base salary and certain benefits until your employment terminates. You and the Firm may mutually agree to waive or modify the length of the Notice Period.

Regardless of whether a Notice Period applies to you, you must comply with the 90-day advance notice period described under the subsection captioned "--Full Career Eligibility," in the event you wish to terminate employment under that same subsection.

Remedies

Ø Cancellation

In addition to the cancellation provisions described under the sections captioned "Protection-Based Vesting," "Bonus Recoupment," "Recapture Provisions" and "Termination of Employment," your outstanding restricted stock units under this award may be cancelled if the Firm in its sole discretion determines that:

- you have failed to comply with any of the advance notice/cooperation requirements or employment restrictions applicable to your termination of employment, or
- you have failed to return the required forms specified under the section captioned "Release/Certification" by the specified deadline, , or
- you have violated any of the provisions as set forth above in the section captioned "Your Obligations."

To the extent provided under the subsection captioned "--Amendment" below, JPMorgan Chase reserves the right to suspend vesting of this award and/or distribution of shares under this award, including, without limitation, during any period that JPMorgan Chase is evaluating whether this award is subject to cancellation and/or recovery and/or whether the conditions for distributions of shares under this award are satisfied. JPMorgan Chase is not responsible for any price fluctuations during any period of suspension and, if applicable, suspended units will be reinstated consistent with Plan administration procedures. See also "subsection captioned "--No Ownership Rights."

In addition, you may be required to pay the Firm up to an amount equal to the Fair Market Value (determined as of the applicable vesting date) of the gross number of shares of Common Stock previously distributed under this award as follows:

- Payment may be required with respect to any shares of Common Stock distributed within the three year period prior to a notice-of-recovery under this section, if the Firm in its sole discretion determines that:
 - you committed a fraudulent act, or engaged in knowing and willful misconduct related to your employment,
 - you violated any of the provisions as set forth above in the section captioned "Your Obligations," or
 - you violated the employment restrictions set forth in the subsection "--Full Career Eligibility," following the termination of your employment.
- In addition, payment may be required with respect to any shares distributed within the one year period prior to notice-of-recovery under this section, if the Firm in its sole discretion determines appropriate pursuant to the provisions in the subsection captioned "Recapture Provisions." Notice-of-recovery under this subsection is a written (including electronic) notice from the Firm to you either requiring payment under this subsection or stating that JPMorgan Chase is evaluating requiring payment under this subsection. Without limiting the foregoing, notice-of-recovery will be deemed provided if the Firm makes a good faith attempt to provide written (including electronic) notice at your last known address maintained in the Firm's employment records. For the avoidance of doubt, a notice-of-recovery that the Firm is evaluating requiring payment under this section shall preserve JPMorgan Chase's rights to require payment as set forth above in all respects and the Firm shall be under no obligation to complete its evaluation other than as the Firm may determine in its sole discretion.

For purposes of this section, shares distributed under this award include shares withheld for tax purposes. However, it is the Firm's intention that you only be required to pay the amounts under this section with respect to shares that are or may be retained by you following a determination of tax liability and that you will not be required to pay amounts with respect to shares representing irrevocable tax withholdings or tax payments previously made (whether by you or the Firm) that you will not be able to recover, recapture or reclaim (including as a tax credit, refund or other benefit). Accordingly, JPMorgan Chase will not require you to pay any amount that the Firm or its nominee in his or her sole discretion determines is represented by such withholdings or tax payments.

Payment may be made in shares of Common Stock or in cash. You agree that any repayment will be a recovery of shares to which you were not entitled under the terms and conditions of your Award Agreement and is not to be construed in any manner as a penalty. You also acknowledge that a violation or attempted violation of the obligations set forth herein will cause immediate and irreparable damage to the Firm, and therefore agree that the Firm shall be entitled as a matter of right to an injunction, from any court of competent jurisdiction, restraining any violation or further violation of such obligations; such right to an injunction, however, shall be cumulative and in addition to whatever other remedies the Firm may have under law or equity.

Nothing in the section in any way limits your obligations under "Bonus Recoupment."

Administrative Provisions

Withholding Taxes: The Firm, in its sole discretion, may (i) retain from each distribution the number of shares of Common Stock required to satisfy applicable tax obligations or (ii) implement any other desirable or necessary procedures, so that appropriate withholding and other taxes are paid to the competent authorities with respect to the vested shares, dividend equivalents and the award. This may include but is not limited to (i) a market sale of a number of such shares on your behalf substantially equal to the withholding or other taxes, (ii) to the extent required by law, withhold from cash compensation, an amount equal to any withholding obligation with respect to the award, shares that vest under this award, and/or dividend equivalents, and (iii) retaining shares that vest under this award or dividend equivalents until you pay any taxes associated with the award, vested shares and/or the dividend equivalents directly to the competent authorities.

Right to Set Off: The Firm may, to the maximum extent permitted by applicable law (including Section 409A of the Code to the extent it is applicable to you), retain for itself funds or the Common Stock resulting from any vesting of this award to satisfy any obligation or debt that you owe to the Firm. Notwithstanding any account agreement with the Firm to the contrary, the Firm will not recoup or recover any amount owed from any funds or unrestricted securities held in your name and maintained at the Firm pursuant to such account agreement to satisfy any obligation or debt or obligation owed by you under this award without your consent. This restriction on the Firm does not apply to accounts described and authorized in "No Ownership Rights" described below.

No Ownership Rights: Restricted stock units do not convey the rights of ownership of Common Stock and do not carry voting rights. No shares of Common Stock will be issued to you until after the restricted stock units have vested and any applicable restrictions have lapsed. Shares will be issued in accordance with JPMorgan Chase's procedures for issuing stock. By accepting this award, you authorize the Firm, in its discretion, to establish on your behalf a brokerage account in your name with the Firm or book-entry account with our stock plan administrator and/or transfer agent and deliver to that account any vested shares derived from the award.

With respect to any applicable vesting date, JPMorgan Chase may impose for any reason, as of such vesting date for such period as it may specify in its sole discretion, such restrictions on the Common Stock to be issued to you as it may deem appropriate, including, but not limited to, restricting the sale, transfer, pledge, assignment or encumbrance of such shares of Common Stock. By accepting this award, you acknowledge that during such specified period should there be a determination that the cancellation or recovery provisions of this award apply, then you agree that any shares subject to such restrictions (notwithstanding the limitation set forth set forth in the Right to Set Off section above) may be cancelled in whole or part. (See sections captioned "Protection-Based Vesting," "Bonus Recoupment," "Recapture Provisions," "Termination of Employment" and "Remedies," as well as the subsection captioned "--Amendment" permitting suspension of vesting.)

Binding Agreement: The Award Agreement will be binding upon any successor in interest to JPMorgan Chase, by merger or otherwise.

Not a Contract of Employment: Nothing contained in the Award Agreement constitutes a contract of employment or continued employment. Employment is “at-will” and may be terminated by either you or JPMorgan Chase for any reason at any time. This award does not confer any right or entitlement to, nor does the award impose any obligation on the Firm to provide, the same or any similar award in the future and its value is not compensation for purposes of determining severance.

Section 409A Compliance: To the extent that Section 409A of the Code is applicable to this award, distributions of shares and cash hereunder are intended to comply with Section 409A of the Code, and the Award Agreement, including these terms and conditions, shall be interpreted in a manner consistent with such intent.

Notwithstanding anything herein to the contrary, if you (i) are subject to taxation under the Code, (ii) are a specified employee as defined in the JPMorgan Chase 2005 Deferred Compensation Plan and (iii) have incurred a separation from service (as defined in that Plan with the exception of death) and if any units/shares under this award represent deferred compensation as defined in Section 409A and such shares are distributable (under the terms of this award) within six months following, and as a result of your separation from service, then those shares will be delivered to during the first calendar month after the expiration of six full months from date of your separation from service. Further, if your award is not subject to a substantial risk of forfeiture as defined by regulations issued under Section 409A of the Code, then the remainder of each calendar year immediately following (i) each applicable vesting date set forth in your Award Agreement shall be a payment date for purposes of distributing the vested portion of the award and (ii) each date that JPMorgan Chase specifies for payment of dividends declared on its Common Stock, shall be the payment date(s) for purposes of distributing dividend equivalent payments.

Change in Outstanding Shares: In the event of any change in the outstanding shares of Common Stock by reason of any stock dividend or split, recapitalization, issuance of a new class of common stock, merger, consolidation, spin-off, combination or exchange of shares or other similar corporate change, or any distributions to stockholders of Common Stock other than regular cash dividends, the Committee will make an equitable substitution or proportionate adjustment, in the number or kind of shares of Common Stock or other securities issued or reserved for issuance pursuant to the Plan and to any restricted stock units outstanding under this award for such corporate events.

Interpretation/Administration: The Committee has sole and complete authority to interpret and administer this Award Agreement, including, without limitation, the power to (i) interpret the Plan and the terms of this Award Agreement; (ii) determine the reason for termination of employment; (iii) determine application of the post-employment obligations and cancellation and recovery provisions; (iv) decide all claims arising with respect to this award; and (v) delegate such authority as it deems appropriate. Any determination contemplated hereunder by the Committee, the Firm, the Director of Human Resources or their respective delegates or nominees shall be binding on all parties.

Notwithstanding anything herein to the contrary, the determinations of the Director of Human Resources, the Firm, the Committee and their respective delegates and nominees under the Plan and the Award Agreements are not required to be uniform. By way of clarification, the Committee, the Firm, the Director of Human Resources and their respective delegates and nominees shall be entitled to make non-uniform and selective determinations and modifications under Award Agreements and the Plan.

Amendment: The Committee or its nominee reserves the right to amend this Award Agreement in any manner, at any time and for any reason; provided, however, that no such amendment shall materially adversely affect your rights under this Award Agreement without your consent except to the extent that the Committee or its delegate considers advisable to (x) comply with applicable laws or changes in or interpretation of applicable laws, regulatory requirements and accounting rules or standards and/or (y) make a change in a scheduled vesting date or impose the restrictions described above under “No Ownership Rights,” in either case, to the extent permitted by Section 409A of the Code if it is applicable to you. This Award Agreement may not be amended except in writing signed by the Director of Human Resources of JPMorgan Chase.

Severability: If any portion of the Award Agreement is determined by the Firm to be unenforceable in any jurisdiction, any court or arbitrator of competent jurisdiction or the Director of Human Resources may reform the relevant provisions (e.g., as to length of service, time, geographical area or scope) to the extent the Firm (or court/arbitrator) considers necessary to make the provision enforceable under applicable law.

Accelerated Distribution for Ethics or Conflict Reasons Resulting From Employment by a Government Entity: Upon receipt of satisfactory evidence that applicable United States federal, state, local, foreign or supranational ethics or conflict of interest laws or regulations require you to divest your interest in JPMorgan Chase restricted stock units, the Firm may accelerate the distribution of all or part of your outstanding award effective on or before the required divestiture date; provided that no accelerated distribution shall occur if the Firm determines that such acceleration will violate Section 409A of the Code.

If you have voluntarily terminated your employment and have satisfied the requirements of the section captioned “Government Office Requirements,” acceleration shall apply (to extent required) to the percentage of your outstanding award that would continue to vest under that section. In the case of a termination of employment where the award is outstanding as a result of the subsections entitled “Job Elimination” or “Full Career Eligibility”, then acceleration shall apply, to the extent required, to the full outstanding award.

Notwithstanding accelerated distribution pursuant to the foregoing, you will remain subject to the applicable terms of your Award Agreement as if your award had remained outstanding for the duration of the original vesting period and shares had been distributed as scheduled as of each applicable vesting date, including, but not limited to, repayment obligations set forth in the section captioned “Remedies” and the employment restrictions in the sections captioned “Protection-Based Vesting” and “Government Office Requirements” and the subsection “Full Career Eligibility.”

Use of Personal Data: By accepting this award, you have acknowledged that the Firm may process your personal data (including sensitive personal data) for purposes, including but not limited to (i) determining your compensation, (ii) payroll activities, including, but not limited to, tax withholding and regulatory reporting, which tax and regulatory reporting and withholding may include, but is not limited to, the United States, your work country (including countries to which you travel on Firm business) and country of residence, (iii) registration of shares and units, (iv) establishing brokerage account on your behalf, and (v) all other lawful purposes related to your employment and this award and that the Firm may provide such data to third party vendors with whom it has contracted to provide such services and/or other bodies, including regulators, supervisory bodies, law enforcement and other government agencies. You are acknowledging and agreeing that your personal data will be transferred to, and processed in, countries and locations that do not have the same data privacy laws and statutory protection for personal data as your work country, country of residence, or country of nationality. If your personal data is subject to data privacy laws or statutory protection for personal data and they so provide for termination of the foregoing authorization, you may terminate the authorization at any time except with respect to tax and regulatory reporting and subject always to the Firm’s legal and regulatory obligations. In the event you terminate this authorization, your award will be cancelled.

Governing Law: This award shall be governed by and construed in accordance with the laws of the State of New York, without regard to conflict of law principles.

Choice of Forum: By accepting this award under the Plan, you agree (and have agreed) that to the extent not otherwise subject to arbitration under an arbitration agreement between you and the Firm, any dispute arising directly or indirectly in connection with this award or the Plan shall be submitted to arbitration in accordance with the rules of the American Arbitration Association if so elected by the Firm in its sole discretion. In the event such a dispute is not subject to arbitration for any reason, you agree to accept the exclusive jurisdiction and venue of the United States District Court for the Southern District of New York with respect to any judicial proceeding in connection with this award or the Plan. You waive, to the fullest extent permitted by law, any objection to personal jurisdiction or to the laying of venue of such dispute and further agree not to commence any action arising out of or relating to this award or the Plan in any other forum.

Waiver of Jury Trial/Class Claims: By accepting this award, you agree, with respect to any claim brought in connection with your employment with the Firm in any forum (i) to waive the right to a jury trial and (ii) that any judicial proceeding or arbitration claim will be brought on an individual basis, and you hereby waive any right to submit, initiate, or participate in a representative capacity or as a plaintiff, claimant or member in a class action, collective action, or other representative or joint action.

Litigation: By accepting any award under the Plan, you agree (and have agreed) that in any action or proceeding by the Firm (other than a derivative suit in the right of the Firm) to enforce the terms and conditions of this Award Agreement or any other Award Agreement where the Firm is the prevailing party, the Firm shall be entitled to recover from you its reasonable attorney fees and expenses incurred in such action or proceeding. In addition, you agree that you are not entitled to, and agree not to seek, advancement of attorney fees and indemnification under the Firm’s By-Laws in the event of such a suit by the Firm.

Nontransferability: Neither this award or any other outstanding awards of restricted stock units, nor your interests or rights in any such awards, shall be assigned, pledged, transferred, hypothecated or subject to any lien. An award may be transferred following your death by will, the laws of descent or by a beneficiary designation on file with the Firm.

Outstanding Awards: The Administrative provisions set forth above shall apply to any award of restricted stock units outstanding as of the date hereof, and such awards are hereby amended.

Definitions

“Cause” means a determination by the Firm that your employment terminated as a result of your (i) violation of any law, rule or regulation (including rules of self-regulatory bodies) related to the Firm’s business, (ii) indictment or conviction of a felony, (iii) commission of a fraudulent act, (iv) violation of the JPMorgan Code of Conduct or other Firm policies or misconduct related to your duties to the Firm (other than immaterial and inadvertent violations or misconduct), (v) grossly inadequate performance of the duties associated with your position or job function or failure to follow reasonable directives of your manager, or (vi) any act or failure to act that is injurious to the interests of the Firm or its relationship with a customer, client or an employee.

“Financial Services Company” means a business enterprise that employs you in any capacity (such as an employee, contractor, consultant, advisor, or self-employed individual, whether paid or unpaid) and engages in:

- commercial or retail banking, including, but not limited to, commercial, institutional and personal trust, custody and/or lending and processing services, originating and servicing mortgages, issuing and servicing credit cards, payment servicing or processing or merchant services,
- insurance, including but not limited to, guaranteeing against loss, harm, damage, illness, disability or death, providing and issuing annuities, acting as principal, agent or broker for purpose of the forgoing,
- financial, investment or economic advisory services, including but not limited to, investment banking services (such as advising on mergers or dispositions, underwriting, dealing in, or making a market in securities or other similar activities), brokerage services, investment management services, asset management services, and hedge funds,
- issuing, trading or selling instruments representing interests in pools of assets or in derivatives instruments,
- advising on, or investing in, private equity or real estate, or
- any similar activities that the Director of Human Resources or nominee determines in his or her sole discretion constitute financial services.

“Firmwide Financial Threshold” means a cumulative return on tangible common equity for calendar years 2017 2018, and 2019 of not less than 15%. Cumulative return on tangible common equity means (i) the sum of the Firm’s reported net income for all three calendar years, divided by (ii) reported year-end tangible equity averaged over the three years.

“Government Office” means (i) a full-time position in an elected or appointed office in local, state, or federal government (including equivalent positions outside the U.S. or in a supranational organization), not reasonably anticipated to be a full-career position, or (ii) conducting a bona fide full-time campaign for such an elective public office after formally filing for candidacy, where it is customary and reasonably necessary to campaign full-time for the office.

“Line of Business” means a business unit of the Firm (or one or more business units designated below under the definition “Line of Business Financial Threshold” of the Corporate Investment Bank). All Corporate Functions (including the functions of the Chief Investment Office) are considered a single Line of Business.

“Line of Business Financial Threshold” means the financial threshold set forth below for the following Lines of Business based on the Firm’s management reporting system:

Asset & Wealth Management	Annual negative pre-provision net income ¹
Card, Commerce Solutions, Auto Finance and Student	Annual negative pre-tax, pre-loan loss reserve income ²
Commercial Banking	Annual negative pre-provision net income including loan charge-offs
Corporate Investment Bank	Annual negative pre-provision net income for CIB overall and/or annual negative allocated product revenues (excluding DVA) for: <ul style="list-style-type: none"> • Macro products: <ul style="list-style-type: none"> • Currency and Emerging Markets • Rates • Commodities • Spread Products <ul style="list-style-type: none"> • Credit • SPG • Public Finance • Equities • Investor Services • Global Banking
Consumer Banking Business, CWM and Business Banking	Annual negative pre-provision net income ²
Corporate Functions (including Chief Investment Office)	Annual negative pre-provision net income ¹ reported at the Firm level
Mortgage Banking	Annual negative pre-tax, pre-loan loss reserve income ²
¹ Pre-tax pre-provision income means Revenue less Expenses ² Pre-tax pre-loan loss reserve income means Revenue less (Expenses plus Net Charge-offs)	

“Not-for-Profit Organization” means an entity exempt from tax under state law and under Section 501(c)(3) of the Code. Section 501(c)(3) only includes entities organized and operated exclusively for religious, charitable, scientific, testing for public safety, literary or educational purposes, or to foster national or international amateur sports competition or for the prevention of cruelty to children or animals. Not-for-Profit Organization shall also mean entities outside the United States exempt from local and national tax laws because they are organized and operated exclusively for religious, charitable, scientific, testing for public safety, literary or educational purposes, or to foster national or international amateur sports competition or for the prevention of cruelty to children or animals

“Recognized Service” means the period of service as an employee set forth in the Firm’s applicable service-related policies.

Government Office Requirements

You may be eligible to continue vesting in all or part of your award if you voluntarily resign to accept a Government Office (as defined above) or to become a candidate for an elective Government Office.

Full Career Eligibility:

“Government Office Requirements” does not apply to you if you satisfy the subsection captioned “--Full Career Eligibility” as of the date that you voluntarily terminate your employment with the Firm.

Eligibility:

Eligibility for continued vesting is conditioned on your providing the Firm:

- At least 60 days’ advance written notice of your intention to resign to accept or pursue a Government Office (see section captioned “Definitions”), during which period you must perform in a cooperative and professional manner services requested by the Firm and not provide services for any other employer. The Firm may elect to shorten this notice period at the Firm’s discretion.
- Confirmation, in a form satisfactory to the Firm, that vesting in this award pursuant to this provision would not violate any applicable law, regulation or rule.
- Documentation in a form satisfactory to the Firm that your resignation is for the purpose of accepting a Government Office or becoming a candidate for a Government Office. (See section captioned “Definitions.”)

Portion of Your Awards Subject to Continued vesting:

Subject to the conditions below, the percentage of your outstanding awards that will continue to vest in accordance with this award’s original schedule will be based on your years of continuous service completed with the Firm immediately preceding your termination date, as follows:

- 50% if you have at least 3 but less than 4 years of continuous service,
- 75% if you have at least 4 but less than 5 years of continuous service, or
- 100% if you have 5 or more years of continuous service.

The portion of each award subject to continued vesting above is referred to as the “CV Award” and the portion not subject to continued vesting will be cancelled on the date your employment terminates.

Conditions for Continued Vesting of Awards:

- You must remain in a non-elective Government Office for two or more years after your employment with the Firm terminates to receive in full your CV Award; provided that if your non-elective Government Office is for a period less than two years, you will be entitled to retain any portion of the CV Award with a vesting date during your period of Government Service; or
- In the case of resignation from the Firm to campaign for an elective Government Office, your name must be on the primary or final public ballot for the election. (If you are not elected, see below for employment restrictions.)

Satisfaction of Conditions:

If your service in a Government Office ends two years or more after your employment with the Firm terminates, or in the case of resignation from the Firm to campaign for a Government Office, your name is on the primary or final public ballot for the election and you are not elected, any CV Awards then outstanding and any such awards that would have then been outstanding but for an accelerated distribution of shares (as described in the subsection captioned --Accelerated Distribution for Ethics or Conflict Reasons Resulting From Employment by a Government Entity”) will be subject for the remainder of the applicable vesting period to the same terms and conditions of this Award Agreement, including employment restrictions during the vesting period, as if you had resigned from the Firm having met the requirements for Full Career Eligibility.

Failure to Satisfy Conditions:

If you do not satisfy the above “Conditions for Continued Vesting of Awards,” any outstanding restricted stock units under each CV Award will be cancelled. You also will be required to repay the Fair Market Value of the number of shares (before tax and other withholdings) of Common Stock distributed to you that would have been outstanding as restricted stock units on the date you failed to satisfy the “Condition for Continued Vesting of Awards” but for their accelerated distribution (as described in the subsection captioned “Accelerated Distribution for Ethics or Conflict Reasons Resulting From Employment by a Government Entity”). Fair Market Value for this purpose will be determined as the date that the shares were distributed.

Exhibit 10.23 (Pinto)

JPMORGAN CHASE & CO. LONG-TERM INCENTIVE PLAN TERMS AND CONDITIONS OF JANUARY 17, 2017 PERFORMANCE SHARE UNIT AWARD OPERATING COMMITTEE (Protection-Based Vesting Provisions)

Award Agreement	<p>These terms and conditions are made part of the Award Agreement dated as of January 17, 2017 (“Grant Date”) awarding performance share units (“PSUs”) pursuant to the terms of the JPMorgan Chase & Co. Long-Term Incentive Plan (“Plan”). To the extent the terms of the Award Agreement (all references to which will include these terms and conditions) conflict with the Plan, the Plan will govern. The Award Agreement, the Plan and Prospectus supersede any other agreement, whether written or oral, that may have been entered into by the Firm and you relating to this award.</p> <p>This award was granted on the Grant Date subject to the Award Agreement and Plan. Unless you decline by the deadline and in the manner specified in the Award Agreement, you will have agreed to be bound by these terms and conditions, effective as of the Grant Date. If you decline the award, it will be cancelled as of the Grant Date.</p> <p>Capitalized terms that are not defined in “<u>Definitions</u>” below or elsewhere in the Award Agreement will have the same meaning as set forth in the Plan.</p> <p>JPMorgan Chase & Co. will be referred to throughout the Award Agreement as “JPMorgan Chase,” and together with its subsidiaries as the “Firm.”</p>
Form and Purpose of Award	<p>Each PSU represents a non-transferable right to require JPMorgan Chase to transfer one share of Common Stock following each vesting date set forth in your Award Agreement. Such transfer is hereinafter referred to as a “distribution” and words to a similar effect, such as distributed, should be construed accordingly.</p> <p>The purpose of this award is to further emphasize sustained long-term performance and to align your interests with those of the Firm and its shareholders.</p>
Dividend Equivalents	<p>If dividends are paid on Common Stock while restricted stock units under this award are outstanding, you will be paid an amount equal to the dividend paid on one share of Common Stock, multiplied by the number of restricted stock units outstanding under this award.</p>

**Protection-
Based Vesting**

This award is intended and expected to vest on each vesting date set forth in your Award Agreement, provided that you are continuously employed by the Firm through such vesting date, or you meet the requirements for continued vesting described under the subsections “--Job Elimination,” “--Full Career Eligibility,” “--Government Office” or “--Disability.” However, vesting and the number of PSUs that will vest are subject to these terms and conditions (including, but not limited to, sections captioned “Recapture Provisions,” and “Remedies” and the following protection-based vesting provision).

Up to a total of fifty percent of your award (including any associated Reinvested Dividend Equivalent Share Units) that would otherwise be distributable to you as of any vesting date (“At Risk PSUs”) may be cancelled if the Chief Executive Officer of JPMorgan Chase (“CEO”) determines in his or her sole discretion that cancellation of all or portion of the At Risk PSUs is appropriate in light of any one or a combination of the following factors:

- Your performance in relation to the priorities for your position, or the Firm’s performance in relation to the priorities for which you share responsibility as a member of the Operating Committee, have been unsatisfactory for a sustained period of time. Among the factors the CEO may consider in assessing performance are: net income, total net revenue, earnings per share and capital ratios of the Firm, both on an absolute basis and, as appropriate, relative to peer firms.
- For any calendar year ending during the vesting period, JPMorgan Chase’s annual pre-tax pre-provision income at the Firm level is negative.
- RSU awards granted to participants in a Line of Business for which you exercise, or during the vesting period exercised, direct or indirect responsibility, were in whole or in part cancelled because the Line of Business did not meet its annual Line of Business Financial Threshold.
- The Firm does not meet the Firmwide Financial Threshold.

For avoidance of doubt, cancellation of the At Risk PSUs, in whole or part, for one or more of the above factors may occur prior to the end of the Performance Period and the maximum number of At Risk PSUs subject to cancellation prior to the end of the Performance Period will be up to fifty percent of the Target Award Number.

In the event that your employment terminates due to “Job Elimination,” “Full Career Eligibility,” “Government Office” or “Disability” thereby entitling you to continued vesting in your award (or potentially acceleration due to satisfaction of the Government Office Requirements), the cancellation circumstances described above will continue to apply to your At Risk PSUs during the vesting period pursuant to the section captioned “Accelerated Distribution for Ethics or Conflict Reasons Resulting from Employment by a Government Entity.”

Any determination above with respect to protection-based vesting provisions is subject to ratification by the Compensation and Management Development Committee of the Board of Directors of JPMorgan Chase (“Committee”). In the case of an award to the CEO, all such determinations shall be made by the Committee.

**Number of
Performance Shares
Units at the end of
Performance Period**

Subject to any cancellation in whole or part of your award pursuant to these terms and conditions:

- **Performance calculation:** The number of PSUs at the end of the Performance Period will be the sum of the number of the Annual PSUs divided by the number of years in the Performance Period, plus
- an additional number of stock units based on Dividend Equivalent Share Units (earned during the Performance Period)

The number of PSUs determined above will be subject to the Qualitative Performance Factor (as detailed below), which if the Committee determines that such an adjustment is appropriate, will be applied following the end of each year during the Performance Period, to adjust downward the number of Annual PSUs. Additionally, the Committee, in its discretion, may make a qualitative performance assessment based on the entire three year Performance Period and apply Qualitative Performance Factor to the entire number of PSUs determined above.

See sections captioned, “Calculation of Relative Performance” and “Definitions.”

**Reinvested Dividend
Equivalent Share
Units**

Delivery of vested shares of Common Stock to your account will be made not later than the date specified in the last sentence of the subsection captioned “Section 409A Compliance.”

If dividends are paid on Common Stock during the Performance Period while the award is outstanding, additional share units representing shares of Common Stock will be allocated to your award as calculated in this section. The number, if any, will be based on the dividends that would have been paid during the Performance Period as of each dividend payment date on the number of PSUs, if any, determined pursuant to the Performance Calculation set forth above, and treated as if reinvested in additional shares of Common Stock on each dividend payment based on the Fair Market Value of one share of Common Stock on each dividend payment date (“Reinvested Dividend Equivalent Share Units”).

**Dividend Equivalents
Payments**

After the end of Performance Period, if dividends are paid on Common Stock while PSUs (including Dividend Equivalent Share Units) under this award are outstanding, you will be paid an amount equal to the dividend paid on one share of Common Stock, multiplied by the number of PSUs (including Dividend Equivalent Share Units) outstanding under this award as of each dividend record date

Holding Requirement	The net number of shares of Common Stock (after tax and all other lawful withholdings) in which you have vested, if any, as of the any vesting date will be held in an account in your name with restrictions preventing you from transferring, assigning, selling, pledging or otherwise encumbering such shares for: (i) a six month period measured from each vesting date; and (ii) a two year period for such shares vesting on March 25th, 2020, and a one year period for such shares vesting on March 25th, 2021, with the holding periods running concurrently. Such restrictions shall only lapse, prior to the expiration of the holding period, in the event of your death or for an accelerated distribution for ethics or conflict reasons. See section captioned, " <u>Death</u> " and subsection captioned, "Accelerated Distribution for Ethics or Conflict Reasons Resulting From Employment by a Government Entity."
Calculation of Performance Ranking	For purposes of the Performance Ranking, the Ranking of the Firm and of each Performance Company for each year in the Performance Period shall be determined and calculated by the Calculation Agent, using the definitions of "Annual PSUs," "ROTCE," "Average Tangible Common Equity," (if otherwise applicable) "Firm Reported ROTCE" and "Performance Table" (including its footnote) as set forth in the Definitions section of these terms and conditions. See section captioned, " <u>Definitions</u> ". Except for Firm Reported ROTCE, calculations will be expressed as a decimal to the second place (i.e. xx.yy%). See section captioned, " <u>Definitions--Performance Table</u> " in the event of a tie. All performance based calculations as set forth herein are binding and conclusive on you and your successors.
Qualitative Performance	<p>Determination of Qualitative Performance Factor. Annually during the Performance Period, the Committee will formally assess your qualitative performance based on 4 broad categories: (1) Risk & Control; (2) Customers & Clients; (3) People & Leadership; and (4) Financial Results. If the Committee determines that your performance "Meets" expectations, no downward adjustment to your Annual PSUs for that year shall take place (and the Qualitative Performance Factor shall be 100%). If the Committee determines that your performance did "Not Meet" expectations, the Committee shall determine whether a downward adjustment is appropriate, and if so, to what extent. A downward adjustment could result in a Qualitative Performance Factor of between 0% and 99%, depending on the circumstances. <u>During the Performance Period</u>, a 0% Performance Factor for each year in the Performance Period would reduce Annual PSUs to zero, resulting in the cancellation of award with no shares vesting.</p> <p>Additionally, the Committee may, in its discretion, may make such assessment of your qualitative performance based on your performance during the entire three year Performance Period and apply the Qualitative Performance Factor to the entire number of PSUs determined under section captioned "<u>Number of Performance Share Units at the end of the Performance Period</u>." In the case of a Qualitative Performance Factor of 0%, the award would be cancelled.</p> <p>The Qualitative Performance Factor shall only be applied, if applicable, during your employment with the Firm, or as soon as administratively practical.</p>
Bonus Recoupment	<p>In consideration of the grant of this award, you agree that you are subject to the JPMorgan Chase Bonus Recoupment Policy (or successor policy) as in effect from time to time as it applies both to the cash incentive compensation awarded to you for performance year 2016 and to this award. You can access this policy as currently in effect through the following link:</p> <p>http://www.jpmorganchase.com/corporate/About-JPMC/corporate-governance-principles.htm#recoupment</p> <p>For the avoidance of doubt, nothing in these terms and conditions in any way limits the rights of the Firm under the JPMorgan Chase Bonus Recoupment Policy (or successor policy).</p>
UK Clawback Policy for Identified Staff	In consideration of grant of this award, and without prejudice to any other provision of this Award Agreement, you agree that you are subject to the JPMorgan Chase Clawback Policy for Identified Staff or successor policy as in effect from time to time as it applies both to the cash incentive compensation awarded to you for performance year 2016 and to this award. You can access this policy as currently in effect in My Rewards through the following link: https://myrewards.jpmchase.net/myrewards

Recapture Provisions (Detrimental Conduct, Risk-Related and Other Recapture Provisions)

Notwithstanding any terms of this Award Agreement to the contrary, JPMorgan Chase reserves the right in its sole discretion to cancel up to 100% of your award (for the avoidance of doubt, including any Reinvested Dividend Equivalent Share Units) and, to the extent set forth in “Remedies” below, to recover from you up to an amount equal to the Fair Market Value (determined as of any vesting date) of the gross number of shares of Common Stock previously distributed (including vested shares subject to the Holding Requirements and shares withheld for tax or other lawful purposes) under this award if the Firm in its sole discretion determines that:

- you engaged in conduct detrimental to the Firm insofar as it causes material financial or reputational harm to the Firm or its business activities, or
 - this award was based on materially inaccurate performance metrics, whether or not you were responsible for the inaccuracy, or
 - this award was based on a material misrepresentation by you, or
 - you improperly or with gross negligence failed to identify, raise or assess, in a timely manner and as reasonably expected, risks and/or concerns with respect to risks material to the Firm or its business activities, or
 - your employment was terminated for Cause (see section captioned “Definitions” below) or, in the case of a determination after the termination of your employment, that your employment could have been terminated for Cause.
- See section captioned and “Remedies” for additional information on cancellations. .

JPMorgan Chase’s right to cancel and/or recover the value of this award under the JPMorgan Chase Bonus Recoupment Policy and the other provisions of this award relate to the “organizational goals” of the Firm as that term is defined by regulations issued under Section 409A of the Internal Revenue Code (“Code”).

Termination of Employment

Except as explicitly set forth below under the subsections captioned “--Job Elimination,” “--Full Career Eligibility,” “--Government Office” or “--Disability” or under the section captioned “Death,” this award (for avoidance of doubt, including any Reinvested Dividend Equivalent Share Units) will be cancelled in full effective on the date your employment with the Firm terminates for any reason.

Subject to these terms and conditions (including, but not limited to, sections captioned “Protection-Based Vesting,” “Bonus Recoupment,” “UK Clawback Policy for Identified Staff,” “Recapture Provisions,” “Remedies,” and “Your Obligations,”) you will be eligible to continue to vest (on the original vesting schedule) with respect to your award in accordance with its terms and conditions following the termination of your employment if one of the following circumstances applies to you:

Ø Job Elimination:

Elimination

In the event that the Director of Human Resources or nominee in his or her sole discretion determines that

- the Firm terminated your employment because your job was eliminated, and
 - after you are notified that your job will be eliminated, you provided such services as requested by the Firm in a cooperative and professional manner, and
- you satisfied the Release/Certification Requirements set forth below.

Ø Full In the event that the Director of Human Resources or nominee in his or her sole discretion determines that

**Career
Eligibility**

- you voluntarily terminated your employment with the Firm, had completed at least five years of continuous service with the Firm immediately preceding your termination date, your Recognized Service (as defined below) on your date of termination equaled or exceeded 15 years, and
- you provided at least 90 days advance written notice to the Firm of your intention to voluntarily terminate your employment under this provision, during which notice period you provided such services as requested by the Firm in a cooperative and professional manner and you did not perform any services for any other employer, and
- continued vesting shall be appropriate, which determination shall be made prior to your termination and will be based on your performance and conduct (before and after providing notice), and
- for 36 months the date of grant of this award, you do not either perform services in any capacity (including self-employment) for a Financial Services Company (as defined below) or work in your profession (whether or not for a Financial Services Company); provided that you may work for a government, education or Not-for-Profit Organization (as defined below), and
- you satisfy the Release/Certification Requirements set forth below.

After receipt of such advance written notice, the Firm may choose to have you continue to provide services during such 90-day period as a condition to continued vesting or shorten the length of the 90-day period at the Firm's discretion, but to a date no earlier than the date you would otherwise meet the service requirement.

Additional advance notice requirements may apply for employees subject to notice period policies. (See "Notice Period" below.)

⌘ Ø Government Government Office:

Office

In the event that you voluntarily terminate your employment with the Firm to accept a Government Office or become a candidate for an elective Government Office, as described at the end of these terms and conditions under the section captioned "Government Office Requirements." See also definition of Government Office in the section captioned "Definitions."

⌘ Ø Disability Disability:

In the event that

- your employment with the Firm terminates because (i) you are unable to return to work while you are receiving benefits under the JPMorgan Chase Long Term Disability Plan, or for non-U.S. employees, under the equivalent JPMorgan Chase-sponsored local country plan (in either case, "LTD Plan"), or (ii) if you are not covered by a LTD Plan, you are unable to return to work due to a long-term disability that would qualify for benefits under the applicable LTD Plan, as determined by the Firm or a third-party designated by the Firm; provided that you (x) request in writing continued vesting due to such disability within 30 days of the date your employment terminates, and (y) provide any requested supporting documentation and (z) receive the Firm's written consent to such treatment, and
- you satisfy the Release/Certification Requirements set forth below.

To qualify for continued vesting after termination of your employment under any of the foregoing circumstances:

- you must timely execute and deliver a release of claims in favor of the Firm, having such form and terms as the Firm shall specify,
- with respect to Full Career Eligibility, prior to the termination of your employment, you must confirm with management that you meet the eligibility criteria (including providing at least 90 days advance written notification), advise that you are seeking to be treated as an individual eligible for Full Career Eligibility, and receive written consent to such continued vesting,
- with respect to Disability, you must satisfy the notice and documentation described above and receive written consent to such continued vesting, and

with respect to Full Career Eligibility, it is your responsibility to take the appropriate steps to certify to the Firm prior to each vesting date while the employment restrictions are outstanding that you have complied with the employment restrictions applicable to you (as described herein) from your date of termination of employment through the applicable vesting date and in all cases, otherwise complied with all other terms of the Award Agreement. (See section captioned "Your Obligations" below.)

**Release/
Certification**

Death	<p>If you die while you are eligible to vest in this award, your designated beneficiary on file with the Firm's Stock Administration Department (or your estate or if no beneficiary has been designated or survives you) may be entitled to receive a distribution of a number of shares of Common Stock associated with your award.</p> <p>Should you die after the end of the Performance Period, your beneficiary will receive shares of Common Stock equal to any outstanding PSUs (including Reinvested Dividend Equivalent Share Units)</p> <p>Should you die during the Performance Period, your Beneficiary will receive shares of Common Stock based on the Annual PSUs for each completed calendar in the Performance Period prior to the date of death and Annual PSUs based on Target Award Percentage equal to 100 percent for any remaining calendar years in the Performance Period; provided that Reinvested Dividend Equivalent Share Units will be based on dividend equivalents through the date of your death.</p> <p>Any shares will be distributed no later than the end of the calendar year immediately following the calendar year which contains your date of death; however, our administrative practice is to register such shares in the name of your beneficiary or estate within 60 days of the Firm's receipt of any required documentation.</p>
Your Obligations	<p>In consideration of the grant of this award, you agree to comply with and be bound by the obligations set forth below next to the subsections captioned "--Non-Solicitation of Employees and Customers," "--Confidential Information," "--Non-Disparagement," "--Cooperation," "--Compliance with Award Agreement," and "--Notice Period."</p> <p>During your employment by the Firm and for the longer of the (i) one year period following the termination of your employment or, (ii) if your award is not cancelled as of your termination date, the three year period from Grant Date,, you will not directly or indirectly, whether on your own behalf or on behalf of any other party, without the prior written consent of the Director of Human Resources: (i) solicit, induce or encourage any of the Firm's then current employees to leave the Firm or to apply for employment elsewhere, (ii) hire any employee or former employee who was employed by the Firm at the date your employment terminated, unless the individual's employment terminated because his or her job was eliminated, or the individual's employment with the Firm has been terminated for more than six months, (iii) to the fullest extent enforceable under applicable law, solicit or induce or attempt to induce to leave the Firm, or divert or attempt to divert from doing business with the Firm, any then current customers, suppliers or other persons or entities that were serviced by you or whose names became known to you by virtue of your employment with the Firm, or otherwise interfere with the relationship between the Firm and such customers, suppliers or other persons or entities. This does not apply to publicly known institutional customers that you service after your employment with the Firm without the use of the Firm's confidential or proprietary information.</p> <p>These restrictions do not apply to authorized actions you take in the normal course of your employment with the Firm, such as employment decisions with respect to employees you supervise or business referrals in accordance with the Firm's policies.</p> <p>You will not, either during your employment with the Firm or thereafter, directly or indirectly (i) use or disclose to anyone any confidential information related to the Firm's business, or (ii) communicate with the press or other media about matters related to the Firm, its customers or employees, including matters and activities relating to your employment, or the employment of others, by the Firm, in the case of either (i) or (ii), except as explicitly permitted by the JPMorgan Chase Code of Conduct and applicable policies or law or legal process. In addition, following your termination of employment, you will not, without prior written authorization, access the Firm's private and internal information through telephonic, intranet or internet means. "Confidential information" shall have the same meaning for the Award Agreement as it has in the JPMorgan Chase Code of Conduct.</p> <p>Nothing in this award precludes you from reporting to the Firm's management or directors, the government, a regulator, a self-regulatory agency, your attorneys or a court, conduct you believe to be in violation of the law or concerns of any known or suspected Code of Conduct violation. It is also not intended to prevent you from responding truthfully to questions or requests from the government, a regulator or in a court of law.</p> <p>You will not, either during your employment with the Firm or thereafter, make or encourage others to make any public statement or release any information in verbal, written, electronic or any other form, that is intended to, or reasonably could be foreseen to, disparage, embarrass or criticize the Firm or its employees, officers, directors or shareholders as a group. This shall not preclude you from reporting to the Firm's management or directors or to the government or a regulator conduct you believe to be in violation of the law or the Firm's Code of Conduct or responding truthfully to questions or requests for information to the government, a regulator or in a court of law in connection with a legal or regulatory investigation or proceeding.</p> <p>You will cooperate fully with and provide full and accurate information to the Firm and its counsel with respect to any matter (including any audit, tax proceeding, litigation, investigation or governmental proceeding) with respect to which you may have knowledge or information, subject to reimbursement for actual, appropriate and reasonable out-of-pocket expenses incurred by you.</p> <p>You will provide the Firm with any information reasonably requested to determine compliance with the Award Agreement, and you authorize the Firm to disclose the terms of the Award Agreement to any third party who might be affected thereby, including your prospective employer.</p>

Ø Notice Period

If you are subject to a notice period or become subject to a notice period after the Grant Date, whether by contract or by policy, that requires you to provide advance written notice of your intention to terminate your employment (“Notice Period”), then as consideration for this award and continued employment, you will provide the Firm with the necessary advance written notice that applies to you, as specified by such contract or policy.

After receipt of your notice, the Firm may choose to have you continue to provide services during the applicable Notice Period or may place you on a paid leave for all or part of the applicable Notice Period. During the Notice Period, you shall continue to devote your full time and loyalty to the Firm by providing services in a cooperative and professional manner and not perform any services for any other employer and shall receive your base salary and certain benefits until your employment terminates. You and the Firm may mutually agree to waive or modify the length of the Notice Period.

Regardless of whether a Notice Period applies to you, you must comply with the 90-day advance notice period described under the subsection captioned “-- Full Career Eligibility” in the event you wish to terminate employment under that same subsection.

Remedies

Ø Cancellation

In addition to the cancellation provisions described under the sections captioned “Bonus Recoupment,” “Protection-Based Vesting,” “UK Clawback Policy for Identified Staff,” “Qualitative Performance Factor,” “Termination of Employment” and “Recapture Provisions,” your outstanding PSUs under this award may be cancelled if the Firm in its sole discretion determines that:

- you have failed to comply with any of the advance notice/cooperation requirements or employment restrictions applicable to your termination of employment, or
- you have failed to return the required forms specified under the section captioned “Release/Certification” by the specified deadline, or
- you have violated any of the provisions as set forth above in the section captioned “Your Obligations.”

To the extent provided under the subsection captioned “-Amendment” below, JPMorgan Chase reserves the right to suspend vesting of this award and/or distribution of shares under this award, including, without limitation, during any period that JPMorgan Chase is evaluating whether this award is subject to cancellation and/or recovery and/or whether the conditions for distributions of shares under this award are satisfied. The Firm is not responsible for any price fluctuations during any period of suspension and, if applicable, suspended units will be reinstated consistent with Plan administration procedures. See also “Administrative Provisions-No Ownership Rights.”

In addition to cancellation of outstanding PSUs (including Reinvested Dividend Equivalent Share Units), you may be required to pay the Firm up to an amount equal to the Fair Market Value (determined as of the applicable vesting date or acceleration date) of the gross number of shares of Common Stock previously distributed, including vested shares subject to the Holding Requirements, under this award as follows:

- Payment may be required with respect to any shares of Common Stock within the three year period prior to a notice-of-recovery under this section, if the Firm in its sole discretion determines that:
 - you committed a fraudulent act, or engaged in knowing and willful misconduct related to your employment;
 - you violated any of the provisions as set forth above in the section captioned “Your Obligations,” or
 - you violated the employment restrictions set forth in the subsection Full Career Eligibility following the termination of your employment.

- In addition, payment may be required with respect to any shares distributed within the one year period prior to notice-of-recovery under this section, if the Firm in its sole discretion determines appropriate pursuant to the provisions in the section above captioned “Recapture Provisions.” Notice-of-recovery under this subsection is a written (including electronic) notice from the Firm to you either requiring payment under this subsection or stating that JPMorgan Chase is evaluating requiring payment under this subsection. Without limiting the foregoing, notice-of-recovery will be deemed provided if the Firm makes a good faith attempt to provide written (including electronic) notice at your last known address maintained in the Firm’s employment records. For the avoidance of doubt, a notice-of-recovery that the Firm is evaluating requiring payment under this section shall preserve JPMorgan Chase’s rights to require payment as set forth above in all respects and the Firm shall be under no obligation to complete its evaluation other than as the Firm may determine in its sole discretion.

For purposes of this section, shares distributed under this award include shares or other amounts withheld for tax purposes. However, it is the Firm’s intention that you only be required to pay the amounts under this subsection with respect to shares that are or may be retained by you following a determination of tax liability and that you will not be required to pay amounts with respect to shares or other amounts representing irrevocable tax withholdings or tax payments previously made (whether by you or the Firm) that you will not be able to recover, recapture or reclaim (including as a tax credit, refund or other benefit). Accordingly, JPMorgan Chase will not require you to pay any amount that the Firm or its nominee in his or her sole discretion determines is represented by such withholdings or tax payments.

Payment may be made in shares of Common Stock (if shares are distributed) or in cash. You agree that any repayment will be a recovery of a distribution to which you were not entitled under the terms and conditions of your Award Agreement and is not to be construed in any manner as a penalty. You also acknowledge that a violation or attempted violation of the obligations set forth herein will cause immediate and irreparable damage to the Firm, and therefore agree that the Firm shall be entitled as a matter of right to an injunction, from any court of competent jurisdiction, restraining any violation or further violation of such obligations; such right to an injunction, however, shall be cumulative and in addition to whatever other remedies the Firm may have under law or equity.

Nothing in the section in any way limits your obligations under the section captioned “Bonus Recoupment” and “UK Clawback Policy for Identified Staff.”

Administrative Provisions

Withholding Taxes: The Firm, in its sole discretion, may (i) retain from each distribution the amount required to satisfy applicable tax obligations or (ii) implement any other desirable or necessary procedures, so that appropriate withholding and other taxes are paid to the competent authorities with respect to the distribution and the award. This may include but is not limited to (i) a market sale of a number of such shares on your behalf substantially equal to the withholding or other taxes, (ii) to the extent required by law, withhold from cash compensation, an amount equal to any withholding obligation with respect to the award and distribution that vest under this award, and (iii) retaining shares that vest under this award until you pay any taxes associated with the award and distribution directly to the competent authorities.

Right to Set Off: The Firm may, to the maximum extent permitted by applicable law (including Section 409A of the Code to the extent it is applicable to you), retain for itself funds or the shares of Common Stock resulting from any vesting of this award to satisfy any obligation or debt that you owe to the Firm. Notwithstanding any account agreement with the Firm to the contrary, the Firm will not recoup or recover any amount owed from any funds or unrestricted securities held in your name and maintained at the Firm pursuant to such account agreement to satisfy any obligation or debt or obligation owed by you under this award without your consent. This restriction on the Firm does not apply to accounts described and authorized in “No Ownership Rights” described below.

No Ownership Rights: PSUs (including Reinvested Dividend Equivalent Share Units) do not convey the rights of ownership of Common Stock and do not carry voting rights. No distribution will be made to you until after the number PSUs (including Reinvested Dividend Equivalent Share Units) have been determined, if any, have vested and any applicable restrictions (other than Holding Requirement) have lapsed. Shares will be issued in accordance with JPMorgan Chase’s procedures for issuing stock. By accepting this award, you authorize the Firm, in its discretion, to establish on your behalf a brokerage account in your name with the Firm or book-entry account with our stock administrator and/or transfer agent and deliver to that account any vested shares derived from the award.

With respect to any applicable vesting date, JPMorgan Chase may impose for any reason, as of such vesting date for such period as it may specify in its sole discretion, such restrictions on the Common Stock to be issued to you as it may deem appropriate, including, but not limited to, restricting the sale, transfer, pledge, assignment or encumbrance of such shares of Common Stock. By accepting this award, you acknowledge that during such specified period should there be a determination that the cancellation or recovery provisions of this Award apply, then you agree that any shares subject to such restrictions (notwithstanding the limitation set forth in the Right to Set Off section above) may be cancelled in whole or part. (See sections captioned “Protection-Based Vesting,” “Qualitative Performance Factor,” “Bonus Recoupment,” “Recapture Provisions,” “Termination of Employment” and “Remedies”, as well as the subsection captioned “-Amendment” permitting suspension of vesting.

Binding Agreement: The Award Agreement will be binding upon any successor in interest to JPMorgan Chase, by merger or otherwise.

Not a Contract of Employment: Nothing contained in the Award Agreement constitutes a contract of employment or continued employment. Employment is “at-will” and may be terminated by either you or JPMorgan Chase for any reason at any time. This award does not confer any right or entitlement to, nor does the award impose any obligation on the Firm to provide, the same or any similar award in the future and its value is not compensation for purposes of determining severance.

Section 409A Compliance: To the extent that Section 409A of the Code is applicable to this award, distributions of shares and cash hereunder are intended to comply with Section 409A of the Code, and the Award Agreement, including these terms and conditions, shall be interpreted in a manner consistent with such intent.

Notwithstanding anything herein to the contrary, if you (i) are subject to taxation under the Code, (ii) are a specified employee as defined in the JPMorgan Chase 2005 Deferred Compensation Plan and (iii) have incurred a separation from service (as defined in that Plan with the exception of death) and if any distribution under this award represents deferred compensation as defined in Section 409A and such amounts are distributable (under the terms of this award) within six months following, and as a result of your separation from service, then those amounts will be during the first calendar month after the expiration of six full months from date of your separation from service. Further, if your award is not subject to a substantial risk of forfeiture as defined by regulations issued under Section 409A of the Code, then the remainder of each calendar year immediately following vesting date set forth in your Award Agreement shall be a payment date for purposes of distributing the vested portion of the award.

Change in Outstanding Shares: In the event of any change in the outstanding shares of Common Stock by reason of any stock dividend or split, recapitalization, issuance of a new class of common stock, merger, consolidation, spin-off, combination or exchange of shares or other similar corporate change, or any distributions to stockholders of Common Stock other than regular cash dividends, the Committee will make an equitable substitution or proportionate adjustment, in the number or kind of shares of Common Stock or other securities issued or reserved for issuance pursuant to the Plan and to any PSUs (including Dividend Equivalent Share Units) outstanding under this award for such corporate events.

Other Equitable Adjustments: Except for the Qualitative Performance Factor, the Committee may make adjustments (up or down) to the award as it deems to be equitable, to maintain the intended economics of the award in light of changed circumstances, which may include unusual or non-recurring events affecting the Firm (or the Performance Companies) or its financial statements in each case resulting from changes in accounting methods, practices or policies, changes in capital structure by reason of legal or regulatory requirements and such other changed circumstances, as the Committee may deem appropriate.

Interpretation/Administration: The Committee has sole and complete authority to interpret and administer this Award Agreement, including, without limitation, the power to (i) interpret the Plan and the terms and conditions of this Award Agreement; (ii) determine the reason for termination of employment; (iii) determine application of the post-employment obligations and cancellation and recovery provisions; (iv) decide all claims arising with respect to this award; and (v) delegate such authority as it deems appropriate. Any determination contemplated hereunder by the Committee, the Firm, the Director of Human Resources or their respective delegates or nominees shall be binding on all parties.

Notwithstanding anything herein to the contrary, the determinations of the Director of Human Resources, the Firm, the Committee and their respective delegates and nominees under the Plan and the Award Agreements are not required to be uniform. By way of clarification, the Committee, the Firm, the Director of Human Resources and their respective delegates and nominees shall be entitled to make non-uniform and selective determinations and modifications under Award Agreements and the Plan.

Amendment: The Committee or its nominee reserves the right to amend this Award Agreement in any manner, at any time and for any reason; provided, however, that no such amendment shall materially adversely affect your rights under this Award Agreement without your consent except to the extent that the Committee or its delegate considers advisable to (x) comply with applicable laws or changes in or interpretation of applicable laws, regulatory requirements and accounting rules or standards and/or (y) make a change in a scheduled vesting date or impose the restrictions described above under “No Ownership Rights,” in either case, to the extent permitted by Section 409A of the Code, if it is applicable to you. This Award Agreement may not be amended except in writing signed by the Director of Human Resources of JPMorgan Chase.

Severability: If any portion of the Award Agreement is determined by the Firm to be unenforceable in any jurisdiction, any court or arbitrator of competent jurisdiction or the Director of Human Resources may reform the relevant provisions (e.g., as to length of service, time, geographical area or scope) to the extent the Firm (or court/arbitrator) considers necessary to make the provision enforceable under applicable law.

Accelerated Distribution for Ethics or Conflict Reasons Resulting From Employment by a Government Entity: Upon receipt of satisfactory evidence that applicable United States federal, state, local, foreign or supranational ethics or conflict of interest laws or regulations require you to divest your interest in the award, the Firm may accelerate the distribution of all or part of your outstanding award, including Reinvested Dividend Equivalent Share Units, effective on or before the required divestiture date and waive the Holding Requirement; provided that no accelerated distribution shall occur if the Firm determines that such acceleration will violate Section 409A of the Code.

If you have voluntarily terminated your employment and have satisfied the requirements of the section captioned “Government Office Requirements,” acceleration shall apply (to extent required) to the percentage of your outstanding award that would continue to vest under that section. In the case of a termination of employment where the award is outstanding as a result of the subsections entitled “Job Elimination” or “Full Career Eligibility,” then acceleration shall apply, to the extent required, to the full outstanding award. Subject to the two foregoing sections, the number of shares of Common Stock to be received on acceleration shall be determined using the methodology set forth under the section captioned “Death.”

To the extent you have vested shares under this award subject to the Holding Requirement and become subject to divestiture requirement as forth herein, the Firm may waive the holding period to the extent required.

Notwithstanding an accelerated distribution or waiver of the Holding Requirement pursuant to the foregoing, you will remain subject to the applicable terms of your Award Agreement as if your award had remained outstanding for the duration of the vesting period and shares had been distributed as scheduled as of each vesting date, including, but not limited to, repayment obligations set forth in the section captioned “Remedies” and employment restrictions in the sections captioned “Protection-Based Vesting and “Government Office” and the subsection “Full Career Eligibility.”

Use of Personal Data: By accepting this award, you have acknowledged that the Firm may process your personal data (including sensitive personal data) for purposes, including but not limited to (i) determining your compensation, (ii) payroll activities, including, but not limited to, tax withholding and regulatory reporting, which tax and regulatory reporting and withholding may include, but is not limited to, the United States and its political subdivisions, (if not the United States) your work country and its political subdivisions (including countries to which you travel on Firm business) and your country of residence or nationality, (iii) registration of shares, (iv) establishing brokerage account on your behalf, and (v) all other lawful purposes related to your employment and this award, and that the Firm may provide such data to third party vendors with whom it has contracted to provide such services and/or other bodies, including regulators, supervisory bodies, law enforcement and other government agencies. You are acknowledging and agreeing that your personal data will be transferred to and processed in countries and locations that do not have the same data privacy laws and statutory protection for personal data as your work country, country of residence, or country of nationality. If your personal data is subject to data privacy laws or statutory protection for personal data and they so provide for termination of the foregoing authorization, you may terminate the authorization at any time except with respect to tax and regulatory reporting and subject always to the Firm's legal and regulatory obligations. In the event you terminate this authorization, your award will be cancelled.

Governing Law: This award shall be governed by and construed in accordance with the laws of the State of New York, without regard to conflict of law principles.

Choice of Forum: By accepting this award under the Plan, you agree (and have agreed) that to the extent not otherwise subject to arbitration under an arbitration agreement between you and the Firm, any dispute arising directly or indirectly in connection with this award or the Plan shall be submitted to arbitration in accordance with the rules of the American Arbitration Association if so elected by the Firm in its sole discretion. In the event such a dispute is not subject to arbitration for any reason, you agree to accept the exclusive jurisdiction and venue of the United States District Court for the Southern District of New York with respect to any judicial proceeding in connection with this award or the Plan. You waive, to the fullest extent permitted by law, any objection to personal jurisdiction or to the laying of venue of such dispute and further agree not to commence any action arising out of or relating to this award or the Plan in any other forum.

Waiver of Jury Trial/Class Claims: By accepting this award, you agree, with respect to any claim brought in connection with your employment with the Firm in any forum (i) to waive the right to a jury trial and (ii) that any judicial proceeding or arbitration claim will be brought on an individual basis, and you hereby waive any right to submit, initiate, or participate in a representative capacity or as a plaintiff, claimant or member in a class action, collective action, or other representative or joint action.

Litigation: By accepting any award under the Plan, you agree (and have agreed) that in any action or proceeding by the Firm (other than a derivative suit in the right of the Firm) to enforce the terms and conditions of this Award Agreement or any other Award Agreement where the Firm is the prevailing party, the Firm shall be entitled to recover from you its reasonable attorney fees and expenses incurred in such action or proceeding. In addition, you agree that you are not entitled to, and agree not to seek, advancement of attorney fees and indemnification under the Firm's By-Laws in the event of such a suit by the Firm.

Nontransferability: Neither this award or any other outstanding awards of restricted stock units or of performance based share units, nor your interests or rights in any such awards, shall be assigned, pledged, transferred, hypothecated or subject to any lien. An award may be transferred following your death by will, the laws of descent or by a beneficiary designation on file with the Firm.

Definitions

"Annual PSUs" means the number of PSUs determined by multiplying the Target Award Number (after giving effect to any cancellation thereof, in whole or in part) by the Target Award Percentage corresponding to the Firm's Performance Ranking for each applicable performance year (both percentage and ranking, as set forth in the footnote to the Performance Table); provided that if the Firm Reported ROTCE for any completed calendar year in the Performance Period either equals or exceeds 14% or is less than 6%, one hundred fifty percent or zero, respectively as the case may be, shall be substituted for that year's Target Award Percentage in calculating the number of Annual PSUs for that year. For avoidance of doubt, any cancellation of this award (in whole or in part) during the Performance Period will reduce the Target Award Number.

"Average Tangible Common Equity" means annual average common stockholders' equity less annual average goodwill and annual average identifiable intangible assets. Annual averages of the components of Average Tangible Common Equity will be calculated using quarterly balances as reported in publicly available financial disclosures. In the event that quarterly balances are not available, annual year end balances will be used. **This calculation is used solely for purposes of the Performance Ranking.**

“Calculation Agent” means a third party entity not owned or controlled by the Firm, such as an accounting or consulting firm, retained from time to time by the Director of Human Resources or his/her delegate.

“Cause” means a determination by the Firm that your employment terminated as a result of your (i) violation of any law, rule or regulation (including rules of self-regulatory bodies) related to the Firm’s business, (ii) indictment or conviction of a felony, (iii) commission of a fraudulent act, (iv) violation of the JPMorgan Code of Conduct or other Firm policies or misconduct related to your duties to the Firm (other than immaterial and inadvertent violations or misconduct), (v) grossly inadequate performance of the duties associated with your position or job function or failure to follow reasonable directives of your manager, or (vi) any act or failure to act that is injurious to the interests of the Firm or its relationship with a customer, client or an employee.

“Financial Services Company” means a business enterprise that employs you in any capacity (such as an employee, contractor, consultant, advisor, or self-employed individual, whether paid or unpaid) and engages in:

- commercial or retail banking, including, but not limited to, commercial, institutional and personal trust, custody and/or lending and processing services, originating and servicing mortgages, issuing and servicing credit cards, payment servicing or processing or merchant services,
- insurance, including but not limited to, guaranteeing against loss, harm, damage, illness, disability or death, providing and issuing annuities, acting as principal, agent or broker for purpose of the foregoing,
- financial, investment or economic advisory services, including but not limited to, investment banking services (such as advising on mergers or dispositions, underwriting, dealing in, or making a market in securities or other similar activities), brokerage services, investment management services, asset management services, and hedge funds,
- issuing, trading or selling instruments representing interests in pools of assets or in derivatives instruments,
- advising on, or investing in, private equity or real estate, or
- any similar activities that the Director of Human Resources or nominee determines in his or her sole discretion constitute financial services.

“Firmwide Financial Threshold” means a cumulative return on tangible common equity for calendar years 2017, 2018 and 2019 of not less than 15%. Cumulative return on tangible common equity means (i) the sum of the Firm’s reported net income for all three years, divided by (ii) reported year-end tangible equity averaged over the three years.

“Firm Reported ROTCE” means the Firm’s percentage return on tangible common equity for each year in the Performance Period (as calculated for use in its publicly available year-end financial disclosures without taking into account any rounding conventions used for financial reporting purposes).

“Government Office” means (i) a full-time position in an elected or appointed office in local, state, or federal government (including equivalent positions outside the U.S. or in a supranational organization), not reasonably anticipated to be a full-career position, or (ii) conducting a bona fide full-time campaign for such an elective public office after formally filing for candidacy, where it is customary and reasonably necessary to campaign full-time for the office.

“Line of Business” means a business unit of the Firm (or one or more business units designated below under the definition “Line of Business Financial Threshold” of the Corporate Investment Bank). All Corporate Functions (including the functions of the Chief Investment Office) are considered a single Line of Business.

“Line of Business Financial Threshold” means the financial threshold set forth below: for the following Lines of Business based on the Firm’s management reporting system:

Asset & Wealth Management	Annual negative pre-provision net income ¹
Card, Commerce Solutions, Auto Finance and Student	Annual negative pre-tax, pre-loan loss reserve income ²
Commercial Banking	Annual negative pre-provision net income including loan charge-offs
Corporate Investment Bank	Annual negative pre-provision net income for CIB overall and/or annual negative allocated product revenues (excluding DVA) for: <ul style="list-style-type: none"> • Macro products: <ul style="list-style-type: none"> Ø Currency and Emerging Markets Ø Rates Ø Commodities • Spread Products <ul style="list-style-type: none"> Ø Credit Ø SPG Ø Public Finance • Equities • Investor Services • Global Banking
Consumer Banking Business, CWM and Business Banking	Annual negative pre-provision net income ²
Corporate Functions (including Chief Investment Office)	Annual negative pre-provision net income ¹ reported at the Firm level
Mortgage Banking	Annual negative pre-tax, pre-loan loss reserve income ²
¹ Pre-tax pre-provision income means Revenue less Expenses ² Pre-tax pre-loan loss reserve income means Revenue less (Expenses plus Net Charge-offs)	

“Not-for-Profit Organization” means an entity exempt from tax under state law and under Section 501(c)(3) of the Code. Section 501(c)(3) only includes entities organized and operated exclusively for religious, charitable, scientific, testing for public safety, literary or educational purposes, or to foster national or international amateur sports competition or for the prevention of cruelty to children or animals. Not-for-Profit Organization shall also mean entities outside the United States exempt from local and national tax laws because they are organized and operated exclusively for purposes identical to those applicable to Section 501(c)(3) organization.

“Performance Companies” mean the following institutions which have business activities that overlap with a significant portion of the Firm’s revenue mix: Bank of America Corporation, Barclays PLC, Capital One Financial Corporation, Citigroup Inc., Credit Suisse Group AG, Deutsche Bank AG, Goldman Sachs Group, Inc., HSBC Holdings PLC, Morgan Stanley, Wells Fargo & Company, and UBS Group AG.

If, during the Performance Period, one or more Performance Companies shall merge, engage in a spin-off or otherwise experience a material change in its revenue mix or business activities or its existence or its primary businesses shall terminate or cease due to receivership, bankruptcy, sale, or otherwise, then the Committee may eliminate such institution from the list of Performance Companies or make such other equitable adjustments, such as adding an acquirer or a new company to the list of Performance Companies, as it deems appropriate, with any such changes having effect for purposes of all calculations hereunder on a prospective basis from the date the applicable change is made.

“Performance Period” means calendar years 2017, 2018 and 2019.

“**Performance Table**” means the table used in the calculation of Annual PSUs for each year in the Performance Period as set forth below:

Firm Reported ROTCE	Target Award Percentage	Performance Ranking ¹ (annual performance)	Target Award Percentage ¹
≥14%	150%	1st Quartile	150%
16% to <14%	Pay by ROTCE scale	2nd Quartile	100% to 125%
<6%	—%	3rd Quartile	70% to 100%
		4th Quartile	25% to 55%

1. The following sets forth the precise Target Award Percentage corresponding to the Firm’s performance ranking (when compared to Performance Companies): Top 3 = 150%; #4 = 125%; #5 = 112.5%; #6 = 100%; #7 = 100%; #8 = 85%; #9 = 70%; #10 = 55%; #11 = 40%; and #12 = 25%.

If, after the calculation of the Performance Ranking, there is a tie, the tie shall be disregarded for purposes of determining the Target Award Percentage. For example, in the case of a tie for the fourth ranking between the Firm and a Performance Company, the Firm shall be treated as having satisfied that ranking. In the case of that same tie among Performance Companies, the fourth and fifth rankings will be deemed to have been satisfied.

“**Recognized Service**” means the period of service as an employee set forth in the Firm’s applicable service-related policies.

“**Performance Ranking**” means the ranking of the ROTCE of the Firm as compared to the ranking of the ROTCE of the Performance Companies as specified in the footnote to the Performance Table for each year in the Performance Period.

“**ROTCE**” means for the Firm and each of the Performance Companies a percentage derived by, for each year in the Performance Period, dividing (i) annual earnings from continuing operations less dividends on preferred stock as set forth in published financial disclosures by (ii) the Average Tangible Common Equity for the year. **If, prior to the end of the vesting period, the Firm or any Performance Company restates its published financial statements for any year in the Performance Period, ROTCE for that year shall be recalculated for the Firm or Performance Company with the Performance Ranking adjusted, if necessary. This calculation is used solely for purposes of the Performance Ranking.**

“**Target Award Number**” means the number of PSUs designated as such in the Award Agreement.

“**Target Award Percentage**” means the applicable percentage specified in the footnote to the Performance Table for each year in the Performance Period.

Government Office Requirement

You may be eligible to continue vesting in all or part of your award if you voluntarily resign to accept a Government Office (as defined above) or to become a candidate for an elective Government Office.

Full Career Eligibility:

“Government Office Requirements” does not apply to you if you satisfy the subsection captioned “--Full Career Eligibility” as of the date that you voluntarily terminate your employment with the Firm.

Eligibility:

Eligibility for continued vesting is conditioned on your providing the Firm:

- At least 60 days’ advance written notice of your intention to resign to accept or pursue a Government Office (see section captioned “Definitions”), during which period you must perform in a cooperative and professional manner services requested by the Firm and not provide services for any other employer. The Firm may elect to shorten this notice period at the Firm’s discretion.
- Confirmation, in a form satisfactory to the Firm, that vesting in this award pursuant to this provision would not violate any applicable law, regulation or rule.
- Documentation in a form satisfactory to the Firm that your resignation is for the purpose of accepting a Government Office or becoming a candidate for a Government Office. (See section captioned “Definitions.”)

Portion of Your Award Subject to Continued vesting:

Subject to the conditions below, the percentage of this award that will continue to vest in accordance with this award’s original schedule will be based on your years of continuous service completed with the Firm immediately preceding your termination date, as follows:

- 50% if you have at least 3 but less than 4 years of continuous service,
- 75% if you have at least 4 but less than 5 years of continuous service, or
- 100% if you have 5 or more years of continuous service.

The portion of this award subject to continued vesting above is referred to as the “CV Award” and the portion not subject to continued vesting will be cancelled as of the date your employment terminates.

Conditions for Continued Vesting of Award:

- You must remain in a non-elective Government Office for two or more years after your employment with the Firm terminates to be eligible to receive the CV Award; provided that if your non-elective Government Office is for a period less than two years, you will be eligible to receive the CV Award if it has a vesting date during your period of Government Service; or

In the case of resignation from the Firm to campaign for an elective Government Office, your name must be on the primary or final public ballot for the election. (If you are not elected, see below for employment restrictions.)

For avoidance of doubt, the performance criteria and protection based vesting set forth in these terms and conditions continue to apply to a CV Award.

Satisfaction of Conditions:

If your service in a Government Office ends two years or more after your employment with the Firm terminates, or in the case of resignation from the Firm to campaign for a Government Office, your name is on the primary or final public ballot for the election and you are not elected, any CV Awards then outstanding and any such awards that would have then been outstanding but for an accelerated distribution of shares (as described in the subsection captioned “--Accelerated Distribution for Ethics or Conflict Reasons Resulting From Employment by a Government Entity”) will be subject for the remainder of the applicable vesting period to the same terms and conditions of this Award Agreement, including employment restrictions during the vesting period, as if you had resigned from the Firm having met the requirements for Full Career Eligibility.

Failure to Satisfy Conditions:

If you do not satisfy the above “Conditions for Continued Vesting of Awards,” any outstanding PSUs under the CV Award will be cancelled. You also will be required to repay the Fair Market Value of the number of shares (before tax and other withholdings) of Common Stock distributed to you that would have been outstanding as PSUs on the date you failed to satisfy the “Conditions for Continued Vesting of Award” but for their accelerated distribution (as described in subsection captioned, “Accelerated Distribution for Ethics or Conflict Reasons Resulting From Employment by a Government Entity”). Fair Market Value for this purpose will be determined as the date that the shares were distributed.

Exhibit 12.1
JPMorgan Chase & Co.

Computation of Ratio of Earnings to Fixed Charges

Year ended December 31, (in millions, except ratios)	2016	2015	2014	2013	2012
Excluding interest on deposits					
Income from continuing operations before income taxes	\$ 34,536	\$ 30,702	\$ 30,699	\$ 26,675	\$ 29,566
Fixed charges:					
Interest expense	8,462	6,211	6,264	7,610	8,498
One-third of rents, net of income from subleases ^(a)	540	535	624	616	554
Total fixed charges	9,002	6,746	6,888	8,226	9,052
Add: Equity in undistributed loss of affiliates/Less: Equity in undistributed income of affiliates ^(b)	362	423	233	112	(99)
Income from continuing operations before income taxes and fixed charges, excluding capitalized interest	\$ 43,900	\$ 37,871	\$ 37,820	\$ 35,013	\$ 38,519
Fixed charges, as above	\$ 9,002	\$ 6,746	\$ 6,888	\$ 8,226	\$ 9,052
Ratio of earnings to fixed charges	4.88	5.61	5.49	4.26	4.26
Including interest on deposits					
Fixed charges as above	\$ 9,002	\$ 6,746	\$ 6,888	\$ 8,226	\$ 9,052
Add: Interest on deposits	1,356	1,252	1,633	2,067	2,655
Total fixed charges and interest on deposits	\$ 10,358	\$ 7,998	\$ 8,521	\$ 10,293	\$ 11,707
Income from continuing operations before income taxes and fixed charges, excluding capitalized interest, as above	\$ 43,900	\$ 37,871	\$ 37,820	\$ 35,013	\$ 38,519
Add: Interest on deposits	1,356	1,252	1,633	2,067	2,655
Total income from continuing operations before income taxes, fixed charges and interest on deposits	\$ 45,256	\$ 39,123	\$ 39,453	\$ 37,080	\$ 41,174
Ratio of earnings to fixed charges	4.37	4.89	4.63	3.60	3.52

(a) The proportion deemed representative of the interest factor.

(b) Prior period amounts have been revised to conform with the current period presentation.

Exhibit 12.2
JPMorgan Chase & Co.

**Computation of Ratio of Earnings to Fixed Charges
And Preferred Stock Dividend Requirements**

Year ended December 31, (in millions, except ratios)	2016	2015	2014	2013	2012
Excluding interest on deposits					
Income from continuing operations before income taxes	\$ 34,536	\$ 30,702	\$ 30,699	\$ 26,675	\$ 29,566
Fixed charges:					
Interest expense	8,462	6,211	6,264	7,610	8,498
One-third of rents, net of income from subleases(a)	540	535	624	616	554
Total fixed charges	9,002	6,746	6,888	8,226	9,052
Add: Equity in undistributed loss of affiliates/Less: Equity in undistributed income of affiliates(b)	362	423	233	112	(99)
Income from continuing operations before income taxes and fixed charges, excluding capitalized interest	\$ 43,900	\$ 37,871	\$ 37,820	\$ 35,013	\$ 38,519
Fixed charges, as above	\$ 9,002	\$ 6,746	\$ 6,888	\$ 8,226	\$ 9,052
Preferred stock dividends (pretax)	2,336	2,134	1,589	1,200	908
Fixed charges including preferred stock dividends	\$ 11,338	\$ 8,880	\$ 8,477	\$ 9,426	\$ 9,960
Ratio of earnings to fixed charges and preferred stock dividend requirements	3.87	4.26	4.46	3.71	3.87
Including interest on deposits					
Fixed charges including preferred stock dividends, as above	\$ 11,338	\$ 8,880	\$ 8,477	\$ 9,426	\$ 9,960
Add: Interest on deposits	1,356	1,252	1,633	2,067	2,655
Total fixed charges including preferred stock dividends and interest on deposits	\$ 12,694	\$ 10,132	\$ 10,110	\$ 11,493	\$ 12,615
Income from continuing operations before income taxes and fixed charges, excluding capitalized interest, as above	\$ 43,900	\$ 37,871	\$ 37,820	\$ 35,013	\$ 38,519
Add: Interest on deposits	1,356	1,252	1,633	2,067	2,655
Total income from continuing operations before income taxes, fixed charges and interest on deposits	\$ 45,256	\$ 39,123	\$ 39,453	\$ 37,080	\$ 41,174
Ratio of earnings to fixed charges and preferred stock dividend requirements	3.57	3.86	3.90	3.23	3.26

(a) The proportion deemed representative of the interest factor.

(b) Prior period amounts have been revised to conform with the current period presentation.

Exhibit 21

JPMorgan Chase & Co.

List of subsidiaries

While there are a number of subsidiaries that are required to be reported for various purposes to bank regulators, the following is a list of JPMorgan Chase & Co.'s significant legal entity subsidiaries as of December 31, 2016, as defined by SEC rules. The list includes the parent company of significant subsidiaries even if the parent company did not meet the definition of a significant subsidiary. Excluded from the list are subsidiaries that, if considered in the aggregate, would not constitute a significant subsidiary under SEC rules as of December 31, 2016.

Also included in the list are certain subsidiaries that have been designated as material legal entities for resolution planning purposes under the Dodd-Frank Act that did not meet the definition of a significant subsidiary under SEC rules.

December 31, 2016 Name	Organized Under The Laws Of
JPMorgan Chase Bank, National Association	United States
Paymentech, LLC	United States
Chase Mortgage Holdings, Inc.	United States
J.P. Morgan Treasury Technologies Corporation	United States
J.P. Morgan International, Inc.	United States
Bank One International Holdings Corporation	United States
J.P. Morgan International Finance Limited	United States
J.P. Morgan Overseas Capital Corporation	United States
J.P. Morgan Whitefriars Inc.	United States
JPMorgan Securities Japan Co., Ltd.	Japan
J.P. Morgan AG	Germany
Dearborn Merchant Services, Inc.	Canada
Chase Paymentech Solutions	Canada
Paymentech Salem Services, LLC	United States
Chase Paymentech Europe Limited	Ireland
J.P. Morgan Capital Holdings Limited	United Kingdom
J.P. Morgan Chase (UK) Holdings Limited	United Kingdom
J.P. Morgan Chase International Holdings	United Kingdom
J.P. Morgan Securities PLC	United Kingdom
J.P. Morgan Europe Limited	United Kingdom
J.P. Morgan International Bank Limited	United Kingdom
JPMorgan Chase Holdings LLC	United States
J.P. Morgan Ventures Energy Corporation	United States
JPMorgan Distribution Services, Inc.	United States
J.P. Morgan Services India Private Limited	India
J.P. Morgan Broker-Dealer Holdings Inc.	United States
J.P. Morgan Securities LLC	United States
J.P. Morgan Equity Holdings, Inc.	United States
Chase Bank USA, National Association	United States
Chase BankCard Services, Inc.	United States
Chase Card Funding LLC	United States
Chase Issuance Trust	United States
JPMorgan Asset Management Holdings Inc.	United States
J.P. Morgan Investment Management Inc.	United States
JPMorgan Asset Management International Limited	United Kingdom
JPMorgan Asset Management Holdings (UK) Limited	United Kingdom
JPMorgan Asset Management (UK) Limited	United Kingdom
JPMorgan Asset Management Holdings (Luxembourg) S.à r.l.	Luxembourg
JPMorgan Asset Management (Europe) S.à r.l.	Luxembourg

Exhibit 23

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on:

Form S-3
(No. 333-191692)
(No. 333-199966)

Form S-8
(No. 333-185584)
(No. 333-185582)
(No. 333-185581)
(No. 333-175681)
(No. 333-158325)
(No. 333-150208)
(No. 333-145108)
(No. 333-142109)
(No. 333-125827)
(No. 333-112967)
(No. 333-64476)

of JPMorgan Chase & Co. or its affiliates of our report dated February 28, 2017 relating to the financial statements and the effectiveness of internal control over financial reporting, which appears in this Form 10-K.

/s/ PricewaterhouseCoopers LLP
New York, New York
February 28, 2017

Exhibit 31.1
JPMorgan Chase & Co.

CERTIFICATION

I, James Dimon, certify that:

1. I have reviewed this Annual Report on Form 10-K of JPMorgan Chase & Co.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Designed such internal controls over financial reporting, or caused such internal controls over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent function):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 28, 2017

/s/ James Dimon

James Dimon
Chairman and Chief Executive Officer

Exhibit 31.2
JPMorgan Chase & Co.

CERTIFICATION

I, Marianne Lake, certify that:

1. I have reviewed this Annual Report on Form 10-K of JPMorgan Chase & Co.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Designed such internal controls over financial reporting, or caused such internal controls over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent function):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 28, 2017

/s/ Marianne Lake

Marianne Lake
Executive Vice President and Chief Financial Officer

Exhibit 32
JPMorgan Chase & Co.

**CERTIFICATION PURSUANT TO 18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the Annual Report of JPMorgan Chase & Co. on Form 10-K for the period ended December 31, 2016 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), each of the undersigned officers of JPMorgan Chase & Co., certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

1. The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
2. The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of JPMorgan Chase & Co.

Date: February 28, 2017

By: /s/ James Dimon

James Dimon
Chairman and Chief Executive Officer

Date: February 28, 2017

By: /s/ Marianne Lake

Marianne Lake
Executive Vice President and Chief Financial Officer

This certification accompanies this Annual Report and shall not be deemed "filed" for purposes of Section 18 of the Securities Exchange Act of 1934, or otherwise subject to the liability of that Section.

A signed original of this written statement required by Section 906 has been provided to, and will be retained by, JPMorgan Chase & Co. and furnished to the Securities and Exchange Commission or its staff upon request.