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**JPMorgan  
Structured Investments  
Solution Series**

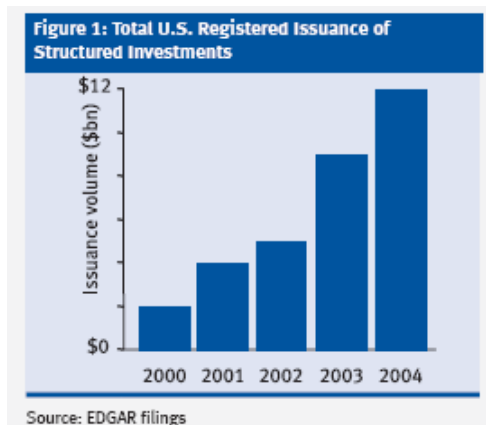
**Volume 2.0 – Maximizing Returns in Range Bound Markets**

JPMorgan is pleased to offer this second edition of the *Solution Series* for investors. The Structured Investments Group at JPMorgan provides innovative tools that enable investors to achieve their financial objectives.

For most of the past year, analysts have been forecasting low returns for both equities and fixed income securities. As a result, many investors have found themselves with few desirable options. Those expecting equity returns to be low might be understandably reluctant to increase their investments in fixed income securities with bond yields hovering near historic lows and inflation fears on the rise. Others might be likewise reluctant to shift into “defensive” sectors of the equity markets, fearing the impact of record-high oil prices on corporate profits. Structured Investments give individuals like these a valuable alternative. Below we describe three Structured Investments that are specifically designed to enhance returns in range-bound or moderately bullish markets.

**How do these investments work?**

This edition of the *Solution Series* describes three types of Structured Investments—Return Enhanced Notes (RENs), Annual Review Notes (ARNs), and Call Overwrite Notes (COINs)—that enable investors to directly monetize their market predictions. Together, these investments represent nearly one-quarter of the rapidly growing U.S. Structured Investment market (see Figure 1 below).



RENs, COINs, and ARNs, each described in greater detail later, enable investors to target a particular market view. At their core, all of these notes generate enhanced returns by monetizing an asset that many investors hold, but few actually recognize. Whether it be equities, credit, rates, or commodities, investors tend to purchase assets for the returns they expect them to generate. By holding the asset in question, investors hold a claim to a wide range of potential returns that may turn out to be higher or lower than

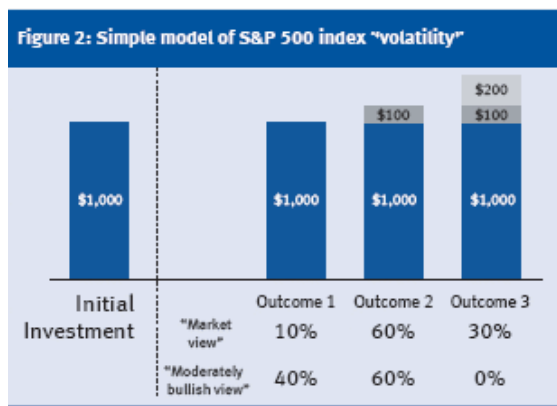
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their expectations. RENS, COINs, and ARNs enable relatively pessimistic investors to sell off the potentially high returns that they do not expect. Derivatives professionals refer to this process as “selling volatility.” If the investors turn out to be right—and returns are relatively low as they expect—by selling volatility they enhance the returns that their investments would otherwise have generated.

To illustrate this point, Figure 2 presents a simplified example. Imagine that in a hypothetical world there are only three possible outcomes for a \$1,000 investment in the S&P 500—the investment could remain flat at \$1,000, could increase to \$1,100, or could increase to \$1,300 (Outcomes 1, 2 and, 3, respectively). Further assume that “typical” investors consider there to be a 10%, 60%, and 30% probability of these three outcomes, respectively.<sup>1</sup> On the other hand, assume that “moderately bullish” investors expect no possibility of making \$1,300 (Outcome 3) on their investment. Instead, they assume that there’s a 40% chance their investment will remain flat (Outcome 1), and a 60% chance that it will appreciate to \$1,100 (Outcome 2). If this were the case, “typical” investors would expect to make \$1,150 overall (.10 X \$1,000 + .60 X \$1,100 + .30 X \$1,300 = \$1,150). In other words, the “market” would expect a 15% return on the S&P 500. By the same logic, “moderately bullish investors” would expect only a 6% return (.40 X \$1,000 + .60 X \$1,100 = \$1,060).



In this case, rather than accepting their 6% forecasted returns, “moderately bullish” investors could purchase Structured Investments that effectively enable them to sell call options on the S&P 500 with an \$1,100 strike price. In the simple world depicted in Figure 2, each option would be worth \$60 (30% probability multiplied by \$200 gain in Outcome 3), providing “moderately bullish” investors with an additional 6% return as long as the index did not rally by 10% (beyond the \$1,100 strike price).

In reality, there are an infinite number of potential outcomes for the S&P 500. As a result, option pricing formulae are considerably more complex than the simple example described above. Even so, the same general principles apply.

1 Together, these three possible outcomes and their associated probabilities describe the “volatility” typical investors attribute to the S&P 500 in this hypothetical example.

Option prices are fundamentally determined by the market’s overall view of the probabilities of various outcomes. By selling off their exposure to high return outcomes (i.e. by “selling volatility”) investors enhance returns whenever their moderately bullish forecasts prove correct.

## Who Should Consider Investing in Structured Investments?

Each of the products described here are designed to target a particular market view. But should investors adopt a market view in the first place? In many regards, this fundamental question lies at the heart of the asset management industry. For many years, financial theorists remained skeptical of market forecasts. In fact, early proponents of the “Efficient Markets Theory” argued that expected stock and bond market returns were always the same, regardless of any observable “fundamentals.” More recently, however, financial theorists have begun to take seriously the proposition that market-wide returns (and volatilities) are time-varying. Research has shown, for example, that factors such as average dividend yields and Price/Earnings ratios help predict future equity returns. Likewise, in the bond markets the “term premium” (i.e. the excess yield offered by long-term bonds) has proven useful in forecasting long-term bond returns.

This evidence reinforces that investors must decide for themselves whether or not to incorporate market forecasts into their investment decisions. For those investors interested in monetizing their market predictions, Structured Investments can be a valuable tool. Each of the investments described in this volume offers a convenient and relatively inexpensive way for investors to enhance returns in a particular market environment. Since these investments generally entail selling volatility, they may also offer investors a more attractive combination of return and risk – as measured by historic Sharpe ratios or Stutzer indices – than more traditional investments in the underlying securities. Even so, the Structured Investments described below are not designed to provide investors with considerable downside protection,<sup>2</sup> and investors should consider these investments only if they are comfortable retaining the downside risk of the underlying securities.

## Scenario 1: Single Digit Market Returns

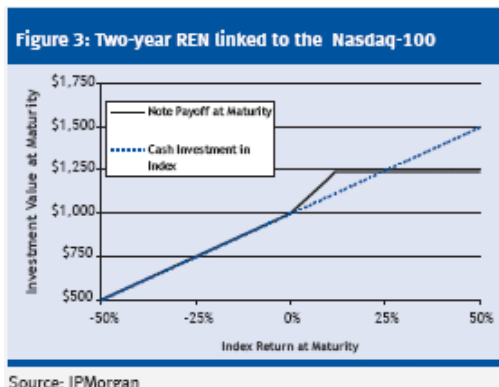
### Solution: Return Enhanced Notes (RENs)

Many investors and market commentators have been calling for low equity returns over the next couple of years. Return Enhanced Notes (RENs) are specifically designed with these investors in mind. RENs pay double or triple the market return up to a cap at maturity in exchange for little or no protection against market declines. In

2 Investors desiring downside protection, on the other hand, should consider the Principal Protected Notes described in the first volume of the Solution Series.

other words, these investments closely resemble the simple probability exercise presented earlier. The return cap of the REN can be set near the *upper bound* of the returns that investors expect (equivalent to the \$1,100 depicted above). This enables investors in RENs to *sell* their right to participate in what they consider to be unlikely market rallies; this sale is then used to finance the purchase of increased equity market participation.

For example, an investor may believe that the Nasdaq-100 Index is likely to achieve 5% returns in each of the next 2 years. The investor could then purchase a REN that pays at maturity twice the Nasdaq-100 return over the next 2 years, up to a 24% maximum return, and exposes the investor to the full downside of the index. If the investor's market view is correct and the Nasdaq-100 increases 5% per year, the investor would receive a 20% return (2 x Nasdaq-100 return of 10%) on their investment in the REN and would have generated an "alpha", or additional profit, of 10% as compared to simply buying and holding the index.



The investor's market view could also turn out to be incorrect. If the Nasdaq-100 were to decline 10% over the course of the two years, the REN investor would also lose 10% of their invested capital, meaning that the REN investor is no worse off than a direct investor. If the market turned out to be extremely bullish and returned 30% over the course of two years, the investor would receive only the maximum return of 24% on their investment, and would not participate in the additional market returns. These market returns were "sold away" to generate the enhanced returns in single digit market return scenarios.

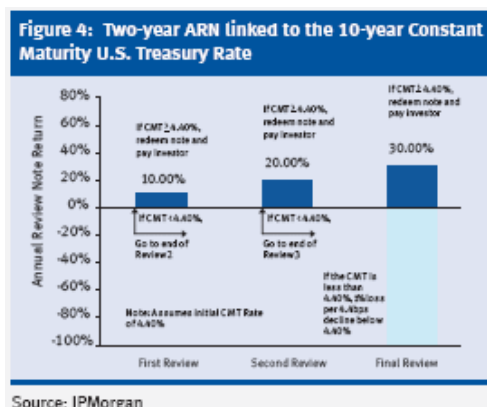
## Scenario 2: Flat or Increasing Long-term Bond Yields

### Solution: Annual Review Notes (ARNs)

Many investors may be predicting flat to modestly increasing long term bond yields over the next year or two, but find it difficult to monetize this view. Shorting bonds is often expensive and inefficient for retail investors and offers little leverage on the actual bond's movement. An Annual Review Note can be linked to the 10-year Constant Maturity U.S. Treasury Rate (among other assets, such as equities, currencies and commodities) in order to implement this market view.

ARNs offer a fixed return based on flat or positive underlying returns, generally on a 1- to 3-year basis. ARNs are also known as "autocallables" because they will be automatically called away from the investor at a premium if a certain condition is fulfilled. If the underlying – in this case, the 10-year Constant Maturity U.S. Treasury Rate (CMT – has remained flat or increased on a periodic review date, the investment will be called away and the investor will receive a premium. If the underlying return is negative on each review date, the investment is not called, and the investor has full downside exposure to the underlying at maturity. The ARN can also be designed with a buffer at maturity.

For example, a 3-year ARN linked to the 10-year CMT Rate with 3 annual monitoring dates could have a payout as follows: if the CMT is flat or has increased on the first review date, the investment will be called away at 110%, and the investor will make a 10% return. If the CMT has decreased on the first review date but is flat or has increased on the second review date, the investment is called away at 120%. If the rate has decreased on both of the prior review dates but is flat or has increased on the final review date, the investment is called away at 130%. If the rate is down on all review dates, the investor loses 1% of their principal for every 4.4 basis points that the rate declines. For example, if the CMT Rate declines from an initial level of 4.40% to 4.00% at maturity, the investor will lose 10% of their principal. Figure 4 represents this payoff graphically.



Similar to RENs, ARNs expose the investor to a full loss of principal. In this case if the 10-year CMT Rate were to go to zero the investor would lose 100% of their principal. However, the investor has the ability to receive a fixed premium if the CMT Rate is flat or has increased only slightly on a review date. The ARN provides an innovative way of monetizing a market view that is commonly held but generally difficult to implement for retail investors.

## Scenario 3: Low and Stable Equity Market Returns

### Solution: Call Overwrite Notes (COINs)

Investors with low to even slightly negative equity market expectations over the next few years can implement

this view with Call Overwrite Notes (COINs). COINs feature a payoff that replicates the combination of an investment in an equity market index with the sequential sale of at-the-money or slightly out-of-the-money call options. These investments utilize the selling of volatility to monetize market expectations, as described earlier. The investor in a COIN essentially has exposure to the upside of the equity index up to the strike price of the call options “sold” each month, and in turn receives a “premium” to cushion any downside movements in the index. COINs enable investors to sell away market rallies beyond their expectations, and boost the returns they do expect.

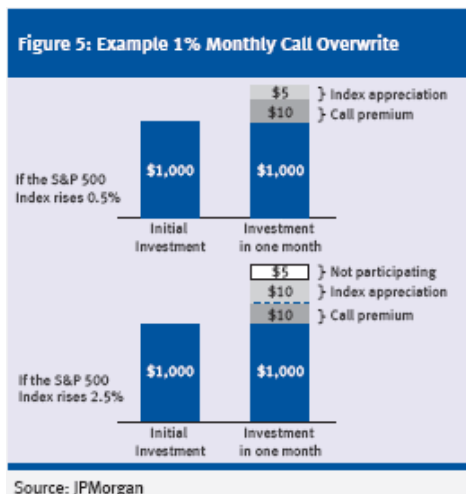


Figure 5 demonstrates a hypothetical example in which an investor purchases the underlying index for \$1,000 and sells a one-month call option with a 101% strike, generating 1% in up-front premium. In one month, if the index increases 0.5% in value, the investor makes 1% on the call option premium and 0.5% on the index investment. This represents an outperformance of 1% versus a direct index investment. If the index increases 2.5% in one month, the investor participates in the first 1% increase in the index and receives the 1% call option premium, and has underperformed an investment in the index by 0.5%.



This investment strategy—owning an underlying asset and selling (or “writing”) a series of call options on it—have been used by institutional investors for years, frequently referred

to as “covered call” or “buy-write” strategies. Recognizing the growing popularity of these strategies, the Chicago Board Options Exchange began publishing the BuyWrite Index (BXM) in 2002. The BXM is a passive total return index based on buying a total return portfolio on the S&P 500 and selling a near-term S&P 500 call option, generally on the third Friday of each month. The call options sold have approximately one month remaining to expiration and an exercise price just above the prevailing index level.

As an example, an investor could purchase a 3-year COIN that replicates the BXM Index and would receive at maturity the combined payoff of the S&P 500 total return, capped each month by the call options “sold” each month, and the premiums generated by the “selling” of these options.

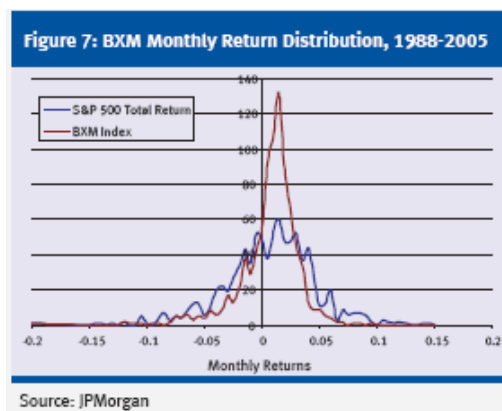
Selling call options on a portfolio effectively limits the upside of the portfolio while providing a cushion against the downside. This effect is seen in the slightly higher mean monthly returns of the S&P 500 as compared to the BXM, indicating that the BXM investor is not capturing the full appreciation of the index in months with sharp increases. However, the higher median monthly return for the BXM and lower standard deviation indicates that the returns are less widely distributed, as can be seen in Figure 7.

Statistic	CBOE BXM	S&P 500
Monthly Arithmetic Mean	1.02%	1.05%
Monthly Compound Rate of Return	0.98%	0.96%
Monthly Standard Deviation	2.83%	4.22%
Excess return	0.64%	0.67%
Monthly Sharpe ratio	0.225	0.1592
Monthly Stutzer	0.216	0.1577

**Table 1:** Summary statistics for BXM and S&P 500, monthly data from 1988 to 2004. The Stutzer ratio is a measure of risk-adjusted returns controls for non-normality. It is equal to the Sharpe ratio for a normally distributed asset.

Source: Barry Feldman and Dhruv Roy, "Passive Options-based Investment Strategies: The Case of the CBOE S&P BuyWrite Index," Ibbotson Associates, 2004.

The creation of buy-write indices and the analysis of theoretical historical data provide a powerful demonstration of benefits that may accrue to buy-write investors, even if their market forecast turns out to be incorrect. Above, we focused on the ability of buy-write strategies to enhance returns in relatively flat markets. As shown in Table 1, analyzing 16 years of historical



data reveals that the annualized return of the BXM slightly outperformed holding the S&P 500 outright. However, if markets had consistently rallied this would not have been the case. More importantly, the *standard deviation* or volatility of BXM returns was significantly less than that of the S&P 500.

From a portfolio construction viewpoint, these lower but far less widely distributed returns represent a superior tradeoff between risk and return. The financial consulting firm, Ibbotson & Co., has performed additional statistical analysis on these indices, and demonstrated historically that the Sharpe ratios and Stutzer index—measures of risk versus return—are significantly superior for the BXM versus the S&P 500.

## Can I Create My Own Structured Investments?

The Structured Investments described in this volume of the *Solution Series* provide access to return profiles that are difficult or in some cases impossible for individual investors to reconstruct. Additionally, Structured Investments can provide access to a wide array of assets that are generally difficult or impossible for individual investors to access.

While each of these investments is created differently, an investor seeking to replicate a REN or COIN strategy would likely need to buy and sell a variety of different options. These transactions would create taxable events that could significantly erode the eventual return of the investment. In contrast, by providing a single payoff profile in one investment many Structured Investments are able to receive long term capital gains tax treatment. For example, an investor selling one month call options to replicate a COIN strategy would pay ordinary income taxes on the premiums generated by the call sales. However an investor in a 3-year COIN that replicated a S&P 500 buy-write strategy similar to the BXM index described earlier could receive long term capital gains tax treatment on the eventual gain realized by the investment if held to maturity.

## Conclusion

Choosing the right investment strategy is difficult, perhaps now more than ever. Many analysts are calling for low equity market returns, and even lower (or negative) bond market returns. Even so, investors must find some alternative for their hard-earned savings. Just like active investing in general, these investments are not for everyone, and the risks of investing should be carefully considered. In this volume we described three Structured Investments designed to enhance investors' returns whenever markets are flat or moderately bullish, highlighting a key advantage of utilizing Structured Investments in a portfolio: the ability to capitalize on risk and return profiles tailored to a specific market view.

