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March 2014

J.P. Morgan Structured Investments

**The J.P. Morgan U.S. Long Equity Dynamic Overlay 80 Index (Series 1)**

**Strategy Guide**

J.P. MORGAN U.S. LONG EQUITY DYNAMIC OVERLAY 80 INDEX

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# Equity Hedging

Many investors are concerned about the value of their equity exposure and seek ways to protect against downside market risk and in particular downside tail risk events. Tail risk events, with respect to equity, generally refer to events where the value of an investment moves significantly downward from its historical average. There are various solutions an investor can consider to eliminate or mitigate such risks, including selling their position outright, or buying protection against a downward move in the equity market. Selling out of a position completely removes exposure to downside risk but prevents investors from participating in any potential upside as well. Alternatively, investors can look at buying protection against a downside move of their investments by purchasing put options.

By purchasing a European-style put option, investors pay a premium upfront in exchange for the right to sell their investment at a predetermined price (the "put strike") on a future date ("expiration date"). A put option insures investors against a future decline in the value of the relevant underlying asset below the put strike on the expiration date. Put options can protect investors' positions while retaining upside exposure to the underlying asset.

Like buying insurance, buying a put option has a cost, which may be high, especially when the put option is most needed. In the event that the underlying asset covered by the put option does not decline below the pre-determined put strike on the expiration date, investors will lose the premium paid. Consequently, investors tend to avoid or postpone buying protection or alternatively seek to reduce upfront costs by limiting the downside protection. One alternative is the purchase of a put spread (buying a put and at the same time selling another put at a lower put strike), which provides protection for a specified range of decline of the underlying asset.

Another alternative is for investors to fund the purchase of downside protection by selling away their ability to participate in upside exposure above a certain threshold. A "collar" is a generic financial term used to describe a structure that combines the sale of a call option and the purchase of a put option financed by the premium received from the sale.

### *Equity Hedging in the Form of a Traditional Collar: Buying Downside Protection in Exchange for Giving Up Some Upside Appreciation*

**Put Option**

A European put option is an option contract that gives the buyer of the put option the right, but not the obligation, to sell a specified amount of an underlying asset at a specified price (the "strike price") at a specified point in time (*i.e.*, upon the expiry of the put option). The chart below is an illustrative example of how a long position in a put option (*i.e.*, the purchase of a put option) combined with an equity investment and adjusted for the premium paid may perform:

- an equity investment (red dashed line)

- an equity investment combined with the purchase of a put option with a strike price of 80% of the value of the underlying asset (blue line). The combined investment performance is effectively floored at -20%; and

- an equity investment combined with the purchase a put option with a strike price of 80% of the value of the underlying asset minus the premium paid by the put option buyer (green line).
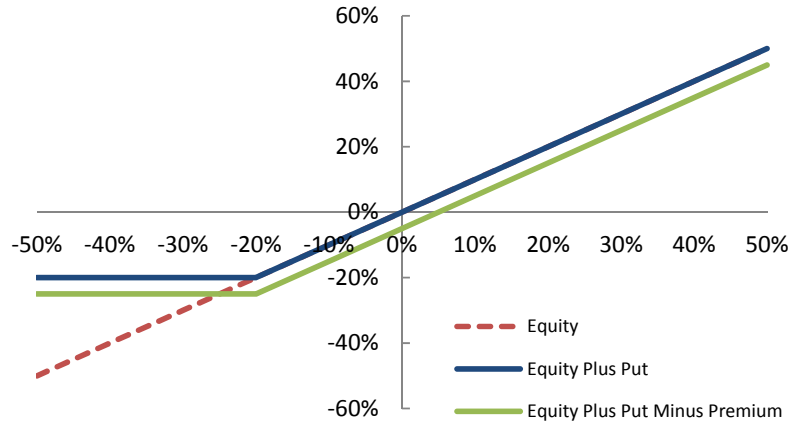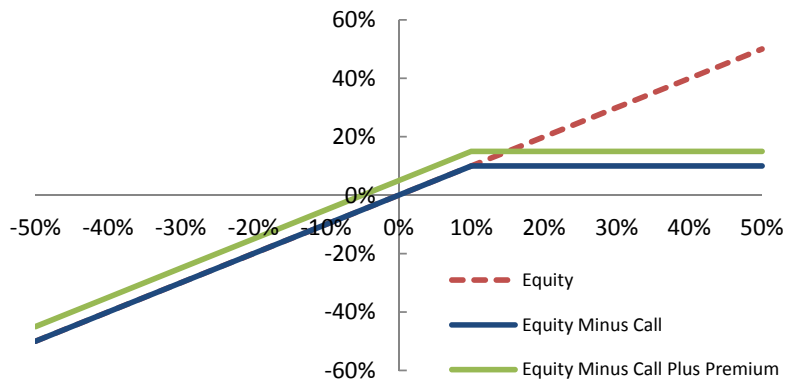
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Source: J.P. Morgan. The information in the above chart is provided solely for illustration.

## Call Option

A European call option is an option contract that gives the option buyer the right, but not the obligation, to buy a specified amount of an underlying asset at a specified strike price at a specified point in time (*i.e.*, upon the expiry of the call option). Conversely, the option seller of a call option is required to sell the specified amount of the underlying asset at the specified strike price when the option buyer chooses to exercise its option to purchase the specified amount of the underlying asset. A call option seller often takes a bearish to neutral view of the underlying asset, *i.e.*, the option seller would believe that the underlying asset is likely to depreciate or be stagnant, and unlikely to appreciate above the strike price during the option period. Selling a call option will provide the call option seller with an amount of option premium payment. The graph below is an illustrative example of how a **short** position in a call option (*i.e.*, the sale of a call option) combined with an equity investment and adjusted for the premium earned may perform:

- An equity investment (red dashed line);

- an equity investment combined with the sale of a call option with a strike price of 105% of the value of the underlying asset (blue line). The combined investment performance is effectively capped at +5%; and

- an equity investment combined with the sale of a call option with a strike price of 105% of the value of the underlying asset plus the premium received by the call option seller (green line).
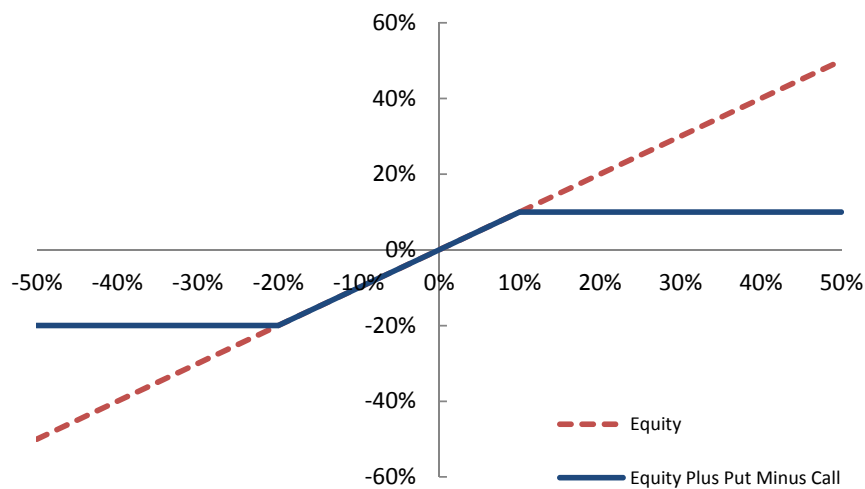
Source: J.P. Morgan. The information in the above chart is provided solely for illustration.

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By selling a call option an investor can receive premium payments and can partially participate in upside appreciation of the relevant underlying asset (up to the strike price of the call option). If the underlying asset appreciates above the strike price of the call option, the investor's upside exposure is effectively capped at the level corresponding to the strike price of the call option.

## Collar Strategy

The sale of a call option will generate a premium that investors can use to offset the cost of the purchase of a put option. Assuming both the put option and the call option have the same expiration, when combined with a long exposure to the same underlying asset, investors forfeit any upside exposure beyond the strike price of the call while getting protection on the long exposure to the underlying asset below the strike price of the put, thus "collaring" the long position in the underlying asset.



Source: J.P. Morgan. The information in the above chart is provided solely for illustration purposes.

Combining a long equity exposure with a collar strategy provides investors with limited downside protection while allowing investors to retain some upside appreciation. However, this combined strategy has its drawbacks, including but not limited to:

- Capped exposure on the upside (beyond the strike price of the call option); and

- Timing mismatch (in the case of a European put option) between the remaining time-to-expiry (*i.e.*, when the put can be exercised) and strike price of the put option on the one hand and market conditions on the other.

### *Delta Hedging Short Call Options to Retain Upside*

When combining a long equity exposure with the sale of a call option, an investor limits its upside potential. For example, if an investor has a long position in an underlying asset and sells a call option on the underlying asset at a strike price of 105% of the value of the underlying asset at the time of the sale, the investor is able to participate in 5% of the appreciation of the underlying asset from the initial value, but has to forfeit any potential upside gain beyond the 5% appreciation of the underlying asset.

Options do not move linearly in relation to their underlying assets. As the value of the underlying asset moves up or down, the value of the call option will move on a fractional basis in relation to the move of the underlying asset. This fractional basis can be quantified as a percentage and is

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called "delta". Delta is the ratio of change in the price of an underlying asset to the corresponding change in the price of a derivative of the underlying asset, and it measures the rate of change of the option value relative to the change in the price of the underlying asset. The delta of an option is not static and changes based on many factors, including but not limited to, volatility, time to expiration, and the proximity of the price of the underlying asset to the strike price of the option.

When an investor has a long position in an underlying asset, and has to sell a call option in order to fund the purchase of a put option on the underlying asset for downside protection, combining the short call position with an additional long position in the underlying asset equal to the delta of the call option and the underlying asset can mitigate the effect of the cap that is effectively imposed by the short call position on the upside exposure to long position in the underlying asset. This is known as "delta hedging" the short call position, the effect of which is that the investor can now enjoy the upside exposure to the underlying asset beyond the level that corresponds to the strike price of the call option.

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# The J.P. Morgan U.S. Long Equity Dynamic Overlay 80 Index (Series 1)

The J.P. Morgan U.S. Long Equity Dynamic Overlay 80 Index (Series 1) (the "Index") is a rules-based Index that tracks the performance of a synthetic long exposure to the S&P 500® Total Return Index ("SPTR") combined with a synthetic exposure to a collar strategy on the S&P 500® Index ("SPX"). The Index seeks to provide long exposure to the U.S. equity markets while providing limited downside protection to investors through a collar strategy as an overlay to the equity investment.

Key features of the Index include:

■ A synthetic long position in SPTR;

■ A synthetic rolling collar strategy on SPX consisting of the following listed options traded on the Chicago Board Options Exchange Incorporated:

   ■ a monthly rolled synthetic short call position referencing SPX call option contracts with 1-month expiry and strike prices varying from 103% to 108% of the relevant levels of SPX;

   ■ a quarterly rolled synthetic long put position referencing SPX put option contracts with 11-month expiry with strike prices equal to 80% of the relevant level of SPX; and

■ A synthetic delta-hedge mechanism with respect to the short call position consisting of a variable synthetic exposure to futures contract referencing SPX.

The Index is subject to the deduction of a total of three types of fees and deductions:

■ *Daily index fee:* on each day, the calculation of the Index reflects the deduction of an adjustment factor of 0.75% per annum (the "Daily Index Fee");

■ *Call deduction and put deduction:* on a monthly or quarterly basis, as applicable, when the Index's synthetic short call or long put exposure, as applicable, is rolled into a new SPX option contract, a call deduction or put deduction, as applicable, is subtracted in the calculation of the Index. The call deduction or put deduction is calculated by multiplying the applicable volatility spread (which is between 0.30% and 3.00%) by the vega of the applicable option contract, subject to certain minimum and maximum amounts. The applicable volatility spread depends on the level of the CBOE Volatility Index ("VIX") on the relevant date of determination. Unlike the Daily Index Fee, the call deduction and the put deduction are not per annum deductions; and

■ *Delta deduction:* on each day the delta hedge is implemented, 0.03% of any increase or decrease in the Index's exposure to the futures contracts on SPX is deducted in the calculation of the Index. Unlike the Daily Index Fee, the delta deduction is not a per annum deduction.

The Index's calculation agent publishes the levels of the Index on Bloomberg under the reference ticker "JPUSLEDO <Index>" in respect of each Index business day subject to the occurrence or continuance of market disruption events (see below).

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## *Mitigating the Inefficiencies of a Traditional Collar:*

The strategy of overlaying a traditional collar on a long equity investment has its drawbacks, including but not limited to:

- Capped exposure on the upside;

- The need to replace the option contracts underlying the collar strategy as each contract comes to expiration; and

- Risk concentration related to a single strike price as a result of holding the relevant option to its expiration.

The Index aims to provide a collar strategy that overcomes the inefficiencies of a traditional collar strategy. The Index's collar strategy is a dynamic rolling collar strategy consisting of longer-dated put options on the long put leg and shorter-dated call options that are delta-hedged by equity futures on the short call leg.

The chart below shows hypothetical back-tested performance (prior to September 17, 2013) and actual historical performance (on or after September 17, 2013) of the Index compared with the historical performance of the S&P 500® Total Return Index.

Hypothetical and Historical performance of the J.P. Morgan U.S. Long Equity Dynamic Overlay 80 Index (Series 1) vs. S&P 500® Total Return Index (September 2002 – February 2014)
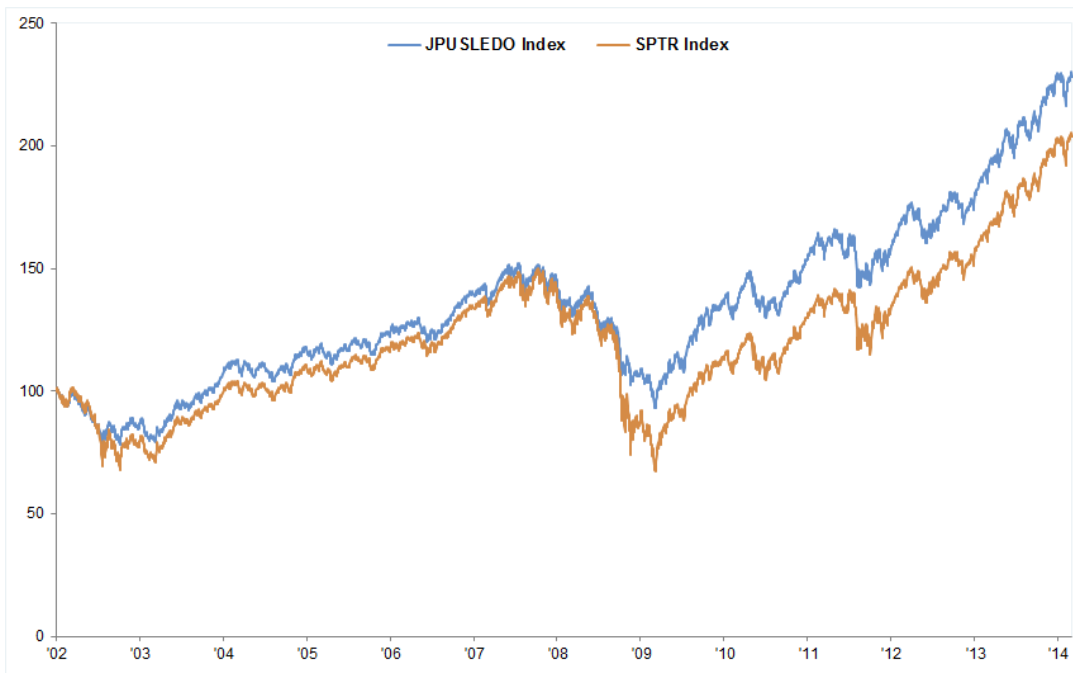


Source: J.P. Morgan; PAST PERFORMANCE AND BACK-TESTED PERFORMANCE ARE NOT INDICATIVE OF FUTURE RESULTS. The information in this chart is provided solely for reference.

Note: The Index was launched on 9/17/2013; therefore any data used for the index prior to that date is back-tested and does not represent actual historical data. The hypothetical back-tested performance of the Index is calculated on materially the same basis as the performance of the Index is now calculated, but does not represent the actual historical performance of the Index and has not been verified by an independent third party. Alternative modelling techniques or assumptions that might prove to be more appropriate may produce different hypothetical results that might differ significantly from the hypothetical data presented here. In addition, back-tested, hypothetical historical results have inherent limitations. These back-tested results are achieved by means of a retroactive application of a back-tested model designed with the benefit of hindsight. The comparison of the hypothetical or historical performance of the Index with the historical performance of the S&P 500® Total Return Index shown is for information purposes only. No guarantee can be given that the Index will outperform the S&P 500® Total Return Index or will not underperform the S&P 500® Total Return Index in the future.

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### The Index is composed of three main components:

1. Synthetic long exposure to SPTR;

2. The long put leg: a quarterly rolled synthetic long put position referencing SPX put option contracts with 11-month expiry with strike prices equal to 80% of the relevant level of SPX

   a. 1/3 of the notional of the put position is rolled every three months

   b. Each referenced put option contract is rolled two months prior to its expiration

3. The short call leg: a monthly rolled synthetic short call position referencing out-of-the-money SPX call option contracts with 1-month expiry and strike prices varying from 103% to 108% of the relevant levels of SPX and dynamic delta hedging of the short call

   a. Call option contracts selected based on strike prices determined by reference to market expectation of volatility (as represented by the level of VIX)

   b. Dynamic delta hedging of the short call position based on pre-set signals of expected volatility (as represented by the level of VIX)

**Hypothetical and Historical Performance of the Long Put Leg and the Short Call Leg of the J.P. Morgan U.S. Long Equity Dynamic Overlay 80 Index (Series 1) (September 2002 – February 2014)**
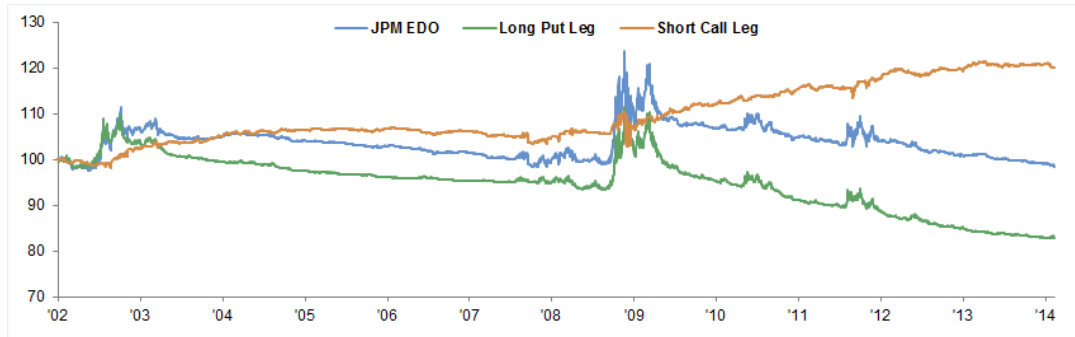


Source: J.P. Morgan, Bloomberg

JPMEDO represents the "long put leg" plus the "short call leg"

Note: The Index was launched on 9/17/2013; therefore any data used for the index prior to that date is back-tested and does not represent actual historical data. The hypothetical back-tested performance of the Index is calculated on materially the same basis as the performance of the Index is now calculated, but does not represent the actual historical performance of the Index and has not been verified by an independent third party. Alternative modelling techniques or assumptions that might prove to be more appropriate may produce different hypothetical results that might differ significantly from the hypothetical results presented here. In addition, back-tested, hypothetical historical results have inherent limitations. These back-tested results are achieved by means of a retroactive application of a back-tested model designed with the benefit of hindsight.

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**Hypothetical Comparative Performance of the Index and the S&P 500® Total Return Index during the Worst Performing Months of the S&P 500® Total Return Index since 2002**

| # | SPTR | JPUSLEDO | Difference | Month |
|---|---|---|---|---|
| 1 | -16.6% | -6.7% | 9.9% | Oct-08 |
| 2 | -15.2% | -5.9% | 9.4% | Nov-08 |
| 3 | -14.8% | -8.4% | 6.3% | Feb-09 |
| 4 | -11.3% | -4.9% | 6.4% | Jan-09 |
| 5 | -10.7% | -8.3% | 2.5% | May-10 |
| 6 | -8.9% | -5.2% | 3.7% | Sep-08 |
| 7 | -8.8% | -8.2% | 0.7% | May-12 |
| 8 | -8.6% | -3.3% | 5.3% | Sep-11 |
| 9 | -8.6% | -3.2% | 5.4% | Jul-02 |
| 10 | -7.1% | -6.8% | 0.2% | Jun-08 |
| 11 | -6.8% | -4.5% | 2.3% | Jun-02 |
| 12 | -6.2% | -5.4% | 0.8% | Aug-11 |
| 13 | -5.2% | -4.4% | 0.8% | Jan-03 |
| 14 | -5.2% | -5.2% | -0.1% | Apr-02 |
| 15 | -4.4% | -1.8% | 2.6% | Feb-08 |
| 16 | -4.1% | -3.8% | 0.3% | May-02 |
| 17 | -3.9% | -3.0% | 0.9% | Jun-10 |
| 18 | -3.8% | -3.4% | 0.5% | Jul-11 |
| 19 | -3.8% | -3.0% | 0.8% | Aug-10 |
| 20 | -3.8% | -3.5% | 0.3% | Jan-10 |

Source: J.P. Morgan, Bloomberg

Note: The Index was launched on 9/17/2013; therefore any data used for the Index prior to that date is back-tested and does not represent actual historical data. The hypothetical back-tested performance of the Index is calculated on materially the same basis as the performance of the Index is now calculated, but does not represent the actual historical performance of the Index and has not been verified by an independent third party. Alternative modelling techniques or assumptions that might prove to be more appropriate may produce different hypothetical results that might differ significantly from the hypothetical results presented here. In addition, back-tested, hypothetical historical results have inherent limitations. These back-tested results are achieved by means of a retroactive application of a back-tested model designed with the benefit of hindsight. The comparison of the hypothetical or historical performance of the Index with the historical performance of the S&P 500® Total Return Index shown is for information purposes only. No guarantee can be given that the Index will outperform the S&P 500® Total Return Index or will not underperform the S&P 500® Total Return Index in the future.

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### *Description of the Long Put Leg:*

The long put leg of the Index's collar strategy consists of three synthetic rolling long put positions (with each representing a third of the total notional amount).  Each position references a SPX put option with 11-month expiry and a strike price of 80% of the level of SPX at the time of the synthetic purchase of the relevant put option.  The put option synthetically purchased at each rebalancing of the Index's synthetic put position is the one with a strike price that is the closest to but at or below 80% of the level of SXP on the day before that rebalancing.  If, at any rebalancing, there is no put option contract available that has the right strike price, then no replacement contract will be selected at that rebalancing and the Index will reference less than three put option contracts for the next 9 months.

The put options are synthetically purchased when they have an 11-month expiry, and rolled into new contracts 2 months before their expiry.  Rolling the put options shortly before their expiration mitigates the negative carry resulting from the significant decrease in option value that typically happens during the last 2 months of a long-dated put option contract such as the put options referenced by the Index.  The rolling of the Index's three put positions is staggered, occurring at the quarterly expiries of SPX put options in March, June, September and December, so that the Index completes the rolling of all its three put positions every 9 months, which is designed to maximize option liquidity.  Rolling the put options on a quarterly basis mitigates the risk of timing mismatch (in the case of a European put option) between the remaining time-to-expiry (i.e., when the put can be exercised) and strike price of the put on the one hand and market conditions on the other.

When synthetically purchased, the strike price of the put option is at or below 80% of the then current level of SPX.  Consequently, the protection embedded into the Index is generally most effective in tail risk events (*i.e.*, during time of a sharp drop in SPX).  The chart below shows the 20 worst performance months of the S&P 500[®] Total Return Index since Jan 2002, and the comparison with the Index.

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### *Description of the Short Call Leg:*

The short call leg is broken into two components:

- a synthetic short call position; and
- a dynamic delta hedging feature.

The Index maintains a synthetic rolling short position (the first component) in out-of-the-money call options of 1-month expiry. The call option contracts referenced by the synthetic short call position are selected based on strike price determined by reference to market expectation of the volatility of SPX (as represented by the level of VIX). The higher the expected volatility is, the higher is the strike price of the call option synthetically sold by the Index. The call option synthetically sold at each rebalancing of the Index's synthetic call position is the one with a strike price that is the closest to the applicable percentage strikes of the SPX level on the day before that rebalancing. Each call option is referenced by the Index until its expiry and then the Index's synthetic short call position is rolled into a new call option contract with 1-month expiry. If, at any rebalancing, there is no call option contract available that has the right strike price, then no call contract will be selected at that rebalancing and the Index will not maintain a synthetic short call position until the next rebalancing.

**Call Strike Selection Based on Level of VIX**

| VIX Level | Percentage Strike |
| --- | --- |
| VIX </= 20 | 103.00% |
| 20 < VIX </= 25 | 104.00% |
| 25 < VIX </= 30 | 105.00% |
| 30 < VIX </= 35 | 106.00% |
| 35 < VIX </= 60 | 107.00% |
| 60 < VIX | 108.00% |

The second component of the short call leg is the dynamic delta hedge exposure. The dynamic delta hedge is designed to mitigate the impact of the cap effectively imposed by the short call position on the Index's long exposure to SPTR. (See above: Delta Hedging Short Call Options to Retain Upside)

The delta hedging mechanism is activated if either one of the below conditions is met:

- the closing level of VIX is below its 6-month moving average, or
- the closing level of VIX is below its 5-year moving average.

If the closing level of VIX is below its 6-month moving average, it generally suggests a rising US equity market or recovering market in which investors are likely to benefit from uncapped long equity exposures.

If the closing level of VIX is below its 5-year moving average, it is generally a sign that the US equity market is in a low volatility environment in which the risk/return profile of capping upside exposure may not be attractive enough.

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The delta hedge will be implemented gradually, *i.e.*, when the closing level of VIX decreases to less than 100% of its 6-month moving average or its 5-year moving average, the delta hedge will be activated; when the closing level of VIX decreases to less than 80% of its 6-month moving average or its 5-year moving average, the delta hedge will be fully implemented.

However, If the closing level of VIX is above its 6-month moving average and its 5-year moving average, then the delta hedge will not be implemented even if the Index is maintaining its synthetic short call position at that time.

### Example of Dynamic Delta Hedging

The dynamic delta hedge of the Index's short call position is started if VIX is below either its 6-month or 5-year moving averages and is fully implemented once VIX is below 80% of either of its two moving averages.
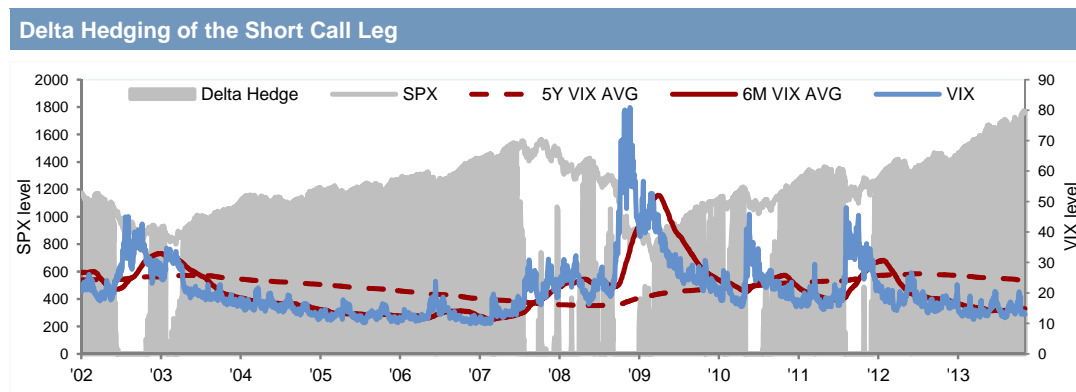
Suppose:

- 5-year moving average of VIX is at 15
- 6-month moving average of VIX is at 20

The dynamic delta hedge is started as soon as VIX is below 20, and will be fully implemented when VIX is below 16 (80%×20).

If:

- VIX is at 19, the dynamic delta hedge will be implemented at 25%
- VIX is at 18, the dynamic delta hedge will be implemented at 50%
- VIX is at 17, the dynamic delta hedge will be implemented at 75%
- VIX is at 16 and lower, the dynamic delta hedge will be implemented at 100%

When the delta hedging feature is activated, the Index will implement, for that day, an additional exposure to the S&P 500® Index by synthetically investing in SPX futures. This exposure is adjusted daily based on changes in the delta of the call option contract reference by the Index and SPX.

**Delta Hedging of the Short Call Leg**



Source: J.P. Morgan, Bloomberg.

Note: The Index was launched on 9/17/2013; therefore any data used for the index prior to that date is back-tested and does not represent actual historical data. The hypothetical back-tested performance of the Index is calculated on materially the same basis as the performance of the Index is now calculated, but does not represent the actual historical performance of the Index and has not been verified by an independent third party. Alternative modelling techniques or assumptions that might prove to be more appropriate may produce different hypothetical results that might differ significantly from the hypothetical results presented here. In addition, back-tested, hypothetical historical results have inherent limitations. These back-tested results are achieved by means of a retroactive application of a back-tested model designed with the benefit of hindsight.

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### Index Fees and Deductions:

The Index is subject to a total of three types of fees and deductions:

◼ *Daily index fee:* on each day, the calculation of the Index reflects the deduction of an adjustment factor of 0.75% per annum (the "Daily Index Fee");

◼ *Call deduction and put deduction:* on a monthly or quarterly basis, as applicable, when the Index's synthetic short call or long put exposure, as applicable, is rolled into a new option contract on the S&P 500® Index, a call deduction or put deduction, as applicable, is subtracted in the calculation of the Index, once with respect to the establishment of a new short call position and twice (once in connection with the synthetic sale of the soon-to-expire put option contract and once in connection with the synthetic purchase of a replacement put option contract) with respect to the establishment of a new long put position. The call deduction or put deduction is calculated by multiplying the applicable volatility spread (which is between 0.30% and 3.00%) by the vega of the applicable option contract, subject to certain minimum and maximum amounts. The applicable volatility spread depends on the level of the CBOE Volatility Index (the "Volatility Index") on the relevant date of determination. The call deduction or put deduction is designed to approximate transaction costs of rolling the Index's synthetic short call or long put positions on the S&P 500® Index, including bid-ask spreads and slippage costs that would be experienced by a professional investor seeking to replicate the hypothetical portfolio contemplated by the Index's synthetic short call and long put positions at prices that approximate the official settlement prices (which are not generally tradable) of the relevant option contracts. The slippage costs that are approximated in the call deduction or put deduction are costs that arise from deviations between the actual official settlement price of an applicable option contract and the prices at which a hypothetical investor would expect to be able to execute trades in the market when seeking to match the expected official settlement price of that option contract. Unlike the Daily Index Fee, the call deduction and the put deduction are not per annum percentage deductions; and

◼ *Delta deduction:* on each day the delta hedge is implemented, 0.03% of any increase or decrease in the Index's exposure to the futures contracts on the S&P 500® Index is deducted in the calculation of the Index. The delta deduction reflects costs relating to adjustments to the Index's delta hedge of its synthetic short call position. Unlike the Daily Index Fee, the delta deduction is not a per annum deduction.

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### *Risks associated with the J.P. Morgan U.S. Long Equity Dynamic Overlay 80 Index*

**We or our affiliates may have economic interests that are adverse to those of the holders of the securities linked to the Index because we are the issuer of the securities, our affiliate, JPMS plc, is the Index Sponsor and the Index Calculation Agent and our affiliate, J.P. Morgan Securities LLC ("JPMS"), will be the calculation agent for the securities (the "calculation agent") and an agent of the offering of the securities.**

Because determinations made by JPMS plc as the Index Sponsor and the Index Calculation Agent and JPMS as the calculation agent may affect any amount payable on the securities, potential conflicts of interest may exist between JPMorgan Chase & Co., JPMS plc and JPMS, on the one hand, and you, as a holder of the securities, on the other.

**Under certain limited circumstances, the Index Sponsor and the Index Calculation Agent have discretion in relation to the Index and are under no obligation to consider your interests as holder of any securities linked to the Index.**

JPMS plc, one of our affiliates, acts as the Index Sponsor and the Index Calculation Agent and is responsible for calculating and publishing the official closing levels of the Index, maintaining the Index and developing the guidelines and policies governing its composition and calculation. The rules governing the Index may be amended at any time by JPMS plc, in its sole discretion, and the rules also permit the use of discretion by JPMS plc in relation to the Index in specific instances. Although JPMS plc will make all determinations and take all action in relation to the Index in good faith, it should be noted that such discretion could have an impact, positive or negative, on the Index closing levels. JPMS plc is under no obligation to consider your interests as a holder of any securities linked to the Index in taking any actions that might affect the value of your securities.

**The reported level of the Index will include the deduction of fees and costs.**

One way in which the Index may differ from other indices is that its reported levels include fees and deductions. As a result of these deductions, the value of the Index will trail the value of a hypothetical identically constituted synthetic portfolio that is not subject to these fees and deductions. The Index is subject to the deduction of a total of three types of fees and costs:

- **Daily index fee**: on each day, the calculation of the Index reflects the deduction of an adjustment factor of 0.75% per annum;

- **Call deduction and put deduction**: on a monthly or quarterly basis, as applicable, when the Index's synthetic short call or long put exposure, as applicable, is rolled into a new option contract on the S&P 500® Index, a call deduction or put deduction, as applicable, is subtracted in the calculation of the Index, once with respect to the establishment of a new short call position and twice (once in connection with the synthetic sale of the soon-to-expire put option contract and once in connection with the synthetic purchase of a replacement put option contract) with respect to the establishment of a new long put position. The call deduction or put deduction is calculated by multiplying the applicable volatility spread (which is between 0.30% and 3.00%) by the vega of the applicable option contract, subject to certain minimum and maximum amounts. The applicable volatility spread depends on the level of the CBOE Volatility Index (the "Volatility Index") on the relevant date of determination. The call deduction or put deduction is designed to approximate transaction costs of rolling the Index's synthetic short call or long put positions on the S&P 500® Index, including bid-ask spreads and slippage costs that would be experienced by a professional investor seeking to replicate the hypothetical portfolio contemplated by the Index's synthetic short call and long put positions at prices that approximate the official settlement prices (which are not generally tradable) of the relevant option contracts. The slippage costs that are

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approximated in the call deduction or put deduction are costs that arise from deviations between the actual official settlement price of an applicable option contract and the prices at which a hypothetical investor would expect to be able to execute trades in the market when seeking to match the expected official settlement price of that option contract. Unlike the daily index fee, the call deduction and the put deduction are not per annum percentage deductions; and

- **Delta deduction:** on each day, 0.03% of any increase or decrease in the Index's exposure to the futures contracts on the S&P 500® Index is deducted in the calculation of the Index. The delta deduction reflects costs relating to adjustments to the Index's delta hedge of its synthetic short call position. Unlike the daily index fee, the delta deduction is not a per annum percentage deduction.

**The Index may not be successful, and may not outperform any alternative strategy that might be employed with respect to the S&P 500® Index and the option contracts and futures contracts underlying the Index.**

The Index follows a synthetic rules-based proprietary strategy that operates on the basis of pre-determined rules. No assurance can be given that the investment strategy on which the Index is based will be successful or that the Index will outperform any alternative strategy that might be employed with respect to the S&P 500® Index and the option contracts and futures contracts underlying the Index.

**Securities that provide exposure to equity option contracts, equity futures contracts and short equity positions, with each rebalanced based on the equity volatility level, are not suitable for all investors. You should actively manage your investment in the securities.**

Securities that provide exposure to equity option contracts, equity futures contracts and short equity positions, with each rebalanced based on the equity volatility level, are not suitable for all investors. Because of the large and sudden value movements associated with option and futures contracts, any securities linked to the Index should be purchased only by sophisticated investors who understand risks associated with investments linked to option contracts, futures contracts, short positions and equity volatility and who intend to monitor and manage their investments actively. You should consider your investment horizon and objectives, financial resources and risk tolerance, as well as any potential trading costs, when evaluating an investment in any securities linked to the Index. Investors should regularly monitor their investment any such securities to ensure that it remains consistent with their investment objectives.

**There may be significant fluctuations in the level of the Index, which could affect the value of any securities linked to the Index.**

The values of the synthetic positions in option contracts and futures contracts underlying the Index can be volatile and move dramatically over short periods of time. There can be no assurance that the relevant synthetic exposures will not result in substantial negative returns. Positive returns on the Index may therefore be reduced or eliminated entirely due to movements in market parameters.

**The Index comprises synthetic assets.**

The exposure to the S&P 500® Total Return Index, and option contracts and futures contracts on the S&P 500® Index provided by the Index is purely synthetic and will exist solely in the records maintained by or on behalf of the Index Calculation Agent. There is no actual portfolio of assets to which any person is entitled or in which any person has any ownership interest. Consequently, you will not have any claim against any of the option contracts or futures contracts that the Index references.

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**The Index has a limited operating history and may perform in unanticipated ways.**

The Index has been calculated on a "live" basis since September 17, 2013 (the "Live Date") and therefore has a limited operating history. Any back-testing or similar analysis performed by any person with respect to the Index must be considered illustrative only and may be based on estimates or assumptions not used by the Index Calculation Agent when determining the level of the Index.  Past performance should not be considered indicative of future performance.

**The synthetic collar strategy employed by the Index may not protect investors from all losses.**

There will be periods of time when the delta hedge is not implemented or fully implemented, and as a result, investors in securities linked to the Index will be deprived of potential gains, because, when the delta hedge is not implemented at all, the Index's upside exposure to the S&P 500® Total Return Index is effectively capped at a level corresponding to the strike price of the applicable call option, and when the delta hedge is only partially implemented, the Index's upside exposure to the S&P 500® Total Return Index partially offset by the strike price of the applicable call option.  Furthermore, the Index's synthetic long put position, which is intended as a hedge for the Index's long position in the S&P 500® Total Return Index, is itself not hedged.  If the level of the S&P 500® Index decreases, but not below a level corresponding to the strike price of the applicable put option, the Index will not be protected from the resulting losses.

**Sudden market movements may leave the Index with the wrong combination of position exposures, thus leading to investor losses.**

During the time when the Index's synthetic short call position is delta-hedged, the Index will be exposed to a total of four synthetic positions: a synthetic long position in the S&P 500® Total Return Index, a synthetic short call position in the call option contracts on the S&P 500® Index, a synthetic long put position in the put option contracts on the S&P 500® Index and a synthetic long position in the futures contracts on the S&P 500® Index.  The four positions are interrelated—the synthetic long put position is designed to provide downside protection to the Index's synthetic long position in the S&P 500® Total Return Index; the synthetic short call position has the effect of limiting the Index's upside exposure to the S&P 500® Total Return Index; and the synthetic long position in the futures contracts on the S&P 500® Index is designed to remove that limiting effect of the synthetic short call position.  However, if the market experiences a sudden movement, the Index may be left with an unfavorable combination of positions.

**The synthetic short call position maintained by the Index presents special risks.**

Combined with its synthetic long position in the S&P 500® Total Return Index, the Index's synthetic short position effectively caps the Index's upside exposure to the S&P 500® Total Return Index to a level corresponding to the strike price of the synthetic short call position. While the Index incorporates a delta hedge mechanism that is designed to mitigate losses from its synthetic short call position, the delta hedge will be switched on and off, and gradually implemented, all depending on the applicable level of VIX compared with its historical moving averages.  During the time the delta hedge is switched off or is not fully implemented, the Index's synthetic short call position will prevent the Index from benefiting, or benefitting fully, from any upside movement of the S&P 500® Total Return Index above the level corresponding to the strike price of the call position.

**The delta hedge may not be successful in serving its intended purposes.**

The delta hedge will be switched on when the applicable VIX level is less than 100% of its 6-month or 5-year historical moving averages, and will be fully implemented when the applicable VIX level is less than 80% of its 6-month or 5-year historical moving averages.  The delta hedge, once implemented, is designed to mitigate the impact of the cap on the Index's upside exposure

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to the S&P 500® Total Return Index effectively imposed by the Index's synthetic short call position.  During the time the delta hedge is switched off or is not fully implemented, the Index's synthetic short call position will prevent the Index from benefiting, or benefitting fully, from any upside movement of the S&P 500® Total Return Index above the level corresponding to the strike price of the call position.

## *Other key risks*

■ Daily rebalancing of the delta hedge may affect trading in the relevant futures contracts.

■ Futures contracts involve significant risks.

**The risks described above are not exhaustive.  You should also review carefully the "Risk Factors" sections in the related underlying supplement and product supplement and the "Selected Risk Considerations" in the relevant term sheet or pricing supplement.**
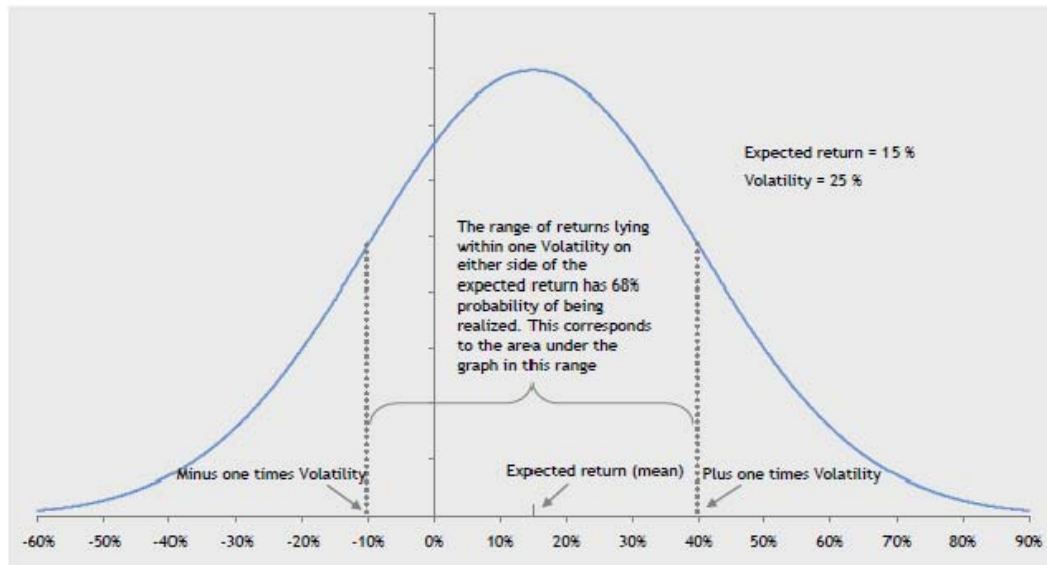
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# Appendix

**What is volatility?**

Volatility is one way to measure the risk associated with trading in an asset. It is intended to give an indication of the variability of the returns of the asset. It is usually quoted in terms of a percentage number per year. The graph below illustrates the hypothetical distribution of annual returns of an asset with an estimated expected return of 15% and estimated volatility of 25%. This example assumes that stock price returns follow a lognormal distribution.

Volatility is used in financial modelling to try to anticipate the distribution of an asset's future returns on the basis of its expected return and estimated volatility. The graph below describes the likelihood of the returns of an asset based on its expected return and estimated volatility. For an expected mean return of 15% and estimated volatility of 25%, there is a 68% likelihood that the returns of the asset will be between –10% (*i.e.*, the expected mean return (15%) minus estimated volatility (25%)) and +40% (*i.e.*, the expected mean return (15%) plus estimated volatility (25%)). Volatility can refer either to a statistical measure of historical variability of the returns of an asset (*i.e.*, realized volatility), or an estimate of the variability of anticipated future returns of an asset (*i.e.*, implied volatility).

**Hypothetical distribution of annual returns with estimated expected return of 15% and volatility of 25%**



Expected return = 15 %
Volatility = 25 %

The range of returns lying within one Volatility on either side of the expected return has 68% probability of being realized. This corresponds to the area under the graph in this range

Minus one times Volatility    Expected return (mean)    Plus one times Volatility

Source: J.P. Morgan

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**What is the volatility measure used by the Index?**

The volatility measure used by the Index is the CBOE Volatility Index, which is also known as VIX. VIX reflects the 30-calendar day implied volatility of the S&P 500® Index and is determined by reference to the prices of put and call options on the S&P 500® Index.

**Historical Performance of VIX and S&P 500® Index**
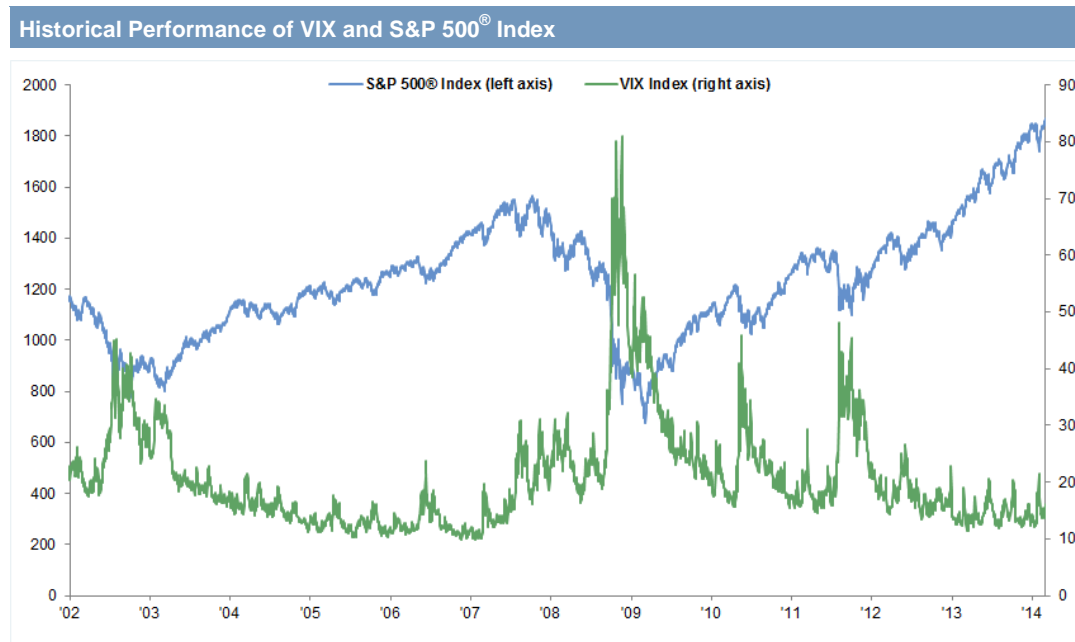


Source: J.P. Morgan, Bloomberg

**What is delta?**

Delta is the ratio comparing the change in the price of an underlying asset to the corresponding change in the price of a derivative of the underlying asset. When the derivative is an option, it measures the rate of change of option value in reaction to changes in the underlying asset's price.

**Why is the Index's short call position delta-hedged?**

A short call position will generate losses when the level or price of the underlying asset increases above the strike price of the call option. As a result, the seller of a call option is deemed to have a "directional view" on the underlying asset.

However, if an investor combines a short call position with a long position in the underlying asset equal to the delta of the applicable call option contract, the long position in the underlying asset will partially offset the losses from the short call position when the underlying asset increases above the strike price of the call option. An investor can thus mitigate the risk of directional exposure through offsetting long positions in the same underlying asset, regardless of whether the level or price of the underlying asset increases above the strike price of the call option. Combining a short call position in an underlying asset with a long position in the same underlying asset equal to the delta of the applicable call option contract is generally referred to as delta-hedging the call position. To be effective, the position in the underlying asset needs to be rebalanced as frequently as possible. The Index rebalances its delta hedge exposure, when activated, at the close of each Index calculation day. The Index's synthetic short call position is delta-hedged, when activated, through synthetic long investments in futures contracts on the S&P 500® Index.

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On each Index calculation day, the Index Calculation Agent determines the notional amount of those futures contracts that would partially mitigate the directional exposure created by the Index's short call position, using the Black-Scholes model for the pricing of options and delta-hedging options.  The Black-Scholes model is a well-known option pricing model, widely used for calculating the premium of a European-style option (*i.e.*, an option that can only be exercised at the end of its life).  Although the assumptions used by the Index as inputs into the model may be different from assumptions used by dealers in the industry, any dealer in the industry using the same assumptions as the Index does would calculate the same notional amount.

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