Underlying supplement no. 5a-I
To the prospectus dated November 7, 2014 and
the prospectus supplement dated November 7, 2014

Registration Statement No. 333-199966
Dated November 7, 2014
Rule 424(b)(2)

JPMORGAN CHASE & CO.

Notes Linked to the J.P. Morgan Volemont Strategy – U.S. Equity (Series 1) (USD)

JPMorgan Chase & Co. may, from time to time, offer and sell notes linked in whole or in part to the J.P. Morgan Volemont Strategy – U.S. Equity (Series 1) (USD) (the "**Index**"). This underlying supplement no. 5a-I describes the Index, the relationship between JPMorgan Chase & Co. and the sponsor of the Index and other relevant information. This underlying supplement no. 5a-I supplements the terms described in the accompanying product supplement, the prospectus supplement and the prospectus. A separate term sheet or pricing supplement, as the case may be, will describe terms that apply to specific issuances of the notes. We refer to these term sheets and pricing supplements generally as terms supplements. The accompanying product supplement, the relevant terms supplement or another relevant underlying supplement will describe any other index or reference asset to which the notes are linked. If the terms described in the relevant terms supplement are inconsistent with those described in this underlying supplement, any other accompanying underlying supplement, the accompanying product supplement, the prospectus supplement or the prospectus, the terms described in the relevant terms supplement will control. In addition, if this underlying supplement no. 5a-I and the accompanying product supplement or another relevant underlying supplement contain information relating to the same index to which the notes are linked, the information contained in the document with the most recent date will control.

The Index and its two underlying components, the variance component and the futures component, are subject to the deduction of a total of four types of fees and adjustments:

- *Index fee:* on each day, the calculation of the Index reflects the deduction of an adjustment factor of 0.75% per annum (the "index fee");
- *Index adjustment:* once each month, if the futures component is activated, the calculation of the Index will reflect a deduction, which we refer to as the "monthly rebalancing adjustment amount," that approximates VIX futures slippage costs (explained below) associated with adjusting the weight attributed to the futures component in the Index;
- *Futures component adjustment:* on each day, if the futures component is activated, the calculation of the futures component will reflect a deduction, which we refer to as the "daily rebalancing adjustment amount," that approximates VIX futures slippage costs (explained below) associated with rolling the VIX futures contracts underlying the futures component; and
- *Variance component adjustment:* on each relevant day, the strike level of any synthetic variance swap initiated under the variance component will reflect the level of the VIX Index on that day less a strike adjustment, which is intended to approximate transaction costs, including bid-ask spreads and slippage costs (explained below).

The monthly rebalancing adjustment amount is determined by applying a rebalancing adjustment factor of between 0.20% and 0.50% per month (depending on the level of the VIX Index) to the aggregate notional amount of each of the VIX futures contracts hypothetically traded as the result of a change in the weight of the futures component in connection with the monthly reweighting. The daily rebalancing adjustment amount is determined by applying a futures rebalancing adjustment factor of between 0.20% and 0.50% per day (depending on the level of the VIX Index) to both (a) the aggregate notional amount of each of the VIX futures contracts hypothetically traded that day and (b) the amount of the change, if any, in the level of the exposure to the synthetic long position in the relevant VIX futures contracts.

The monthly rebalancing adjustment amount and the daily rebalancing adjustment amount are intended to approximate the VIX futures slippage costs that would be experienced by a professional investor seeking to replicate the hypothetical portfolio contemplated by the Futures Component at prices that approximate the official settlement prices (which are not generally tradable) of the relevant VIX futures contracts. VIX futures slippage costs are costs that arise from deviations between the actual official settlement price of a VIX futures 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 a VIX futures contract.

The strike adjustment is intended to approximate transaction costs, including bid-ask spreads and slippage costs, that would be experienced by a professional investor seeking to replicate the payoff of the hypothetical portfolio contemplated by the Variance Component. The slippage costs that are approximated in the strike adjustment arise from the limited availability of appropriate transactions and SPX Index options that could be used in seeking to replicate the payoff of the hypothetical portfolio contemplated by the Variance Component. Unlike the index fee, the monthly rebalancing adjustment amount, the daily rebalancing adjustment amount and the strike adjustment are not per annum fees.

The level of the Index and the value of the notes will be adversely affected, perhaps significantly, if the performance of the underlying synthetic variance swaps and the contingent synthetic long position in the relevant VIX futures contracts is not sufficient to offset these adjustments and deductions. See "Risk Factors — The reported level of the Index will include the deduction of fees and adjustments" in this underlying supplement. For more information about these adjustments and deductions, see "The J.P. Morgan Volemont Strategy – U.S. Equity (Series 1) (USD) — Calculation and Publication of Index Levels" in this underlying supplement.

Investing in the notes involves a number of risks. See "Risk Factors" in the accompanying product supplement and "Risk Factors" beginning on page US-6.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of the notes or passed upon the accuracy or the adequacy of the relevant terms supplement, this underlying supplement no. 5a-I, any other accompanying underlying supplement, the accompanying product supplement, the prospectus supplement or the prospectus. Any representation to the contrary is a criminal offense.

The notes are not bank deposits, are not insured by the Federal Deposit Insurance Corporation or any other governmental agency and are not obligations of, or guaranteed by, a bank.

J.P.Morgan

November 7, 2014

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We have not authorized anyone to provide any information other than that contained or incorporated by reference in the relevant terms supplement, this underlying supplement no. 5a-I, any other accompanying underlying supplement, the accompanying product supplement, the prospectus supplement or the prospectus with respect to the notes offered by the relevant terms supplement and with respect to JPMorgan Chase & Co. We take no responsibility for, and can provide no assurance as to the reliability of, any other information that others may give you. The relevant terms supplement, together with this underlying supplement no. 5a-I, any other accompanying underlying supplement, the accompanying product supplement, the prospectus supplement and the prospectus, will contain the terms of the notes and will supersede all other prior or contemporaneous oral statements as well as any other written materials including preliminary or indicative pricing terms, correspondence, trade ideas, structures for implementation, sample structures, fact sheets, brochures or other educational materials of ours. The information in each of the relevant terms supplement, this underlying supplement no. 5a-I, any other accompanying underlying supplement, the accompanying product supplement, the prospectus supplement and the prospectus may only be accurate as of the date of that document.

The notes are not appropriate for all investors and involve important legal and tax consequences and investment risks that should be discussed with your professional advisers. You should be aware that the regulations of Financial Industry Regulatory Authority, Inc., or FINRA, and the laws of certain jurisdictions (including regulations and laws that require brokers to ensure that investments are suitable for their customers) may limit the availability of the notes. The relevant terms supplement, this underlying supplement no. 5a-I, any other accompanying underlying supplement, the accompanying product supplement, the prospectus supplement and the prospectus do not constitute an offer to sell or a solicitation of an offer to buy the notes in any circumstances in which that offer or solicitation is unlawful.

The notes are not futures contracts or swaps and are not regulated under the Commodity Exchange Act of 1936, as amended (the "Commodity Exchange Act"). The notes are offered pursuant to an exemption from regulation under the Commodity Exchange Act, commonly known as the hybrid instrument exemption, that is available to securities that have one or more payments indexed to the value, level or rate of one or more commodities, as set out in section 2(f) of that statute. Accordingly, you are not afforded any protection provided by the Commodity Exchange Act or any regulation promulgated by the Commodity Futures Trading Commission.

In the relevant terms supplement, this underlying supplement no. 5a-I, any other accompanying underlying supplement, the accompanying product supplement, the prospectus supplement and the prospectus, "we," "us" and "our" refer to JPMorgan Chase & Co., unless the context requires otherwise. To the extent applicable, the index described in this underlying supplement no. 5a-I is deemed to be one of the "Indices" and one of the "Volatility Indices" referred to in the accompanying product supplement.

SUPPLEMENTAL TERMS OF NOTES

The following supplemental terms of the notes supplement, and to the extent they are inconsistent, supersede, the description of the general terms of the debt securities set forth in the accompanying product supplement and under the headings "Description of Notes" in the prospectus supplement and "Description of Debt Securities" in the prospectus. Capitalized terms used but not defined in this underlying supplement no. 5a-I have the meanings assigned in the relevant terms supplement, this underlying supplement no. 5a-I, any other accompanying underlying supplement, the accompanying product supplement, the prospectus supplement and the prospectus.

General

The notes are unsecured and unsubordinated obligations of JPMorgan Chase & Co. linked in whole or in part to the J.P. Morgan Volemont Strategy – U.S. Equity (Series 1) (USD) (the "**Index**").

The Index is a synthetic, dynamic strategy that reflects returns from two underlying components:

- the "**Variance Component**," which provides exposure to synthetic sales of 30-calendar day variance swaps on the S&P 500® Index (the "**SPX Index**"); and
- the "**Futures Component**" which, when activated, reflects returns from maintaining a synthetic long position in futures contracts (each, a "**VIX futures contract**" and together, "**VIX futures contracts**") on the CBOE Volatility Index® (the "**VIX Index**").

This underlying supplement no. 5a-I describes the Index, the relationship between JPMorgan Chase & Co.and the sponsor of the Index and terms that will apply generally to notes linked in whole or in part to the Index and other relevant information. This underlying supplement no. 5a-I supplements the terms described in the accompanying product supplement and the prospectus supplement and the prospectus. A separate term sheet or pricing supplement, as the case may be, will describe terms that apply to specific issuances of the notes, including any changes to the terms specified below. We refer to these term sheets and pricing supplements generally as terms supplements. The accompanying product supplement, the relevant terms supplement or another accompanying underlying supplement will describe any other index or reference asset to which the notes are linked. If the terms described in the relevant terms supplement are inconsistent with those described in this underlying supplement, any other accompanying underlying supplement, the accompanying product supplement, the prospectus supplement or the prospectus, the terms described in the relevant terms supplement will control. In addition, if this underlying supplement no. 5a-I and the accompanying product supplement or another accompanying underlying supplement contain information relating to the Index, the information contained in the document with the most recent date will control.

The "**Index Calculation Agent**" means the entity appointed by the sponsor of the Index (the "**Index Sponsor**"), J.P. Morgan Securities plc ("**JPMS plc**"), to calculate and publish the official closing level of the Index, which is currently JPMS plc. See "The J.P. Morgan Volemont Strategy – U.S. Equity (Series 1) (USD)" below. JPMS plc is our affiliate and may have interests adverse to you. Please see "Risk Factors — Risks Relating to the Index Generally — 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 the notes."

Postponement of a Determination Date

Notes Linked Solely to the Index

Notwithstanding any contrary provision in the accompanying product supplement, for notes linked solely to the Index, the following provisions will apply. If a Determination Date is a Disrupted Day (as defined in the accompanying product supplement), the applicable Determination Date will be postponed to the immediately succeeding scheduled trading day (as defined below) that is not a Disrupted Day.

In no event, however, will any Determination Date be postponed to a date that is after the applicable Final Disrupted Determination Date (as defined in the accompanying product supplement). If a Determination Date is or has been postponed to the applicable Final Disrupted Determination Date and that day is a Disrupted Day, the Note Calculation Agent will determine the closing level of the Index for that Determination Date on the Final Disrupted Determination Date in accordance with the formula for and method of calculating the closing level of the Index last in effect prior to the commencement of the market disruption event (or prior to the non-trading day), using:

(a) the closing level of the SPX Index (or, if an SPX Disruption Event or a non-trading day that affected the SPX Index has occurred, its good faith estimate of the closing level of the SPX Index that would have prevailed but for that SPX Disruption Event or non-trading day) on the applicable Final Disrupted Determination Date;

(b) the closing level of the VIX Index (or, if a VIX Index Disruption Event or a non-trading day that affected the VIX Index has occurred, its good faith estimate of the closing level of the VIX Index that would have prevailed but for that VIX Index Disruption Event or non-trading day) on the applicable Final Disrupted Determination Date; and

(c) the official settlement price (or, if a VIX Futures Disruption Event or a non-trading day that affected any relevant VIX futures contracts has occurred, its good faith estimate of the official settlement price that would have prevailed but for that VIX Futures Disruption Event or non-trading day) on the applicable Final Disrupted Determination Date of each VIX futures contract most recently constituting the Index and any VIX futures contract required to roll any expiring futures contract in accordance with the method of calculating the Index.

Notwithstanding any contrary definition in the accompanying product supplement, a "**scheduled trading day**" is, unless otherwise specified in the relevant terms supplement, a day, as determined by the Note Calculation Agent, on which each of the following exchanges is scheduled to be open for trading for their respective regular trading sessions: (a) the primary exchange or market of trading for any VIX futures contract then included in the Index or any relevant successor index, as applicable, (b) the primary exchange or market of trading for securities underlying the SPX Index and (c) the exchanges on which futures or options contracts related to the SPX Index are traded.

Notwithstanding any contrary definition in the accompanying product supplement, a "**trading day**" is, unless otherwise specified in the relevant terms supplement, a day, as determined by the Note Calculation Agent, on which trading is generally conducted on (a) the primary exchange or market of trading for any VIX futures contract then included in the Index or any relevant successor index, as applicable, (b) the primary exchange or market of trading for securities underlying the SPX Index and (c) the exchanges on which futures or options contracts related to the SPX Index are traded.

Notes Linked to the Index and Other Reference assets

If the notes are linked to the Index and other reference assets, the provisions relating to postponement of a Determination Date as set forth in the accompanying product supplement will apply, except that if a Determination Date is or has been postponed to the applicable Final Disrupted Determination Date and, on that day, the closing level of the Index has not been established in accordance with the postponement provisions of the accompanying product supplement that apply prior to the applicable Final Disrupted Determination Date, the closing level of the Index for that Determination Date will be determined by the Note Calculation Agent on the applicable Final Disrupted Determination Date in accordance with the formula for and method of calculating the closing level of the Index last in effect prior to the commencement of the market disruption event (or prior to the non-trading day), using:

(a) the closing level of the SPX Index (or, if an SPX Disruption Event or a non-trading day that affected the SPX Index has occurred, its good faith estimate of the closing level of the SPX Index that would have prevailed but for that SPX Disruption Event or non-trading day) on the applicable Final Disrupted Determination Date;

(b) the closing level of the VIX Index (or, if a VIX Index Disruption Event or a non-trading day that affected the VIX Index has occurred, its good faith estimate of the closing level of the VIX Index that would have prevailed but for that VIX Index Disruption Event or non-trading day) on the applicable Final Disrupted Determination Date; and

(c) the official settlement price (or, if a VIX Futures Disruption Event or a non-trading day that affected any relevant VIX futures contracts has occurred, its good faith estimate of the official settlement price that would have prevailed but for that VIX Futures Disruption Event or non-trading day) on the applicable Final Disrupted Determination Date of each VIX futures contract most recently constituting the Index and any VIX futures contract required to roll any expiring futures contract in accordance with the method of calculating the Index.

Market Disruption Events

Notwithstanding any contrary provision in the accompanying product supplement, the following provisions will apply to notes linked in whole or in part to the Index. With respect to the Index or any relevant successor index, a "**market disruption event**," unless otherwise specified in the relevant terms supplement, means:

- the occurrence of an SPX Disruption Event;
- the occurrence of a VIX Index Disruption Event;
- the occurrence of a VIX Futures Disruption Event; or
- the failure of the sponsor or calculation agent of the Index (or that successor index) to calculate and publish the official closing level of the Index,

in each case as determined by the Note Calculation Agent in its sole discretion; and

- a determination by the Note Calculation Agent in its sole discretion that the applicable event described above materially interfered with our ability or the ability of any of our affiliates to adjust or unwind all or a material portion of any hedge with respect to the notes.

An "**SPX Disruption Event**," unless otherwise specified in the relevant terms supplement, means:

- the occurrence or existence of a suspension, absence or material limitation of trading of equity securities then constituting 20% or more of the level of the SPX Index on the relevant exchanges for those equity securities for more than two hours of trading during, or during the one-hour period preceding the close of, the principal trading session on the relevant exchange;
- a breakdown or failure in the price and trade reporting systems of any relevant exchange as a result of which the reported trading prices for equity securities then constituting 20% or more of the level of the SPX Index during the one hour preceding the close of the principal trading session on that relevant exchange are materially inaccurate;
- the occurrence or existence of a suspension, absence or material limitation of trading on the primary exchange or market for trading in futures or options contracts related to the SPX Index for more than two hours of trading during, or during the one-hour period preceding the close of, the principal trading session on that exchange or market; or
- a decision to permanently discontinue trading in those related futures or options contracts,

in each case as determined by the Note Calculation Agent in its sole discretion.

For purposes of determining whether an SPX Disruption Event exists at any time, if trading in an equity security included in the SPX Index is materially suspended or materially limited at that time, then the relevant percentage contribution of that equity security to the level of the SPX Index will be based on a comparison of:

- the portion of the level of the SPX Index attributable to that equity security relative to
- the overall level of the SPX Index,

in each case immediately before that suspension or limitation.

For purposes of determining whether an SPX Disruption Event has occurred, unless otherwise specified in the relevant terms supplement:

- a limitation on the hours or number of days of trading will not constitute a market disruption event if it results from an announced change in the regular business hours of the relevant exchange, or the primary exchange or market for trading in futures or options contracts related to the SPX Index;
- limitations pursuant to the rules of any relevant exchange similar to New York Stock Exchange ("**NYSE**") Rule 80B (or any applicable rule or regulation enacted or promulgated by any other self-regulatory organization or any government agency of scope similar to NYSE Rule 80B as determined by the Note Calculation Agent) on trading during significant market fluctuations will constitute a suspension, absence or material limitation of trading;
- a suspension of trading in futures or options contracts on the SPX Index by the primary exchange or market for trading in those contracts by reason of:
  - a price change exceeding limits set by that exchange or market,
  - an imbalance of orders relating to those contracts, or
  - a disparity in bid and ask quotes relating to those contracts

  will, in each case, constitute a suspension, absence or material limitation of trading in futures or options contracts related to the SPX Index; and
- a "suspension, absence or material limitation of trading" on any relevant exchange or on the primary exchange or market on which futures or options contracts related to the SPX Index are traded will not include any time when that exchange or market is itself closed for trading under ordinary circumstances.

Unless otherwise specified in the relevant terms supplement, "**relevant exchange**" means, with respect to the SPX Index, the primary exchange or market of trading for any equity security (or any combination thereof) then included in the SPX Index.

A "**VIX Index Disruption Event**," unless otherwise specified in the relevant terms supplement, means the failure by the sponsor of the VIX Index to calculate and publish the level of the VIX Index.

A "**VIX Futures Disruption Event**," unless otherwise specified in the relevant terms supplement, means:

- the termination or suspension of, or material limitation or disruption in the trading of any relevant VIX futures contract on the relevant exchange or any options contracts relating to the Index on the primary exchange or market for any such options contracts, which will not include any time when the relevant exchange or that primary exchange or market, as applicable, is itself closed for trading under ordinary circumstances;

- the price at any time of any relevant VIX futures contract has increased or decreased by an amount equal to the maximum permitted price change set by the relevant exchange;
- a failure by the relevant exchange to calculate and publish the official settlement price or final settlement value, as applicable, of any relevant VIX futures contract on any day upon which the official settlement price or final settlement value, as applicable, of that futures contract is scheduled to be calculated and published by the relevant exchange;
- any event that disrupts or impairs the ability of market participants generally to effect transactions in or obtain market values for any relevant VIX futures contract;
- a breakdown or failure in the price and trade reporting systems of the primary exchange or market of any options contracts relating to the Index as a result of which the reported trading prices for those options contracts are materially inaccurate during the last one-hour period preceding the close of the principal trading session on that primary exchange or market;
- the closure by the relevant exchange on any day on which the relevant exchange is open for trading during its regular trading session prior to its scheduled closing time, unless such earlier closing time is announced by the relevant exchange at least one hour prior to the actual closing time for the regular trading session on the relevant exchange;
- the occurrence of a material change in the formula for or the method of calculating the official settlement price of any relevant VIX futures contract; or
- the occurrence of a material change in the content, composition or constitution of any relevant VIX futures contract,

in each case as determined by the Note Calculation Agent in its sole discretion.

For purposes of determining whether a VIX Futures Disruption Event has occurred, unless otherwise specified in the relevant terms supplement, a limitation on the hours or number of days of trading will not constitute a market disruption event if it results from an announced change in the regular business hours of the relevant exchange.

Unless otherwise specified in the relevant terms supplement, "**relevant exchange**" means, with respect to the relevant VIX futures contracts, the primary exchange or market of trading for any VIX futures contract then included in the Index or any relevant successor index, if applicable.

Discontinuation of the Index; Alteration of Method of Calculation

The provisions relating to the discontinuation of an index as set forth in the accompanying product supplement will apply, except that if the Note Calculation Agent is to determine the closing level of the Index or any successor index for any Determination Date because no successor index for the Index is available at that time, or the Note Calculation Agent has previously selected a successor index for that Index and publication of that successor index is discontinued prior to, and that discontinuation is continuing on, that Determination Date or other relevant date, then the closing level of the Index will be computed by the Note Calculation Agent in accordance with the formula for and method of calculating the Index or successor index, as applicable, last in effect prior to that discontinuation, using the official closing levels of the SPX Index and the VIX Index on that date and the official settlement price at the close of the principal trading session on that date of each VIX futures contract most recently constituting the Index and any VIX futures contract required to roll any expiring futures contract in accordance with the method of calculating the Index.

RISK FACTORS

Your investment in the notes will involve certain risks. Investing in the notes is not equivalent to taking a long position in the Index or any of its component synthetic variance swaps or VIX futures contracts. In addition, your investment in the notes entails other risks not associated with an investment in conventional debt securities. ***You should consider carefully the following discussion of risks, as well as the discussion of risks included in the relevant terms supplement, the accompanying product supplement and any accompanying underlying supplement, before you decide that an investment in the notes is suitable for you.***

Risks Relating to the Index Generally

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

We, JPMorgan Chase & Co., are the issuer of the notes, JPMS plc, one of our affiliates, is the Index Sponsor and the Index Calculation Agent and JPMS, another affiliate of ours, is the Note Calculation Agent and an agent of the offering of the notes. JPMS plc, as Index Calculation Agent, will determine whether there has been a market disruption event with respect to the Index. JPMS, as Note Calculation Agent, will determine, among other things, whether there has been a market disruption event with respect to the notes and any payments on the notes. In the event of any such market disruption event, JPMS plc may use an alternate method to calculate the Index, and JPMS may postpone any valuation date or use an alternate method to calculate the closing level of the Index on that valuation date. JPMS, as an agent of the offering of the notes, will receive the aggregate profits generated from the deduction of the index fee of 0.75% per annum from the level of the Index to cover ongoing payments related to the distribution of the notes and as a structuring fee for developing the notes. While we and our affiliates will act in good faith in making all determinations with respect to the notes and the Index, there can be no assurance that any determinations made by JPMorgan Chase & Co., JPMS plc or JPMS in these various capacities will not affect the value of the notes or the level of the Index. Because determinations made by JPMS plc as the Index Sponsor and the Index Calculation Agent and JPMS as the Note Calculation Agent may affect any amount payable on the notes, 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 notes, 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 the notes.

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, including but not limited to the determination of the levels to be used in the event of market disruptions that affect its ability to calculate and publish the Index and the interpretation of the rules governing the Index. In addition, JPMS plc has discretion, acting in good faith and in a commercially reasonable manner, to include, exclude or substitute any VIX futures contract or the VIX Index on a specific date of its choosing. Unlike other indices, the maintenance of the Index is not governed by an independent committee. Although judgments, policies and determinations concerning the Index are made by JPMS plc, JPMorgan Chase & Co., as the parent company of JPMS plc, ultimately controls JPMS plc.

Although JPMS plc will make all determinations and take all action in relation to the Index acting in good faith, it should be noted that such discretion could have an impact, positive or negative, on the closing levels of the Index. JPMS plc is under no obligation to consider your interests as a holder of the

notes in taking any actions that might affect the value of your notes. Furthermore, the inclusion of the VIX futures contracts in the Index is not an investment recommendation by us or JPMS plc of the VIX futures contracts or the VIX Index.

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

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, the Variance Component and the Futures Component are subject to the deduction of a total of four types of fees and adjustments:

- *Index fee:* on each day, the calculation of the Index reflects the deduction of an adjustment factor of 0.75% per annum (the "index fee");
- *Index adjustment:* once each month, if the Futures Component is activated, the calculation of the Index will reflect a deduction, which we refer to as the "monthly rebalancing adjustment amount," that approximates VIX futures slippage costs associated with adjusting the weight attributed to the Futures Component in the Index;
- *Futures Component adjustment:* on each day, if the Futures Component is activated, the calculation of the Futures Component will reflect a deduction, which we refer to as the "daily rebalancing adjustment amount," that approximates VIX futures slippage costs associated with rolling the VIX futures contracts underlying the Futures Component; and
- *Variance Component adjustment:* on each relevant day, the strike level of any synthetic variance swap initiated under the Variance Component will reflect the level of the VIX Index on that day less a strike adjustment, which is intended to approximate transaction costs, including bid-ask spreads and slippage costs.

The monthly rebalancing adjustment amount is determined by applying a rebalancing adjustment factor of between 0.20% and 0.50% per month (depending on the level of the VIX Index) to the aggregate notional amount of each of the VIX futures contracts hypothetically traded as the result of a change in the weight of the Futures Component in connection with the monthly reweighting. The daily rebalancing adjustment amount is determined by applying a futures rebalancing adjustment factor of between 0.20% and 0.50% per day (depending on the level of the VIX Index) to both (a) the aggregate notional amount of each of the VIX futures contracts hypothetically traded that day and (b) the amount of the change, if any, in the level of the exposure to the synthetic long position in the relevant VIX futures contracts.

For additional information, see "Risks Relating to the Variance Component — The determination of the strike levels as part of the calculation of the Variance Component includes a downward adjustment that will adversely affect the level of the Variance Component" and "Risks Relating to the Futures Component — The daily rebalancing adjustment amount is likely to have a substantial adverse effect on the level of the Futures Component over time" below.

The Index may not be successful, and may not outperform any alternative strategy that might be employed in respect of the synthetic variance swaps and/or the VIX futures contracts underlying the Index.

The Index follows a synthetic rules-based proprietary strategy that operates on the basis of pre-determined rules. Accordingly, you should determine whether those rules as described under "The J.P. Morgan Volemont Strategy – U.S. Equity (Series 1) (USD)" are appropriate in light of your individual circumstances and investment objectives. 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 in respect of the synthetic variance swaps and/or the VIX futures contracts underlying the Index.

Notes that provide exposure to equity volatility are not suitable for all investors. You should actively manage your investment in the notes.

Notes that provide exposure to equity volatility are not suitable for all investors. The notes reflect the performance of the Index, which is dependent on the returns of synthetic variance swaps on the SPX Index and the price of the VIX futures contracts. As a consequence, investors in the notes should understand that their investment is exposed to the performance of the synthetic variance swaps and the synthetic positions in VIX futures contracts, which can be volatile and move dramatically over short periods of time. Because of the large and sudden value movements associated with synthetic variance swaps and VIX futures contracts, the notes should be purchased only by sophisticated investors who understand risks associated with investments linked to 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 the notes. Investors should regularly monitor their investment in the notes 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 the notes.

The performance of the Index is dependent on the performance of any synthetic variance swaps and any synthetic long position in VIX futures contracts included in the Index. As a consequence, investors in investment products linked to the Index should understand that their investment is exposed to the performance of synthetic variance swaps and synthetic positions in VIX futures contracts. The values of the synthetic variance swaps and levels of the 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 be subject to substantial negative returns. Positive returns on the Index may therefore be reduced or eliminated entirely due to movements in market parameters.

The hypothetical back-tested performance of the Index has been highly volatile during periods of large movement in the level of the SPX Index and during periods when the Futures Component has been activated. Although past performance is not indicative of future performance, it is likely that the Index will continue to be highly volatile during periods in the future, with the potential for sudden, significant fluctuations in the daily performance of the Index. Accordingly, the notes are not designed for investors who are unwilling to be exposed to potential significant fluctuations in the level of the Index and, therefore, in the value of the notes.

The Index's weighting methodology may not be successful.

Assuming that the Variance Component had sold synthetic variance swaps daily throughout the immediately preceding month, the weight of the Futures Component is adjusted once each month using a methodology that is intended to result in the level of the Futures Component, if activated, being approximately twice as sensitive to a change in the volatility of the SPX Index as the level of the Variance Component. Accordingly, when the Futures Component is activated, the positive sensitivity to the volatility of the SPX Index provided by the Futures Component is expected to more than offset any negative sensitivity to the volatility of the SPX Index provided by the Variance Component, so that the Index as a whole will be expected to reflect positive sensitivity to the volatility of the SPX Index.

If the Variance Component had not consistently sold synthetic variance swaps throughout the immediately preceding month, the positive sensitivity to volatility of the SPX Index provided by the Futures Component, if activated, would be more than twice the negative sensitivity to the volatility of the SPX Index provided by the Variance Component. In addition, if the Variance Component had not sold any synthetic variance swaps throughout the immediately preceding month, the Variance Component would not provide any exposure to the volatility of the SPX Index. Under these circumstances, the only exposure to the volatility of the SPX Index provided by the Index as a whole would be the positive sensitivity to the volatility of the SPX Index provided by the Futures Component, if activated.

No assurance can be given that this weighting methodology will be successful or that the Index will provide the intended sensitive to volatility during any market conditions. See "The J.P. Morgan Volemont Strategy – U.S. Equity (Series 1) (USD) — General" for additional information.

The Index comprises synthetic assets.

The exposure to variance swaps and VIX futures contracts 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 synthetic variance swaps or the VIX futures contracts underlying the Index.

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

The Index was established on April 30, 2013 and therefore has a limited operating history. Any back-testing or similar analysis performed by any person in respect of 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.

Concentration risks associated with the Index may adversely affect the value of your notes.

The Index provides synthetic exposure to 30-calendar day synthetic variance swaps on the SPX Index and VIX futures contracts with a maturity of between two and three months and thus is less diversified than other funds, investment portfolios or indices investing in or tracking a broader range of products and, therefore, could experience greater volatility. You should be aware that other indices may be more diversified than the Index in terms of both the number and variety of synthetic variance swaps and/or VIX futures contracts. You will not benefit, with respect to the notes, from any of the advantages of a diversified investment and will bear the risks of a highly concentrated investment.

The VIX futures contracts composing the Index, the SPX Index or the VIX Index may be removed or replaced in certain extraordinary events.

Following the occurrence of certain extraordinary events with respect to the VIX futures contracts, the SPX Index or the VIX Index, as described under "The J.P. Morgan Volemont Strategy – U.S. Equity (Series 1) (USD) — Extraordinary Events," the affected futures contract may be replaced by a substitute futures contract, the SPX Index may be replaced by a successor index or the VIX Index may be replaced by a successor index, as applicable. You should realize that the replacement or substitution of a futures contract, the SPX Index or the VIX Index may affect the performance of the Index, and therefore, the return on the notes, as the replacement futures contract or index may perform significantly better or worse than the affected futures contract or the SPX Index or the VIX Index, as applicable.

Risks Relating to the Variance Component

The determination of the strike levels as part of the calculation of the Variance Component includes a downward adjustment that will adversely affect the level of the Variance Component.

On each relevant day, the Index Calculation Agent will determine the strike level of the synthetic variance swap, if any, that is to be initiated on that day. The strike level will reflect the level of the VIX Index on that day less a strike adjustment. The strike adjustment is intended to approximate transaction costs, including bid-ask spreads and slippage costs, that would be experienced by a professional investor seeking to replicate the payoff of the hypothetical portfolio contemplated by the Variance Component. The slippage costs that are approximated in the strike adjustment arise from the limited availability of appropriate transactions and SPX Index options that could be used in seeking to replicate the payoff of the hypothetical portfolio contemplated by the Variance Component.

The strike adjustment generally increases as the level of the VIX Index increases, subject to a minimum of 1.1 and a maximum of 2.6. Because of the strike adjustment, the realized volatility of the SPX Index will need to be lower than would have been the case if the strike adjustment were not applied in order for a synthetic variance swap to generate a positive return or to avoid generating a loss. Accordingly, the strike adjustment will adversely affect the level of the Variance Component. For an illustration of the calculation of the strike adjustment, see "The J.P. Morgan Volemont Strategy – U.S. Equity (Series 1) (USD) — Calculation and Publication of Index Levels — Calculation of Variance Component Levels — Synthetic Variance Swap Initiation — Step 2: Determine the Strike Level of the new Synthetic Variance Swap" in this underlying supplement.

An increase in the realized volatility of the SPX Index may have a substantial adverse effect on the level of the Variance Component.

The Variance Component seeks to capitalize on the long-term trend of the realized volatility of a broad market equity index tending to be less than the implied volatility of that equity index by synthetically selling 30-calendar day variance swaps on the SPX Index on a daily basis when certain market conditions are present. In a short variance swap position, parties arrange to exchange at a specified time (*e.g.*, in one month) a pre-agreed notional amount multiplied by the difference between the square of a strike level, which is determined by reference to implied volatility, and the square of the realized volatility of an underlying asset (*i.e.*, the variance of that underlying asset). Selling a variance swap means that an investor will benefit when realized volatility is lower than the predetermined strike level. However, if realized volatility is higher than the strike level, this will result in a loss to the seller of a variance swap.

Because the seller of a variance swap on the SPX Index will generally receive a positive return when the implied volatility of the SPX Index is consistently greater than the realized volatility of the SPX Index, subject to transaction costs, the Variance Component synthetically sells variance swaps on a daily basis only on days when the implied volatility of the SPX Index is greater than the realized volatility of the SPX Index. The implied volatility of the SPX Index is determined for these purposes by averaging the levels of the VIX Index over a preceding 20-day period and the realized volatility of the SPX Index is determined for these purposes based on the levels of the SPX Index over a preceding 5-day period. If, however, the realized volatility of the SPX Index increases during the 30-calendar day term of a synthetic variance swap, that synthetic variance swap may generate a loss, which may be substantial and which will adversely affect the level of the Variance Component.

Flat realized volatility of the SPX Index may have an adverse effect on the level of the Variance Component due to the strike adjustment.

As described in the immediately preceding risk factor, the Variance Component synthetically sells variance swaps on a daily basis only on days when the implied volatility of the SPX Index is greater than the realized volatility of the SPX Index. If the implied volatility of the SPX Index, determined by reference to levels of the VIX Index, is greater than the realized volatility of the SPX Index, the Variance Component will synthetically sell a variance swap with a strike level determined by reference to the level of the VIX Index, subject to a deduction for the strike adjustment. As a result, if realized volatility is not far below the implied volatility and the realized volatility remains unchanged over the term of the variance swap, the short position in that synthetic variance swap may generate a loss.

For example, assume that the Index Calculation Agent determines that a synthetic variance swap is to be sold based on an implied volatility of the SPX Index of 25 and a realized volatility of 24 and that the level of the VIX Index used to determine the strike level of that synthetic variance swap is also 25. Under these circumstances, the strike adjustment will be 1.35 and the strike level (expressed in volatility percentage points) will be 23.65. If the realized volatility remains at 24 over the term of the synthetic variance swap, which is above the strike level of 23.65, that short synthetic variance swap will generate a loss that will adversely affect the level of the Variance Component even though the realized volatility remains below the implied volatility.

The methodology for determining whether to sell synthetic variance swaps may not be successful.

The Variance Component synthetically sells variance swaps on a daily basis only on days when the implied volatility of the SPX Index is greater than the realized volatility of the SPX Index. The implied volatility of the SPX Index is determined for these purposes by averaging the levels of the VIX Index over a preceding 20-day period and the realized volatility of the SPX Index is determined for these purposes based on the levels of the SPX Index over a preceding 5-day period. No assurance can be given that this methodology for determining whether to sell synthetic variance swaps will be successful or that the Index will provide short exposure to synthetic variance swaps in a manner that will cause the Variance Component to generate a positive return. For additional information, see "— An increase in the realized volatility of the SPX Index may have a substantial adverse effect on the level of the Variance Component" and "— The Variance Component may be uninvested at any time" below.

The returns on the synthetic variance swaps underlying the Variance Component are capped.

Because the return on the synthetic variance swaps underlying the Variance Component reflects the difference between the implied volatility of the SPX Index and the realized volatility of the SPX Index, the return on those synthetic variance swaps is capped because the realized volatility of the SPX Index cannot fall below zero. Accordingly, the amount of appreciation of the Variance Component is limited.

The returns on the synthetic variance swaps underlying the Variance Component are non-linear, which may have an adverse effect on the level of the Variance Component.

A variance swap is an instrument designed to give investors exposure to the variance of an underlying asset. Variance is the square of volatility and is used in some products, including the synthetic variance swaps underlying the Variance Component, in place of volatility due to mathematical properties that make it more convenient to value and hedge those products. For example, the mark-to-market value of a variance swap can be determined as the time-weighted average of any realized variance and the implied variance for the remaining term of that variance swap. One result of referencing variance rather than volatility is that the payout on a variance swap is non-linear.

Because the payoff on a variance swap is non-linear, for the seller of a variance swap, (a) gains on the variance swap increase at a decreasing rate as volatility declines and (b) losses on the variance swap increase at an accelerating rate as volatility increases. As a result, gains generated by large declines in the realized volatility of the SPX Index may be more than offset by losses generated by large increases in the realized volatility of the SPX Index. For an illustration of the payoff on a variance swap, see "The J.P. Morgan Volemont Strategy – U.S. Equity (Series 1) (USD) — The Variance Component" in this underlying supplement. These effects will result in the returns of the short positions in synthetic variance swaps underlying the Variance Component being less than they otherwise would be if the payouts on variance swaps were linear, which may have an adverse effect on the level of the Variance Component.

The Variance Component may be uninvested at any time.

The Variance Component synthetically sells variance swaps on a daily basis only on days when the implied volatility of the SPX Index is greater than the realized volatility of the SPX Index. The implied volatility of the SPX Index is determined for these purposes by averaging the levels of the VIX Index over a preceding 20-day period and the realized volatility of the SPX Index is determined for these purposes based on the levels of the SPX Index over a preceding 5-day period. Accordingly, during periods when the implied volatility of the SPX Index is less than or equal to the realized volatility of the SPX Index, the Variance Component will not synthetically sell variance swaps, but the Variance Component will continue to provide exposure to any existing synthetic variance swaps until they mature. If the implied volatility of the SPX Index is less than or equal to the realized volatility of the SPX Index for a sustained period, the Variance Component will not provide exposure to synthetic variance swaps, as existing synthetic variance swaps will have matured, and the level of the Variance Component will remain constant. Under these circumstances, the index fee will continue to be deducted from the level of the Index, even though there is no exposure to synthetic variance swaps.

Daily sales of the synthetic variance swaps underlying the Variance Component may affect trading in the market for listed options on the SPX Index.

The daily sale of the synthetic variance swaps underlying the Variance Component, when the conditions for those sales are satisfied, may cause us, our affiliates or third parties with whom we transact to adjust our or their hedges accordingly, and to do so frequently during periods of high volatility in the U.S. equity market. The trading activity associated with these hedging transactions may affect the market for listed options on the SPX Index and, in turn, adversely affect the levels of the Variance Component and the Futures Component.

During low volatility market conditions, the Variance Component will provide decreased exposure to short positions in any synthetic variance swaps.

During low volatility market conditions (as measured by the level of the VIX Index), any new synthetic variance swaps sold by the Variance Component will be synthetically sold at a notional amount that has been scaled down at a rate that increases as volatility decreases. Accordingly, under these circumstances, the Variance Component will provide decreased exposure to short positions in any synthetic variance swaps. Under these circumstances, if the realized volatility of the SPX Index is less than the strike level of a synthetic variance swap, the level of the Variance Component will not increase as much as it would if the notional amount of that synthetic variance swap had not been scaled down.

Mark-to-market values of the existing short positions in synthetic variance swaps will have direct and indirect effects on the level of the Index.

In general, the level of the Variance Component on any day references the mark-to-market values of the existing short positions in synthetic variance swaps outstanding on that day. The mark-to-market value of a synthetic variance swap reflects the realized volatility of the SPX Index on each day that has elapsed since that synthetic variance swap was initiated and the implied volatility with respect to the period including each day remaining until that synthetic variance swap matures. Accordingly, the mark-to-market values of the existing short positions in synthetic variance swaps will have a direct effect on the level of the Variance Component. In addition, because the notional of any new synthetic variance swap is determined, in part, by reference to the level of the Variance Component, the mark-to-market values of the existing short positions in synthetic variance swaps will also have an indirect effect on the level of the Variance Component. Because of these direct and indirect effects on the level of the Variance Component, the mark-to-market value of a synthetic variance swap, which is only an estimate of the value of that synthetic variance swap, may have an adverse effect on the level of the Variance Component.

Risks Relating to the Futures Component

The daily rebalancing adjustment amount is likely to have a substantial adverse effect on the level of the Futures Component over time.

The futures rebalancing adjustment factor, which is used to calculate the daily rebalancing adjustment amount, is not a per annum fee. The daily rebalancing adjustment amount is determined if the Futures Component is activated by applying a futures rebalancing adjustment factor of between 0.20% and 0.50% per day (depending on the level of the VIX Index) to both (a) the aggregate notional amount of each of the VIX futures contracts hypothetically traded that day and (b) the amount of the change, if any, in the level of the exposure to the synthetic long position in VIX futures contracts, which we refer to as the Long Return Exposure. The daily rebalancing adjustment amount is deducted from the level of the Futures Component on each Futures Component Calculation Day (as defined in "The J.P. Morgan Volemont Strategy – U.S. Equity (Series 1) (USD)" in this underlying supplement) if the synthetic long position is activated on that Futures Component Calculation Day and/or on the immediately preceding Futures Component Calculation Day. The monthly rebalancing adjustment amount is similar to the daily rebalancing adjustment amount, but is deducted from the level of the

Index once each month. For additional information about the monthly rebalancing adjustment amount, see "Risks Relating to the Index Generally — The reported level of the Index will include the deduction of fees and adjustments" above.

The daily rebalancing adjustment amount is intended to approximate the VIX futures slippage costs that would be experienced by a professional investor seeking to replicate the hypothetical portfolio contemplated by the Futures Component at prices that approximate the official settlement prices (which are not generally tradable) of the relevant VIX futures contracts. VIX futures slippage costs are costs that arise from deviations between the actual official settlement price of a VIX futures 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 a VIX futures contract. However, the actual VIX futures slippage costs that would be incurred if a professional investor were to seek to replicate such a portfolio may be higher or lower than the daily rebalancing adjustment amount used in the calculation of the Futures Component.

For example, assuming that (a) the level of the VIX Index is equal to or less than 35 (which corresponds to the lowest rate of 0.20% per day for the rebalancing adjustment factor) and (b) the synthetic long position in VIX futures contracts is fully activated, the performance of the Futures Component would be lower by approximately 0.40% over a one-month roll period (or lower by approximately 4.80% over the course of a year) as compared to the performance of a hypothetical alternative index based solely on the official settlement prices of the VIX futures contracts without accounting for a deduction of a daily rebalancing adjustment amount. All else being equal, the level of the Futures Component will decline unless the performance of the synthetic positions in VIX futures contracts included in the Futures Component, based on their official settlement prices, is sufficient to offset the negative effect of the daily rebalancing adjustment amount.

When the level of the VIX Index is greater than 35, the rebalancing adjustment factor will be greater than 0.20% and can be up to 0.50% on any given day. In this case, the impact on the Futures Component performance due to the daily rebalancing adjustment amount will be substantially greater. For example, if the level of the VIX Index is greater than 70 (which corresponds to the highest rate of 0.50% per day for the rebalancing adjustment factor) and the synthetic long position is fully activated, the performance of the Futures Component would be lower by approximately 1.00% over a one-month roll period as compared to the performance of a hypothetical alternative index based solely on the official settlement prices of the VIX futures contracts without accounting for a deduction of a daily rebalancing adjustment amount. However, the VIX Index historically has not remained at such elevated levels for more than a few days, weeks or months at a time. Nevertheless, we cannot provide any assurance that the VIX Index will consistently remain at or below 35 (which corresponds to the lowest rate of 0.20% per day for the rebalancing adjustment factor) over the term of the notes.

In addition, on days on which the amount of the Long Return Exposure is adjusted (which adjustments occur in increments of 25% per day), in determining the daily rebalancing adjustment amount, the rebalancing adjustment factor of between 0.20% and 0.50% per day is effectively applied to an amount of up to approximately twice the change in the Long Return Exposure. Therefore, a change in the Long Return Exposure will also result in a substantial increase in the daily rebalancing adjustment amount.

While the amount of the daily rebalancing adjustment amount cannot be predicted with certainty, the daily rebalancing adjustment amount is likely to have a substantial adverse effect on the level of the Futures Component over time. For more information about the daily rebalancing adjustment amount, see "The J.P. Morgan Volemont Strategy – U.S. Equity (Series 1) (USD) — Calculation and Publication of Index Levels — Calculation of Futures Component Levels — The Daily Rebalancing Adjustment Amount" in this underlying supplement.

The level of the Futures Component is expected to increase only in limited market conditions and is expected to decrease in other market conditions, which may adversely affect the level of the Index.

The performance of a rolling excess return strategy, like the Futures Component when the synthetic long position in VIX futures contracts is activated, is affected by the price return of the futures contracts underlying the Futures Component and the roll return from rolling those futures contracts over time. See "— The Futures Component is an excess return strategy, and not a total return strategy." In addition, when the synthetic long position in VIX futures contracts is activated, the Futures Component rolls its futures contracts throughout each monthly period in order to keep the weighted average maturity of the relevant futures contracts underlying the synthetic long position to approximately two months. Under this rolling process, when the synthetic long position in VIX futures contracts is activated, after initially establishing a synthetic long position in the second-month VIX futures contract (*i.e.*, synthetically buying the second-month VIX futures contract) at the beginning of each monthly period, the Futures Component will synthetically sell a portion of the second-month VIX futures contract and buy a portion of the third-month VIX futures contract on each Futures Component Calculation Day during the monthly period. Furthermore, when activating the synthetic long position, the Futures Component does so progressively in 25% increments on each subsequent Futures Component Calculation Day (so long as the conditions for activating the synthetic long position continue to hold true on that day) until it is fully activated (*i.e.*, until the Long Return Exposure is equal to 100%); however, the synthetic long position may not be fully activated or may not be activated at all.

When the market for VIX futures contracts is in "contango," meaning that the price of a VIX futures contract with a later expiration is higher than the price of a VIX futures contract with an earlier expiration, excluding other considerations, the price of VIX futures contracts will decrease as the contracts move nearer to maturity. Under these market conditions, the price return of each VIX futures contract that composes the synthetic long position, if activated, generally will be negative (as the price each day will be less than the price observed the day before), and the roll return generally will also be negative (as the Futures Component will be synthetically selling a portion of the second-month VIX futures contract at a price that is lower than the price it pays to synthetically buy a portion of the third-month VIX futures contract). Therefore, under these market conditions, generally, we expect that returns from the synthetic long position, if activated, will be negative and, therefore, the level of the Futures Component will decline. We should note that, unless the market is in contango only for short periods of time, we do not expect this scenario to arise, as we expect the Futures Component to deactivate the synthetic long position when the market is in contango for a sustained period of time.

The level of the Futures Component will increase only if the synthetic long position is activated and generates a positive return (which is typical in markets exhibiting "backwardation," meaning that the price of a VIX futures contract with a later expiration is lower than the price of a VIX futures contract with an earlier expiration) and that return is sufficient to offset the negative effect of the daily rebalancing adjustment amount. The synthetic long position is expected to be activated only during periods of high volatility, which may be limited in duration. Conversely, the level of the Futures Component will decrease if the synthetic long position is activated and generates a negative return or if the synthetic long position is activated and the return from the synthetic long position is not sufficient to offset the negative effect of the daily rebalancing adjustment amount. The level of the Futures Component will remain constant if the synthetic long position is not activated (which is typical in markets exhibiting contango). Under these circumstances, the index fee will continue to be deducted from the level of the Index, even though there is no exposure to VIX futures contracts. Contango in VIX futures contracts is typical in a low-volatility market environment.

The Futures Component is likely to be uninvested (and, therefore, provide no exposure to VIX futures contracts) for sustained periods of time.

As described in more detail below, under normal market conditions, the Futures Component is expected to be deactivated. In general, the Futures Component is expected to provide exposure to VIX futures contracts only during periods of high volatility, which may be limited in duration. When deactivated, the Futures Component will provide no exposure to VIX futures contracts. Accordingly, for any period during which the synthetic long position is deactivated, the level of the Futures Component will remain constant. Under these circumstances, the index fee will continue to be deducted from the level of the Index, even though there is no exposure to VIX futures contracts.

Because the Long Return Exposure is adjusted only if the applicable conditions are satisfied for three consecutive Futures Component Calculation Days that are not Disrupted Futures Component Calculation Days, the Long Return Exposure may not be adjusted during non-trending market conditions.

On any given Futures Component Calculation Day, the Long Return Exposure that will be used in the calculation of the level of the Futures Component on the following Futures Component Calculation Day will vary between 0% and 100%. This Long Return Exposure is determined as follows. If the level of the VIX Futures Component on each of the three consecutive immediately preceding Futures Component Calculation Days that are not Disrupted Futures Component Calculation Days (as defined in "The J.P. Morgan Volemont Strategy – U.S. Equity (Series 1) (USD)" in this underlying supplement) is greater than or equal to the rolling weighted average price of VIX futures contracts with a maturity that is one month less than the maturity of the VIX futures contracts included in the synthetic long position (*i.e.*, the first-month and second-month VIX futures contracts), whether the Futures Component is activated or not, then the exposure on the relevant Futures Component Calculation Day will be increased by 25%, subject to a maximum exposure of 100%. Conversely, if the VIX Index on each of three consecutive immediately preceding Futures Component Calculation Days that are not Disrupted Futures Component Calculation Days is less than the rolling weighted average price of those VIX futures contracts, then the exposure on the relevant Futures Component Calculation Day will be reduced by 25%, subject to a minimum exposure of 0%.

Because the Long Return Exposure is adjusted only if the applicable conditions are satisfied for three consecutive Futures Component Calculation Days that are not Disrupted Futures Component Calculation Days, the Long Return Exposure may not be adjusted when the market for VIX futures contracts fluctuates between contango and backwardation rapidly. For example, the Long Return Exposure will not be adjusted if the level of the VIX Index is greater than or equal to the rolling weighted average price of VIX futures contracts with a maturity that is one month less than the maturity of the VIX futures contracts included in the synthetic long position (*i.e.*, the first-month and second-month VIX futures contracts) for one or two Futures Component Calculation Days that are not Disrupted Futures Component Calculation Days, after which the level of the VIX Index is less than the rolling weighted average price of those VIX futures contracts for one or two Futures Component Calculation Days that are not Disrupted Futures Component Calculation Days. As a result, the Long Return Exposure may not be adjusted for an extended period if the market for VIX futures contracts fluctuates between contango and backwardation rapidly during that period. Under these conditions, and contrary to the purpose of the Futures Component, the Futures Component may not generate positive returns that may partially or fully offset losses that may be expected to be generated by the Variance Component during high-volatility market conditions. Furthermore, under these conditions, the Futures Component may incur negative roll yields from a synthetic long position that has not been deactivated or fully deactivated or may fail to capture positive roll yields from a synthetic long position that has not been activated or fully activated. See the immediately following risk factor for additional information.

Due to the time lag inherent in the Futures Component, the Long Return Exposure may not be adjusted quickly enough in response to a change in market conditions for the investment strategy on which the Futures Component is based to be successful.

Because large price movements in VIX futures contracts can occur suddenly and over a short period of time, the VIX futures contracts may rapidly move from backwardation to contango or from contango to backwardation; however, the Long Return Exposure will remain unchanged until the applicable conditions described in the immediately preceding risk factor have been satisfied for three consecutive Futures Component Calculation Days that are not Disrupted Futures Component Calculation Days, after which the Long Return Exposure will change in increments of 25% per Futures Component Calculation Day, subject to a maximum exposure of 100% and a minimum exposure of 0%. Accordingly, several Futures Component Calculation Days will pass following a change in the futures market before the synthetic long position can be fully activated (*i.e.*, the Long Return Exposure is equal to 100%) or deactivated (*i.e.*, the Long Return Exposure is 0%), by which time market conditions may have changed. Due to this time lag, the Long Return Exposure may not be adjusted quickly enough for the investment strategy on which the Futures Component is based to be successful.

The Futures Component may not activate or deactivate the synthetic long position at all due to short-term changes in the VIX futures contracts. Price movements in the VIX futures contracts over a period of three Futures Component Calculation Days that are not Disrupted Futures Component Calculation Days could be significant. Accordingly, the Futures Component may not benefit from an activation of the synthetic long position in short periods of backwardation and the Futures Component may be adversely affected if the synthetic long position is not deactivated during a short period of contango. In addition, because it takes several Futures Component Calculation Days to activate or deactivate fully the synthetic long position, by the time the synthetic long position is activated or deactivated fully, the prices of the VIX futures contracts may be moving in the opposite direction, which may adversely affect the level of the Futures Component.

See "— Changing prices of the VIX futures contracts included in the Futures Component may have an adverse effect on the level of the Futures Component" above for more information about the effect of contango and backwardation on the level of the Futures Component.

Changing prices of the VIX futures contracts included in the Futures Component may have an adverse effect on the level of the Futures Component.

When activated, the Futures Component replicates the returns from a long position in VIX futures contracts that is rolled throughout each month. Unlike equities, which typically entitle the holder to a continuing stake in a corporation, futures contracts normally specify a certain date for the delivery of the underlying asset or financial instrument or, in the case of futures contracts relating to indices such as the VIX Index, a certain date for payment in cash of an amount determined by the level of the relevant index. As the VIX futures contracts included in the Futures Component approach expiration, they are replaced by similar contracts that have a later expiration. Thus, for example, a VIX futures contract purchased and held in August may specify an October expiration. As time passes, the contract expiring in October may be gradually replaced by a contract for delivery in November, through incremental synthetic sales of a portion of the position in the October contract, accompanied by incremental synthetic purchases of the November contract. This process is referred to as "rolling."

The synthetic long position is expected to generate positive returns only when the market for VIX futures contracts is in "backwardation," meaning that the price of a VIX futures contract with a later expiration is lower than the price of a VIX futures contract with an earlier expiration. Excluding other considerations, if the market for the relevant VIX futures contracts is in backwardation, the purchase of the third-month VIX futures contract in connection with the roll of the synthetic long position will take place at a price that is lower than the price of the sale of the second-month VIX futures contract, thereby creating a positive "roll yield." Accordingly, the Futures Component is designed to progressively activate the synthetic long position in VIX futures contracts with a weighted average maturity of approximately two months under certain market conditions that may result when the market for the relevant VIX futures contracts is in backwardation. Backwardation in VIX futures contracts is typical in a high-volatility market environment.

Under normal market conditions, VIX futures contracts are expected to be in "contango," meaning that the price of a VIX futures contract with a later expiration is higher than the price of a VIX futures contract with an earlier expiration. Excluding other considerations, if the market for the relevant VIX futures contracts is in contango, the synthetic purchase of the third-month VIX futures contract in connection with the roll of the synthetic long position will take place at a price that is higher than the price at which the synthetic sale of the second-month VIX futures contract will take place, thereby creating a *negative* "roll yield." To reduce the potential for a negative roll yield when VIX futures contracts are in contango, the Futures Component is designed to progressively deactivate the synthetic long position, if already activated, under market conditions described below that may result when the market for the relevant VIX futures contracts is in contango. Contango in VIX futures contracts is typical in a low-volatility market environment.

While the Futures Component strategy is intended to cause the synthetic long position to be activated only during periods when the market for VIX futures contracts is in backwardation with the intention of generating positive returns that may partially or fully offset losses that may be expected to be generated by the Variance Component during high-volatility market conditions, no assurance can be given that the investment strategy on which the Futures Component is based will be successful. In addition, while the Futures Component strategy is intended to cause the long position to be fully deactivated during periods when the market for the relevant VIX futures contracts is in contango so that negative roll yields for the synthetic long position will be avoided, no assurance can be given that negative roll yields will be avoided. See "— Due to the time lag inherent in the Futures Component, the Long Return Exposure may not be adjusted quickly enough in response to a change in market conditions for the investment strategy on which the Futures Component is based to be successful" below for more information.

The Futures Component is an excess return strategy, and not a total return strategy.

The Futures Component is an excess return strategy and not a total return strategy. The return from investing in futures contracts derives from three sources: (a) changes in the price of the relevant futures contracts (which is known as the "price return"); (b) any profit or loss realized when rolling the relevant futures contracts (which is known as the "roll return"); and (c) any interest earned on the cash deposited as collateral for the purchase of the relevant futures contracts (which is known as the "collateral return").

Some strategies linked to futures contracts are excess return strategies that measure the returns accrued from investing in uncollateralized futures contracts (*i.e.*, the sum of the price return and the roll return associated with an investment in futures contracts). By contrast, a total return strategy, in addition to reflecting those returns, also reflects interest that could be earned on funds committed to the trading of the underlying futures contracts (*i.e.*, the collateral return associated with an investment in futures contracts). Because the Futures Component is an excess return strategy, the Futures Component will therefore not generate the same return as would be generated from investing directly in the relevant VIX futures contracts or in a total return index related to the VIX futures contracts.

The Futures Component may in the future include contracts that are not traded on regulated futures exchanges.

The Futures Component is currently based solely on futures contracts traded on regulated futures exchanges (referred to in the United States as "designated contract markets"). If these exchange-traded futures cease to exist, the Index may also cease to exist or may in the future include over-the-counter contracts (such as swaps and forward contracts) traded on trading facilities that are subject to lesser degrees of regulation or, in some cases, no substantive regulation. As a result, trading in those contracts, and the manner in which prices and volumes are reported by the relevant trading facilities, may not be subject to the provisions of, and the protections afforded by, the Commodity Exchange Act, or other applicable statutes and related regulations that govern trading on regulated U.S. futures exchanges. In addition, many electronic trading facilities have only recently initiated trading and do not have significant trading histories. As a result, the trading of contracts on those facilities, and the inclusion of those contracts in the Futures Component, may be subject to certain risks not presented by U.S. exchange-traded futures contracts, including risks related to the liquidity and price histories of the relevant contracts.

Daily rebalancing of the Futures Component may affect trading in the relevant VIX futures contracts.

The daily rebalancing of the VIX futures contracts underlying the Futures Component when the synthetic long position in VIX futures contracts is activated may cause us, our affiliates or third parties with whom we transact to adjust our or their hedges accordingly, and to do so frequently during periods of high volatility in the U.S. equity market. The trading activity associated with these hedging transactions will contribute to the trading volume of the VIX futures contracts included in the Futures Component and may affect the market price of these VIX futures contracts and, in turn, adversely affect the level of the Futures Component.

The level of the VIX Index has tended to revert to a long-term mean level and any increase in the spot level of the VIX Index will likely continue to be constrained.

In the past, the level of the VIX Index has typically reverted over the longer term to a historical mean, and its absolute level has been constrained within a band. It is likely that the spot level of the VIX Index will continue to do so in the future, especially when economic uncertainties recede. If this happens, the value of VIX futures contracts may decrease, and the potential upside of your investment in the notes due to the synthetic long position may correspondingly be limited as a result. Under these circumstances, the level of the Futures Component and the value of your notes will be adversely affected.

THE J.P. MORGAN VOLEMONT STRATEGY – U.S. EQUITY (SERIES 1) (USD)

General

The J.P. Morgan Volemont Strategy – U.S. Equity (Series 1) (USD) (the "**Index**") was developed and is maintained and calculated by J.P. Morgan Securities plc ("**JPMS plc**"). The description of the strategy and methodology underlying the Index included in this underlying supplement is based on rules formulated by JPMS plc (the "**Rules**") and is qualified by the full text of the Rules. The Rules, and not this description, will govern the calculation and constitution of the Index and other decisions and actions related to its maintenance. The Rules in effect as of the date of this underlying supplement are attached as Annex A to this underlying supplement. The Index is the intellectual property of JPMS plc, and JPMS plc reserves all rights with respect to its ownership of the Index. The Index was established on April 30, 2013 and is published by Bloomberg L.P. under the ticker symbol "JPVOLUSA."

The Index is a synthetic, dynamic strategy that adjusts its synthetic exposures to two underlying components based on market conditions with the aims of generating positive returns during normal market conditions and mitigating losses or generating positive returns during high-volatility market conditions:

- the "**Variance Component**" seeks to capitalize on the long-term trend of the realized volatility of a broad market equity index tending to be less than the implied volatility of that equity index by synthetically selling 30-calendar day variance swaps on the S&P 500® Index (the "**SPX Index**") on a daily basis when certain market conditions are present. The Variance Component aims to reflect negative sensitivity to the volatility of the SPX Index and, subject to transaction costs, will generally yield a positive return when the realized volatility of the SPX Index is consistently less than the implied volatility of the SPX Index, which may occur under normal market conditions; and

- the "**Futures Component**" is generally expected to be activated only under high-volatility market conditions and is intended to generate positive returns that may partially or fully offset losses that may be expected to be generated by the Variance Component during high-volatility market conditions. The Futures Component, when activated, reflects returns from maintaining a synthetic long position in futures contracts (each, a "**VIX futures contract**" and together, "**VIX futures contracts**") on the CBOE Volatility Index® (the "**VIX Index**"), which is a benchmark index designed to measure the market price of 30-calendar day implied volatility of the SPX Index. The Futures Component, when activated, aims to reflect positive sensitivity to the volatility of the SPX Index and will generally yield a positive return when the market for VIX futures contracts is in "backwardation" (meaning that the price of a VIX futures contract with a later expiration is lower than the price of a VIX futures contract with an earlier expiration, as described in more detail below), which is typical during high-volatility market conditions.

No assurance can be given that the Index's strategy will be successful or that the Index will generate positive returns under any market conditions. See "Risk Factors" in this underlying supplement.

The Variance Component synthetically sells variance swaps on a daily basis on days when the implied volatility of the SPX Index (as measured by the VIX Index) is greater than the realized volatility of the SPX Index. The implied volatility of the SPX Index is determined for these purposes by averaging the levels of the VIX Index over a preceding 20-day period and the realized volatility of the SPX Index is determined for these purposes based on the levels of the SPX Index over a preceding 5-day period. In addition, the Futures Component is expected to be deactivated, and therefore to reflect no return, during periods when a signal indicates that the market for VIX futures contracts is in contango (meaning that the price of a VIX futures contract with a later expiration is higher than the price of a VIX futures contract with an earlier expiration, as described in more detail below), which is also typical under normal market conditions. Under these circumstances, the Index is generally expected to reflect negative sensitivity to the volatility of the SPX Index through the Variance Component.

If the implied volatility of the SPX Index is less than or equal to the realized volatility of the SPX Index, which is typical under high-volatility market conditions, the Variance Component will not synthetically sell any additional variance swaps. In addition, the Futures Component will be progressively activated during periods when a signal indicates that the market for VIX futures contracts is in backwardation, which is also typical under high-volatility market conditions. Under these circumstances, the Index is generally expected to reflect positive sensitivity to the volatility of the SPX Index because the Futures Component will be progressively activated and weighted as described below.

Assuming that the Variance Component had sold synthetic variance swaps daily throughout the immediately preceding month, the weight of the Futures Component is adjusted once each month using a methodology that is intended to result in the level of the Futures Component, if activated, being approximately twice as sensitive to a change in the volatility of the SPX Index as the level of the Variance Component (as adjusted to account for differences in the maturities of the synthetic variance swaps underlying the Variance Component and the VIX futures contracts underlying the Futures Component). Accordingly, when the Futures Component is activated, the positive sensitivity to the volatility of the SPX Index provided by the Futures Component is expected to more than offset any negative sensitivity to the volatility of the SPX Index provided by the Variance Component, so that the Index as a whole will be expected to reflect positive sensitivity to the volatility of the SPX Index.

If the Variance Component had not consistently sold synthetic variance swaps throughout the immediately preceding month, the positive sensitivity to volatility of the SPX Index provided by the Futures Component, if activated, would be more than twice the negative sensitivity to the volatility of the SPX Index provided by the Variance Component. In addition, if the Variance Component had not sold any synthetic variance swaps throughout the immediately preceding month, the Variance Component would not provide any exposure to the volatility of the SPX Index. Under these circumstances, the only exposure to the volatility of the SPX Index provided by the Index as a whole would be the positive sensitivity to the volatility of the SPX Index provided by the Futures Component, if activated.

The Index is described as a "synthetic" portfolio or strategy because its reported value does not represent the value of any actual assets held by any person and there is no actual portfolio of assets in which any person has any ownership interest.

Fees and Adjustments

The Index, the Variance Component and the Futures Component are subject to the deduction of a total of four types of fees and adjustments:

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

- *Index adjustment:* once each month, if the Futures Component is activated, the calculation of the Index will reflect a deduction, which we refer to as the "monthly rebalancing adjustment amount," that approximates VIX futures slippage costs (explained below) associated with adjusting the weight attributed to the Futures Component in the Index;

- *Futures Component adjustment:* on each day, if the Futures Component is activated, the calculation of the Futures Component will reflect a deduction, which we refer to as the "daily rebalancing adjustment amount," that approximates VIX futures slippage costs (explained below) associated with rolling the VIX futures contracts underlying the Futures Component; and

- *Variance Component adjustment:* on each relevant day, the strike level of any synthetic variance swap initiated under the Variance Component will reflect the level of the VIX Index on that day less a strike adjustment, which is intended to approximate transaction costs, including bid-ask spreads and slippage costs.

The monthly rebalancing adjustment amount is determined by applying a rebalancing adjustment factor of between 0.20% and 0.50% per month (depending on the level of the VIX Index) to the aggregate notional amount of each of the VIX futures contracts hypothetically traded as the result of a change in the weight of the Futures Component in connection with the monthly reweighting. The daily rebalancing adjustment amount is determined by applying a futures rebalancing adjustment factor of between 0.20% and 0.50% per day (depending on the level of the VIX Index) to both (a) the aggregate notional amount of each of the VIX futures contracts hypothetically traded that day and (b) the amount of the change, if any, in the level of the exposure to the synthetic long position in the relevant VIX futures contracts.

The monthly rebalancing adjustment amount and the daily rebalancing adjustment amount are intended to approximate the VIX futures slippage costs that would be experienced by a professional investor seeking to replicate the hypothetical portfolio contemplated by the Futures Component at prices that approximate the official settlement prices (which are not generally tradable) of the relevant VIX futures contracts. VIX futures slippage costs are costs that arise from deviations between the actual official settlement price of a VIX futures 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 a VIX futures contract.

The strike adjustment is intended to approximate transaction costs, including bid-ask spreads and slippage costs, that would be experienced by a professional investor seeking to replicate the payoff of the hypothetical portfolio contemplated by the Variance Component. The slippage costs that are approximated in the strike adjustment arise from the limited availability of appropriate transactions and SPX Index options that could be used in seeking to replicate the payoff of the hypothetical portfolio contemplated by the Variance Component. Unlike the index fee, the monthly rebalancing adjustment amount, the daily rebalancing adjustment amount and the strike adjustment are not per annum fees.

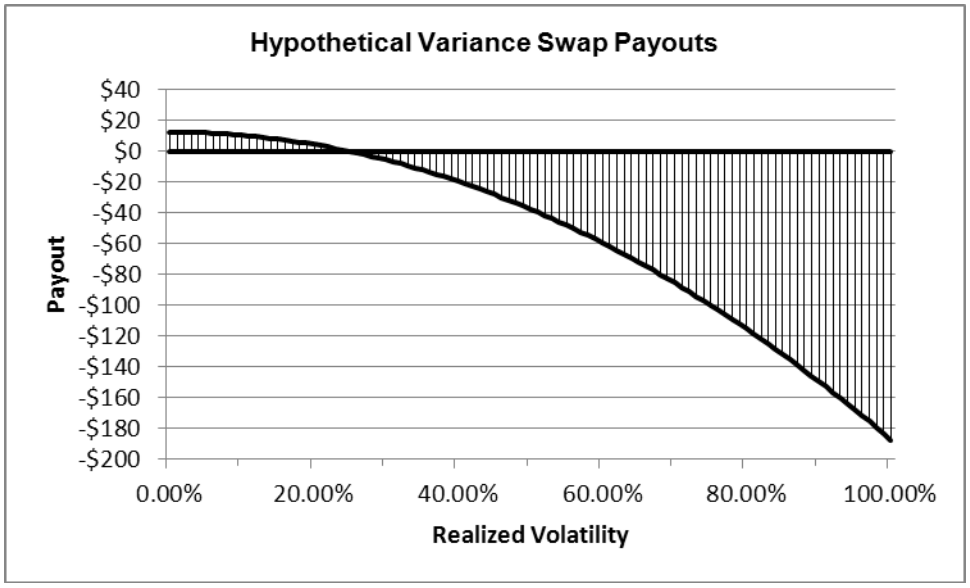
The Variance Component

The Variance Component seeks to capitalize on the long-term trend of the realized volatility of a broad market equity index tending to be less than the implied volatility of that equity index by synthetically selling 30-calendar day variance swaps on the SPX Index on a daily basis when certain market conditions are present. Subject to transaction costs, the Variance Component will generally yield a positive return when the realized volatility of the SPX Index is consistently less than the implied volatility of the SPX Index, which may occur under normal market conditions.

Volatility is a measure of the variability of the returns of a given financial asset over a time period. One common approach to estimating volatility is to measure the variability of the historical returns of an asset, which is referred to as realized volatility. Another approach to estimating volatility is to infer the market's expectation of the volatility of an asset over a future period from the prices of listed option contracts that reference the asset, which is referred to as implied volatility. For example, the implied volatility of the SPX Index can be inferred from the prices of listed options on the SPX Index. The VIX Index is viewed as the benchmark for measuring the near term (30-calendar day) implied volatility of the SPX Index.

A variance swap is an instrument designed to give investors exposure to the variance of an underlying asset. Variance is the square of volatility and is used in some products, including the synthetic variance swaps underlying the Variance Component, in place of volatility due to mathematical properties that make it more convenient to value and hedge those products. For example, the mark-to-market value of a variance swap can be determined as the time-weighted average of any realized variance and the implied variance for the remaining term of that variance swap. One result of referencing variance rather than volatility is that the payout on a variance swap is non-linear, as described below.

In a short variance swap position, parties arrange to exchange at a specified time (*e.g.*, in one month) a pre-agreed notional amount multiplied by the difference between the square of a strike level, which is determined by reference to implied volatility, and the square of the realized volatility of an underlying asset (*i.e.*, the variance of that underlying asset). Selling a variance swap means that an investor will benefit when realized volatility is lower than the predetermined strike level. However, if realized volatility is higher than the strike level, this will result in a loss to the seller of a variance swap. The following graph shows the returns of a seller of a hypothetical variance swap struck at 25.00% with a notional amount set so that, in general, if the realized volatility of the underlying asset is less than the strike level by 1%, the return on that variance swap will be approximately $1.00 and if the realized volatility of the underlying asset is greater than the Strike Level by 1%, the return on that variance swap will be approximately -$1.00. As shown in the graph below, the payoff on a variance swap is non-linear. In particular, for the seller of a variance swap, (a) potential gains on the variance swap are capped because volatility cannot decline below 0%, (b) gains on the variance swap increase at a decreasing rate as volatility declines and (c) losses on the variance swap increase at an accelerating rate as volatility increases. Sellers of variance swaps may experience significant losses when the volatility of the underlying asset is considerably higher than the strike level. The strike level of a variance swap may be slightly higher than the strike level for a swap that reflects a linear payout by referencing volatility rather than variance to reflect the additional risk borne by the seller of the variance swap due to the non-linear payout.



Because the seller of a variance swap on the SPX Index will generally receive a positive return when the implied volatility of the SPX Index is consistently greater than the realized volatility of the SPX Index, subject to transaction costs, the Variance Component synthetically sells variance swaps on a daily basis only on days when the implied volatility of the SPX Index is greater than the realized volatility of the SPX Index. The implied volatility of the SPX Index is determined for these purposes by averaging the levels of the VIX Index over a preceding 20-day period and the realized volatility of the SPX Index is determined for these purposes based on the levels of the SPX Index over a preceding 5-day period.

The strike level of that synthetic variance swap will reflect the level of the VIX Index on the relevant day, which is a measure of the implied volatility of the SPX Index on that day, less a strike adjustment. The strike adjustment is intended to approximate transaction costs, including bid-ask spreads and slippage costs, that would be experienced by a professional investor seeking to replicate the payoff of the hypothetical portfolio contemplated by the Variance Component. The slippage costs that are approximated in the strike adjustment arise from the limited availability of appropriate transactions and SPX Index options that could be used in seeking to replicate the payoff of the hypothetical portfolio contemplated by the Variance Component.

The notional amount of that synthetic variance swap will be set so that, in general, if the realized volatility of the SPX Index is less than the strike level by 1%, the return for the seller of that synthetic variance swap will be approximately 0.025% and if the realized volatility of the SPX Index is greater than the strike level by 1%, the return for the seller of that synthetic variance swap will be approximately -0.025%. These returns are approximate rather than exact because the returns on variance swaps are non-linear, as described above. In addition, the further that the realized volatility of the SPX Index is from the strike level, the less accurate this approximation will be.

In general, the level of the Variance Component on any day references the mark-to-market values of the existing short positions in synthetic variance swaps outstanding on that day. The mark-to-market value of a synthetic variance swap reflects the realized volatility of the SPX Index on each day that has elapsed since that synthetic variance swap was initiated and the implied volatility with respect to the period including each day remaining until that synthetic variance swap matures. Accordingly, the mark-to-market values of the existing short positions in synthetic variance swaps will have a direct effect on the level of the Variance Component. In addition, because the notional of any new synthetic variance swap is determined, in part, by reference to the level of the Variance Component, the mark-to-market values of the existing short positions in synthetic variance swaps will also have an indirect effect on the level of the Variance Component.

For more information about the Variance Component, see "Calculation and Publication of Index Levels — Calculation of Variance Component Levels" below. For more information about the SPX Index and the VIX Index, see "Background on S&P 500® Index" and "Background on the CBOE Volatility Index®" in this underlying supplement.

The Futures Component

The Futures Component is generally expected to be activated only under high-volatility market conditions and is intended to generate positive returns that may partially or fully offset losses that may be expected to be generated by the Variance Component during high-volatility market conditions. The Futures Component, when activated, replicates the returns from a contingent long position in VIX futures contracts that is rolled throughout each month as described below. VIX futures contracts allow investors the ability to invest in forward volatility based on their view of the direction of future movement of the VIX Index. The VIX Index is a benchmark index designed to measure the market price of 30-calendar day implied volatility of the SPX Index, and the calculation of the spot level of the VIX Index is based on prices of put and call options on the SPX Index.

As described in more detail below, under normal market conditions, the Futures Component is expected to be deactivated. In general, the Futures Component is expected to provide exposure to VIX futures contracts only during periods of high volatility, which may be limited in duration. When deactivated, the Futures Component will provide no exposure to VIX futures contracts. Accordingly, for any period during which the Futures Component is deactivated, the level of the Futures Component will remain constant.

Unlike equities, which typically entitle the holder to a continuing stake in a corporation, futures contracts normally specify a certain date for the delivery of the underlying asset or financial instrument or, in the case of futures contracts relating to indices such as the VIX Index, a certain date for payment in cash of an amount determined by the level of the relevant index. In the case of VIX futures contracts, one set of contracts settles each month on the published settlement date. At any time, the VIX futures contracts scheduled to settle on the next scheduled settlement date are referred to as the first-month VIX futures contracts, and the VIX futures contracts scheduled to settle on the following month's settlement date are referred to as the second-month VIX futures contracts. On the day that the first-month VIX futures contracts are scheduled to be settled, the old second-month VIX futures contracts become the new first-month VIX futures contracts, the old third-month VIX futures contracts become the new second-month VIX futures contracts and so forth.

A long position in VIX futures contracts can be maintained by selling VIX futures contracts that specify cash settlement on a nearby date and buying VIX futures contracts that specify cash settlement on a later date. This process is known as "rolling" a futures position. When activated, the Futures Component will maintain a synthetic long position in second-month and third-month VIX futures contracts. Specifically, when the Futures Component is activated, the synthetic long position is maintained by synthetically selling on a daily basis the second-month VIX futures contract to reduce the synthetic long position in the second-month VIX futures contract and synthetically buying on a daily basis the third-month VIX futures contract to increase the synthetic long position in the third-month VIX futures contract. One of the effects of daily rolling is to maintain an approximate specified weighted average maturity for the underlying VIX futures contracts. The weighted average maturity for the VIX futures contracts underlying the synthetic long position is approximately two months on any day when the Futures Component is activated.

A synthetic long position will expected to generate positive returns only when the market for VIX futures contracts is in "backwardation," meaning that the price of a VIX futures contract with a later expiration is lower than the price of a VIX futures contract with an earlier expiration. Excluding other considerations, if the market for the relevant VIX futures contracts is in backwardation, the synthetic purchase of the third-month VIX futures contract in connection with the roll of the synthetic long position will take place at a price that is lower than the price at which the synthetic sale of the second-month VIX futures contract will place, thereby creating a positive "roll yield." Accordingly, the Futures Component is designed to progressively activate the synthetic long position in VIX futures contracts with a weighted average maturity of approximately two months under market conditions described below that may result when the market for the relevant VIX futures contracts is in backwardation.

Under normal market conditions, VIX futures contracts are expected to be in "contango," meaning that the price of a VIX futures contract with a later expiration is higher than the price of a VIX futures contract with an earlier expiration. Excluding other considerations, if the market for the relevant VIX futures contracts is in contango, the synthetic purchase of the third-month VIX futures contract in connection with the roll of the synthetic long position will take place at a price that is higher than the price at which the synthetic sale of the second-month VIX futures contract will take place, thereby creating a *negative* "roll yield." To reduce the potential for a negative roll yield when VIX futures contracts are in contango, the Futures Component is designed to progressively deactivate the synthetic long position, if already activated, under market conditions described below that may result when the market for the relevant VIX futures contracts is in contango.

Exposure to the synthetic long position will vary between 0% and 100%, in 25% increments. On any Futures Component Calculation Day (as defined below), the exposure to the synthetic long position that will be used in the calculation of the level of the Futures Component on the following Futures Component Calculation Day will be increased by 25%, subject to a maximum exposure of 100%, if the level of the VIX Index was greater than or equal to the rolling weighted average price of VIX futures contracts with a maturity that is one month less than the maturity of the VIX futures contracts included in the synthetic long position (*i.e.*, the first-month and second-month VIX futures contracts), whether activated or not, for each of the three consecutive immediately preceding Futures Component Calculation Days that were not Disrupted Futures Component Calculation Days. Conversely, the exposure to the synthetic long position will be decreased by 25%, subject to a minimum exposure of 0%, on any Futures Component Calculation Day if the level of the VIX Index was less than the rolling weighted average price of those VIX futures contracts for each of the three consecutive immediately preceding Futures Component Calculation Days that were not Disrupted Futures Component Calculation Days. On any Futures Component Calculation Day for which these conditions are not met, the exposure to the synthetic long position will not be increased or decreased.

Because several Futures Component Calculation Days will pass following a change in the futures market before the synthetic long position will be fully activated (*i.e.*, where the exposure to the synthetic long position is equal to 100%) or deactivated (*i.e.*, where the exposure to the synthetic long position is equal to 0%), the Futures Component is subject to a time lag. See "Risk Factors — Risks Relating to the Futures Component — Due to the time lag inherent in the Futures Component, the

Long Return Exposure may not be adjusted quickly enough in response to a change in market conditions for the investment strategy on which the Futures Component is based to be successful" in this underlying supplement.

On each day when the Futures Component is activated, the calculation of the Futures Component will reflect the daily deduction of a "daily rebalancing adjustment amount" that is determined by applying a futures rebalancing adjustment factor of between 0.20% and 0.50% per day (depending on the level of the VIX Index) to both (a) the aggregate notional amount of each of the VIX futures contracts hypothetically traded that day and (b) the amount of the change, if any, in the level of the exposure to the synthetic long position. The daily rebalancing adjustment amount is intended to approximate the VIX futures slippage costs that would be experienced by a professional investor seeking to replicate the hypothetical portfolio contemplated by the Futures Component at prices that approximate the official settlement prices (which are not generally tradable) of the relevant VIX futures contracts.

For more information about the Futures Component, see "Calculation and Publication of Index Levels — Calculation of Futures Component Levels" below. For more information about VIX futures contracts and the VIX Index, see "Background on Futures Contracts on the CBOE Volatility Index®" and "Background on the CBOE Volatility Index®," respectively, in this underlying supplement.

Index Sponsor and Index Calculation Agent

JPMS plc is the sponsor of the Index (the "**Index Sponsor**"). The Index Sponsor may designate any entity (including a non-related third party) from time to time to act as calculation agent for the Index (the "**Index Calculation Agent**"). As of the date of this underlying supplement, JPMS plc is acting as the Index Calculation Agent.

Each of the Index Sponsor and the Index Calculation Agent will act in good faith and in a commercially reasonable manner with respect to determinations, interpretations and calculations made by it pursuant to the Rules.

All determinations, interpretations and calculations of the Index Sponsor and the Index Calculation Agent relating to the Rules will be final, conclusive and binding and no person shall be entitled to make any claim against the Index Sponsor, the Index Calculation Agent or any other Relevant Person in respect thereof. None of the Index Sponsor, the Index Calculation Agent and any other Relevant Person will:

- be under any obligation to revise any determination, interpretation or calculation made or action taken for any reason in connection with the Rules or the Index; or
- have any responsibility to any person for any determination, interpretation or calculation made or anything done (or omitted to be done) (whether as a result of negligence or otherwise) with respect to the Index or with respect to the publication of any Index Level (or failure to publish such level) or any use to which any person may put the Index or the Index Levels.

"**Relevant Person**" means each of the Index Sponsor, the Index Calculation Agent and each of their respective affiliates and subsidiaries and their respective directors, officers, employees, representatives, delegates and agents.

Calculation and Publication of Index Levels

Publication of Index Levels

Unless an Index Calculation Day is a Disrupted Index Calculation Day (as defined under "Index Disruption Events" below), the Index Calculation Agent will calculate and publish (in a manner determined by the Index Calculation Agent from time to time) the level of the Index (the "**Index Level**") with respect to each Index Calculation Day. The Index Level is rounded to two decimal places only for purposes of publication.

If an Index Calculation Day is a Disrupted Index Calculation Day, then the Index Calculation Agent will not calculate or publish the Index Level for that Index Calculation Day and will suspend the calculation and publication of the Index Level until the first succeeding Index Calculation Day that is not a Disrupted Index Calculation Day.

"**Index Calculation Day**" means any day that is a Variance Component Calculation Day and a Futures Component Calculation Day.

"**Variance Component Calculation Day**" means each day that is both (a) an SPX Index Business Day and (y) a VIX Index Business Day.

"**SPX Index Business Day**" means, with respect to the SPX Index, any day on which each Exchange and each Related Exchange are scheduled to be open for trading for their respective regular trading sessions.

"**VIX Index Business Day**" means, with respect to the VIX Index, any day on which The Chicago Board Options Exchange, Incorporated (the "**VIX Index Sponsor**") is scheduled to publish the level of the VIX Index.

"**Futures Component Calculation Day**" means each day (other than a Saturday or Sunday) on which the Related Exchange(s) with respect to each VIX futures contract and the VIX Index are all scheduled to be open for trading during their respective regular trading sessions.

"**Exchange**" means, with respect to the SPX Index, (a) the New York Stock Exchange and the NASDAQ Global Select Market, (b) any successor to such exchange or quotation system or (c) any substitute exchange or quotation system to which trading in the shares or other components underlying the SPX Index has temporarily relocated (*provided* that the Index Calculation Agent has determined that there is comparable liquidity relative to such shares or other components underlying the SPX Index on that temporary substitute exchange or quotation system as on the original Exchange).

"**Related Exchange**" means (a) the Chicago Mercantile Exchange with respect to the SPX Index and the Chicago Board Options Exchange® with respect to VIX futures contracts and the VIX Index, (b) any successor to that exchange or quotation system or (c) any substitute exchange or quotation system to which trading in (i) futures or option contracts relating to the SPX Index, (ii) VIX futures contracts or (iii) the VIX Index, as applicable, has temporarily relocated (*provided* that the Index Calculation Agent has determined that there is comparable liquidity relative to the relevant futures or option contracts relating to the SPX Index, VIX futures contracts or the VIX Index (as the case may be) on that temporary substitute exchange or quotation system as on the original exchange or quotation system).

Calculation of Index Levels

The Index Level is calculated in U.S. dollars with respect to each Index Calculation Day by adjusting the Index Level as of the immediately preceding Index Calculation Day that was not a Disrupted Index Calculation Day to reflect the return of the Index since the immediately preceding Index Calculation Day that was not a Disrupted Index Calculation Day, subject to deductions reflecting the Adjustment Factor and the Monthly Rebalancing Percentage, as described below. On each Index Calculation Day (which we refer to as the current Index Calculation Day), the return of the Index reflects the following:

- the return of the gross index (*i.e.*, the return of the Index determined by reference to the performance of the Variance Component and the weighted performance of the Futures Component, without deducting the amounts described in the following two bullets) since the immediately preceding Index Business Day that was not a Disrupted Index Calculation Day;

- the deduction of an adjustment factor of 0.75% per annum (the "**Adjustment Factor**"); and

- a deduction equal to the sum of a rebalancing adjustment factor of between 0.20% and 0.50% per day (depending on the level of the VIX Index on the immediately preceding VIX Index Business Day that was not a Disrupted VIX Index Business Day (as defined under "Index Disruption Events" below)) (the "**Rebalancing Adjustment Factor**"), applied to the aggregate notional amount of each of the VIX futures contracts hypothetically traded that day as the result of a change in the Futures Component Weight on that Index Calculation Day (the "**Monthly Rebalancing Percentage**"). This deduction will be zero unless the current Index Business Day is a Monthly Index Rebalancing Day. Unlike the Adjustment Factor, the Rebalancing Adjustment Factor is not a per annum fee.

On December 18, 2007 (the "**Index Base Date**"), the Index Level was 100.00. With respect to each Index Calculation Day after the Index Base Date that is not a Disrupted Index Calculation Day (which we refer to as the current Index Calculation Day), the Index Calculation Agent determines the Index Level as follows:

$$\textbf{Index(t)} = \text{Index}(t-1) \times \left(\frac{\text{GrossIndex}(t)}{\text{GrossIndex}(t-1)} - \text{DailyIndexFee}(t) - \text{MonthlyRebalAdj}(t) \right)$$

where:

Index(t)	means the Index Level determined by the Index Calculation Agent with respect to the current Index Calculation Day;
Index(t-1)	means the Index Level determined by the Index Calculation Agent with respect to the immediately preceding Index Calculation Day that was not a Disrupted Index Calculation Day;
GrossIndex(t)	means the Gross Index Level determined by the Index Calculation Agent with respect to the current Index Calculation Day;
GrossIndex(t-1)	means the Gross Index Level determined by the Index Calculation Agent with respect to the immediately preceding Index Calculation Day that was not a Disrupted Index Calculation Day;
DailyIndexFee(t)	means the amount deducted due to the Adjustment Factor with respect to the current Index Calculation Day, as described under "The Daily Index Fee" below; and
MonthlyRebalAdj(t)	means the amount, if any, deducted due to the Rebalancing Adjustment Factor with respect to the current Index Calculation Day, as described under "The Monthly Rebalancing Adjustment Amount" below, which will be zero unless the current Index Business Day is a Monthly Index Rebalancing Day (as defined below).

The Gross Index Level

The Gross Index Level is the level of the Index determined by reference to the performance of the Variance Component and the weighted performance of the Futures Component, without taking into account the effect of the Adjustment Factor or the application of the Rebalancing Adjustment Factor to the Monthly Rebalancing Percentage as the result of a change in the Futures Component Weight. The Gross Index Level is calculated with respect to each Index Calculation Day by adjusting the Gross Index Level as of the immediately preceding Monthly Index Rebalancing Day to reflect the return of the Variance Component and the weighted return of the Futures Component since the immediately preceding Monthly Index Rebalancing Day.

With respect to each Index Calculation Day that is not a Disrupted Index Calculation Day (which we refer to as the current Index Calculation Day), the Index Calculation Agent determines the Gross Index Level as follows:

$$\textbf{GrossIndex(t)} = \text{GrossIndex(rebal)} \times (1 + \text{Return(t,rebal)})$$

where:

GrossIndex(t) means the Gross Index Level with respect to the current Index Calculation Day;

GrossIndex(rebal) means the Gross Index Level with respect to the Monthly Index Rebalancing Day immediately preceding the current Index Calculation Day; and

Return(t,rebal) means the gross index return from the immediately preceding Monthly Index Rebalancing Day to the current Index Calculation Day, calculated as follows:

$$\textbf{Return(t,rebal)} = \left(\frac{\text{VarianceComp(t)}}{\text{VarianceComp(rebal)}} - 1\right) + \text{w(rebal)} \times \left(\frac{\text{FuturesComp(t)}}{\text{FuturesComp(rebal)}} - 1\right)$$

where:

VarianceComp(t) means the Variance Component Level with respect to the current Index Calculation Day, as described under "Calculation of Variance Component Levels" below;

VarianceComp(rebal) means the Variance Component Level with respect to the Monthly Index Rebalancing Day immediately preceding the current Index Calculation Day, as described under "Calculation of Variance Component Levels" below;

FuturesComp(t) means the Futures Component Level with respect to the current Index Calculation Day, as described under "Calculation of Futures Component Levels" below;

FuturesComp(rebal) means the Futures Component Level with respect to the Monthly Index Rebalancing Day immediately preceding the current Index Calculation Day, as described under "Calculation of Futures Component Levels" below; and

w(rebal) means the Futures Component Weight with respect to the Monthly Index Rebalancing Day immediately preceding the current Index Calculation Day, as described under "The Futures Component Weight" below.

The Futures Component Weight

With respect to each Monthly Index Rebalancing Day, the Index Calculation Agent determines the Futures Component Weight. The Futures Component Weight has an effect on the level of the Index only when the Futures Component is activated. When the Futures Component is not activated, the level of the Futures Component will not contribute to changes in the level of the Index, regardless of the Futures Component Weight.

The Futures Component Weight is set so that, in general, the return on the Futures Component, if activated, will be approximately 1.00% of the level of the Index if the realized volatility of the SPX Index increases by 1%, and the return on the Futures Component, if activated, will be approximately -1.00% of the level of the Index if the realized volatility of the SPX Index decreases by 1%. Assuming that the Variance Component has sold synthetic variance swaps daily throughout the immediately

preceding month, the positive sensitivity to the volatility of the SPX Index provided by the Futures Component is expected to be approximately twice the magnitude of the sensitivity to the volatility of the SPX Index provided by the Variance Component (as adjusted to account for differences in the maturities of the synthetic variance swaps underlying the Variance Component and the VIX futures contracts underlying the Futures Component). Accordingly, under these circumstances, the Index as a whole would be expected to provide a positive sensitivity to the volatility of the SPX Index. See "Risk Factors — Risks Relating to the Variance Component — The Index's weighting methodology may not be successful" in this underlying supplement for additional information.

With respect to each Monthly Index Rebalancing Day (which we refer to as the current Monthly Index Rebalancing Day), the Index Calculation Agent determines the Futures Component Weight as follows:

$$\mathbf{w(rebal)} = \frac{2 \times \sqrt{2} \times \text{TargetVega}}{\text{FuturesCompVega(rebal)}}$$

where:

w(rebal)	means the Futures Component Weight with respect to the current Monthly Index Rebalancing Day;
TargetVega	means 0.50%; and
FuturesCompVega(rebal)	means the Futures Component Vega with respect to the current Monthly Index Rebalancing Day, calculated as follows:

$$\mathbf{FuturesCompVega(rebal)} = \frac{1}{\text{ContractWeight(A, rebal)} \times \text{ContractPrice(2, rebal)} + \text{ContractWeight(B, rebal)} \times \text{ContractPrice(3, rebal)}}$$

where:

ContractWeight(A, rebal)	means the weight of the second-month VIX futures contract with respect to the Futures Component Calculation Day on which the current Monthly Index Rebalancing Day occurs, calculated as set forth under "Calculation of Futures Component Levels — Contract Rolling and VIX Futures Contract Weights" below;
ContractWeight(B, rebal)	means the weight of the third-month VIX futures contract with respect to the Futures Component Calculation Day on which the current Monthly Index Rebalancing Day occurs, calculated as set forth under "Calculation of Futures Component Levels — Contract Rolling and VIX Futures Contract Weights" below; and
ContractPrice(i, rebal)	means the Daily Contract Reference Price of the ith-month VIX futures contract with respect to the Futures Component Calculation Day on which the current Monthly Index Rebalancing Day occurs.

The Daily Index Fee

On each Index Calculation Day, the Index Level is subject to the daily deduction of an amount that reflects the Adjustment Factor of 0.75% per annum and the number of calendar days that have elapsed since the immediately preceding Index Calculation Day that was not a Disrupted Index Calculation Day (which we refer to as the current Index Calculation Day), calculated as follows:

$$\mathbf{DailyIndexFee(t)} = \text{AF} \times \text{Act(t,t-1)} / 360$$

where:

AF means the Adjustment Factor of 0.75% per annum; and

Act(t,t-1) means the number of calendar days from, and including, the immediately preceding Index Calculation Day that was not a Disrupted Index Calculation Day to, but excluding, the current Index Calculation Day.

The Monthly Rebalancing Adjustment Amount

On each Index Calculation Day that is a Monthly Index Rebalancing Day (which we refer to as the current Index Calculation Day), the Index Level is subject to the deduction of an amount that reflects the Rebalancing Adjustment Factor of between 0.20% and 0.50% (depending on the level of the VIX Index on the immediately preceding VIX Index Business Day that was not a Disrupted VIX Index Business Day) applied to the aggregate notional amount of each of the VIX futures contracts hypothetically traded that day as the result of a change in the Futures Component Weight on the current Index Calculation Day, calculated as follows:

$$\textbf{MonthlyRebalAdj(t)} = \text{MonthlyRebalPercentage(t)} \times \text{RAF}$$

where:

MonthlyRebalPercentage(t) means the Monthly Rebalancing Percentage with respect to the current Monthly Index Rebalancing Day, calculated as follows:

$$\textbf{MonthlyRebalPercentage(t)} = |\text{w(t)} - \text{w(rebal)}| \times \text{LongReturnExposure(t)}$$

where:

w(t) means the Futures Component Weight with respect to the current Monthly Index Rebalancing Day;

w(rebal) means the Futures Component Weight with respect to the immediately preceding Monthly Index Rebalancing Day; and

LongReturnExposure(t) means the Long Return Exposure, if any, on the current Index Calculation Day, determined as described under "Calculation of Futures Component Levels — The Long Position Exposure" below; and

RAF means the Rebalancing Adjustment Factor on the current Index Calculation Day, determined by reference to the level of the VIX Index on the immediately preceding VIX Index Business Day that was not a Disrupted VIX Index Business Day, determined as follows:

Level of the VIX Index on the immediately preceding VIX Index Business Day that was not a Disrupted VIX Index Business Day	Rebalancing Adjustment Factor
=< 35	0.20%
=< 50 and > 35	0.30%
=< 70 and > 50	0.40%
> 70	0.50%

"**Monthly Index Rebalancing Day**" means the last Index Calculation Day of each calendar month or, if that day is a Disrupted Index Calculation Day, the immediately following Index Calculation Day that is not a Disrupted Index Calculation Day.

On each Index Calculation Day that is not a Monthly Index Rebalancing Day, the Futures Component Weight does not change. Accordingly, the Index is subject to a deduction with respect to a change in the Futures Component Weight only on a Monthly Index Rebalancing Day.

On each Index Calculation Day that is a Monthly Index Rebalancing Day, the product of (a) the Monthly Rebalancing Percentage and (b) the Rebalancing Adjustment Factor is intended to approximate the VIX futures slippage costs that would be experienced by a professional investor seeking to replicate the hypothetical portfolio contemplated by the Futures Component at prices that approximate the official settlement prices (which are not generally tradable) of the relevant VIX futures contracts. VIX futures slippage costs are costs that arise from deviations between the actual official settlement price of a VIX futures 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 a VIX futures contract.

For example, assume that (a) the current Index Calculation Day is a Monthly Index Rebalancing Day, (b) the Futures Component Weight with respect to the current Monthly Index Rebalancing Day is 40%, (c) the Futures Component Weight with respect to the immediately preceding Monthly Index Rebalancing Day was 30%; and (d) the Long Return Exposure is 75% on the current Index Calculation Day. The Monthly Rebalancing Percentage would be calculated as follows:

$$|40\% - 30\%| \times 75\% = \mathbf{7.50\%}$$

The percentage reduction in the Index Level due to the Rebalancing Adjustment Factor is equal to the product of (a) the Monthly Rebalancing Percentage and (b) the Rebalancing Adjustment Factor. Assuming that the level of the VIX Index on the previous Index Calculation Day is less than or equal to 35, so that the Rebalancing Adjustment Factor on the current Index Calculation Day is equal to 0.20%, the percentage reduction in the Index Level due to the Rebalancing Adjustment Factor with respect to the current Index Calculation Day would be calculated as follows:

$$7.50\% \times 0.20\% = \mathbf{0.015\%}$$

If, however, the level of the VIX Index were greater than 70, the Rebalancing Adjustment Factor on the current Index Calculation Day would be equal to 0.50%, and the percentage reduction in the Index Level due to the Rebalancing Adjustment Factor with respect to the current Index Calculation Day would be calculated as follows:

$$7.50\% \times 0.50\% = \mathbf{0.0375\%}$$

As shown above, the Rebalancing Adjustment Factor increases as the level of the VIX Index increases, and the Rebalancing Adjustment Factor can be as high as 0.50% per month. These examples are purely hypothetical, and the actual percentage reduction in the Index Level due to the Rebalancing Adjustment Factor in connection with any Monthly Index Rebalancing Day may be different from the percentages shown above. See "Risk Factors — Risks Relating to the Index Generally — The reported level of the Index will include the deduction of fees and adjustments" in this underlying supplement.

Calculation of Variance Component Levels

The Variance Component Level is calculated with respect to each Variance Component Calculation Day (which we refer to as the current Variance Component Calculation Day) by adjusting the Variance Component Level as of the immediately preceding Variance Component Calculation Day that was not a Disrupted Variance Component Calculation Day (as defined under "Index Disruption Events" below) to reflect:

- the value of the Active Synthetic Variance Swap, if any, initiated on a Potential Variance Swap Start Date that is the current Variance Component Calculation Day;

- the change in the value of any other Active Synthetic Variance Swap since the immediately preceding Variance Component Calculation Day that was not a Disrupted Variance Component Calculation Day; and

- the Additional Variance Swap Amount, as described under "The Additional Variance Swap Amount" below, which reflects the change in the value of any Synthetic Variance Swap with a Maturity Date that occurs after the immediately preceding Variance Component Calculation Day that was not a Disrupted Variance Component Calculation Day but before the current Variance Component Calculation Day.

"**Active Synthetic Variance Swap**" means, with respect to an SPX Index Business Day, each Synthetic Variance Swap (a) that is initiated on a Potential Variance Swap Start Date and (b) whose Maturity Date occurs on or after that SPX Index Business Day.

"**Synthetic Variance Swap**" means, with respect to an SPX Index Business Day, a synthetic variance swap that references the SPX Index and either (a) was initiated on a Potential Variance Swap Start Date preceding that SPX Index Business Day or (b) will be or may be initiated on a Potential Variance Swap Start Date that is that SPX Index Business Day.

"**Potential Variance Swap Start Date**" means each Variance Component Calculation Day that is not a Disrupted Variance Component Calculation Day.

"**Maturity Date**" means, with respect to an Active Synthetic Variance Swap, (a) the 30th calendar day following the Potential Variance Swap Start Date for that Active Synthetic Variance Swap if that calendar day is an SPX Index Business Day or (b) if that calendar day is not an SPX Index Business Day, the immediately following SPX Index Business Day (such day specified in clause (a) or clause (b), the "**Scheduled Maturity Date**"); *provided* that if that Scheduled Maturity Date is a Disrupted SPX Index Business Day (as defined under "Index Disruption Events" below), the Maturity Date will be the earlier of (i) the first SPX Index Business Day immediately following the Scheduled Maturity Date that is not a Disrupted SPX Index Business Day and (ii) the eighth SPX Index Business Day immediately following the Scheduled Maturity Date (irrespective of whether that eighth SPX Index Business Day is a Disrupted SPX Index Business Day) (any such Maturity Date determined pursuant to this clause (ii), the "**Deemed Maturity Date**").

On December 18, 2007 (the "**Variance Component Base Date**"), the Variance Component Level was 100.00. With respect to each Variance Component Calculation Day after the Variance Component Base Date that is not a Disrupted Variance Component Calculation Day (which we refer to as the current Variance Component Calculation Day), the Index Calculation Agent determines the Variance Component Level as follows:

VarianceComp(t) = VarianceComp(t-1) + NewSwap(t) + ActiveSwapMtM(t) + AdditionalSwap(t-1,t)

where:

VarianceComp(t)	means the Variance Component Level with respect to the current Variance Component Calculation Day;
VarianceComp(t-1)	means the Variance Component Level with respect to the immediately preceding Variance Component Calculation Day that was not a Disrupted Variance Component Calculation Day;
NewSwap(t)	means the Active Synthetic Variance Swap Closing Level (as defined under "The Active Synthetic Variance Swap Closing Level" below) with respect to the current Variance Component Calculation Day of the Active Synthetic Variance Swap, if any, initiated on a Potential Variance Swap Start Date that is the current Variance Component Calculation Day, as described under "Synthetic Variance Swap Initiation" below, or, if none, zero;

ActiveSwapMtM(t) means the sum of the mark-to-market values of the Active Synthetic Variance Swaps with respect to the current Variance Component Calculation Day that were initiated on a Potential Variance Swap Start Date prior to the current Variance Component Calculation Day (each, a "**Pre-existing Active Synthetic Variance Swap**"), where the mark-to-market value of any Pre-existing Active Synthetic Variance Swap is equal to:

(a) the Active Synthetic Variance Swap Closing Level with respect to the current Variance Component Calculation Day of that Pre-existing Active Synthetic Variance Swap *minus*

(b) the Active Synthetic Variance Swap Closing Level with respect to the Variance Component Calculation Day that was not a Disrupted Variance Component Calculation Day immediately preceding the current Variance Component Calculation Day of that Pre-existing Active Synthetic Variance Swap.

If there are no Pre-existing Active Synthetic Variance Swaps with respect to the current Variance Component Calculation Day, the sum of the mark-to-market values of the Pre-existing Active Synthetic Variance Swaps will be deemed to be zero; and

AdditionalSwap(t-1,t) means the Additional Variance Swap Amount, as described under "The Additional Variance Swap Amount" below.

Synthetic Variance Swap Initiation

On each Potential Variance Swap Start Date, the Index Calculation Agent will determine whether to initiate a short position in a Synthetic Variance Swap on that Potential Variance Swap Start Date (see Step 1 below). If a short position in a Synthetic Variance Swap is initiated on that Potential Variance Swap Start Date, the Index Calculation Agent will also determine the Strike Level and the Variance Notional for that Synthetic Variance Swap (see Steps 2 and 3 below).

Step 1: Determine whether to initiate a short position in a Synthetic Variance Swap. Because the seller of a Synthetic Variance Swap will generally receive a positive return when the implied volatility of the SPX Index is consistently greater than the realized volatility of the SPX Index, subject to transaction costs, a short position in a Synthetic Variance Swap is initiated on a Potential Variance Swap Start Date only when the Average Implied Volatility is greater than the Realized Volatility. Accordingly, on each Potential Variance Swap Start Date:

- if the Averaged Implied Volatility with respect to that Potential Variance Swap Start Date is greater than the Realized Volatility with respect to that Potential Variance Swap Start Date, a short position in a Synthetic Variance Swap will be initiated on that Potential Variance Swap Start Date; and

- if the Averaged Implied Volatility with respect to that Potential Variance Swap Start Date is less than or equal to the Realized Volatility with respect to that Potential Variance Swap Start Date, a short position in a Synthetic Variance Swap will not be initiated on that Potential Variance Swap Start Date.

With respect to a Potential Variance Swap Start Date, the "**Averaged Implied Volatility**" means the average implied volatility of the SPX Index determined as the arithmetic average of the VIX Index Levels over the twenty VIX Index Business Days that were not Disrupted VIX Index Business Days immediately preceding that Potential Variance Swap Start Date.

With respect to a Potential Variance Swap Start Date, the "**Realized Volatility**" means the annualized realized volatility of the SPX Index determined based on the logarithmic daily returns of the SPX Index over the five SPX Index Business Days that were not Disrupted SPX Index Business Days immediately preceding the relevant Potential Variance Swap Start Date. For more information about how the annualized realized volatility of the SPX Index is calculated, see the Rules attached as Annex A to this underlying supplement.

On any VIX Index Business Day, the "**VIX Index Level**" is the official closing level of the VIX Index published by the VIX Index Sponsor with respect to that VIX Index Business Day.

Step 2: Determine the Strike Level of the new Synthetic Variance Swap. On each Potential Variance Swap Start Date, the Index Calculation Agent will determine the Strike Level of the Synthetic Variance Swap, if any, that is to be initiated on that Potential Variance Swap Start Date. The Strike Level will reflect the VIX Index Level on that Potential Variance Swap Start Date, which is a measure of the implied volatility of the SPX Index on that Potential Variance Swap Start Date, less the Strike Adjustment. The Strike Adjustment is intended to approximate transaction costs, including bid-ask spreads and slippage costs, that would be experienced by a professional investor seeking to replicate the payoff of the hypothetical portfolio contemplated by the Variance Component. The slippage costs that are approximated in the Strike Adjustment arise from the limited availability of appropriate transactions and SPX Index options that could be used in seeking to replicate the payoff of the hypothetical portfolio contemplated by the Variance Component.

Because the VIX Index Level is expressed in terms of volatility points (*i.e.*, a volatility of 20% would be expressed as a VIX Index Level of 20 (or 20% × 100)), the calculation of the Strike Level also includes a divisor of 100 so that the Strike Level will be expressed in percentage terms.

The Strike Adjustment generally increases as the VIX Index Level increases, subject to a minimum of 1.1 and a maximum of 2.6. See "Risks Relating to the Variance Component — The determination of the strike levels as part of the calculation of the Variance Component includes a downward adjustment that will adversely affect the level of the Variance Component."

Accordingly, with respect to each Potential Variance Swap Start Date (which we refer to as the current Potential Variance Swap Start Date), the Index Calculation Agent will determine the Strike Level of the Synthetic Variance Swap, if any, that is to be initiated on that Potential Variance Swap Start Date as follows:

StrikeLevel(SD) = (VIX(SD) – StrikeAdjustment(SD)) / 100, subject to a minimum of 0%

where:

StrikeLevel(SD)	means the Strike Level of the Synthetic Variance Swap, if any, that is to be initiated on the current Potential Variance Swap Start Date;
VIX(SD)	means the VIX Index Level on the current Potential Variance Swap Start Date; and
StrikeAdjustment(SD)	means the Strike Adjustment with respect to the Synthetic Variance Swap, if any, that is to be initiated on the current Potential Variance Swap Start Date, calculated as follows:

StrikeAdjustment(SD) = (VIX(SD) × 5%) + 0.1, subject to a minimum of 1.1 and a maximum of 2.6

The following table shows the calculation of the Strike Adjustment and the Strike Level for a range of hypothetical VIX Index Levels as of the relevant Potential Variance Swap Start Date.

VIX Index Level	Strike Adjustment	Strike Level
10.00	1.10	8.90%
15.00	1.10	13.90%
20.00	**1.10**	**18.90%**
25.00	1.35	23.65%
30.00	1.60	28.40%
35.00	1.85	33.15%
40.00	2.10	37.90%
45.00	2.35	42.65%
50.00	**2.60**	**47.40%**
55.00	2.60	52.40%
60.00	2.60	57.40%
65.00	2.60	62.40%
70.00	2.60	67.40%

The numbers appearing in the table above are purely hypothetical, and actual VIX Index Levels, Strike Adjustments and Strike Levels may be different. These numbers should not be taken as an indication or prediction of future VIX Index Levels, Strike Adjustments or Strike Levels and are intended merely to illustrate how the Strike Adjustment and Strike Level may change in response to changes in VIX Index Levels in hypothetical scenarios.

Step 3: Determine the Variance Notional of the new Synthetic Variance Swap. On each Potential Variance Swap Start Date, the Index Calculation Agent will determine the Variance Notional of the Synthetic Variance Swap, if any, that is to be initiated on that Potential Variance Swap Start Date. The Variance Notional of each Synthetic Variance Swap is set so that, in general, if the realized volatility of the SPX Index is less than the Strike Level by 1%, the return on that Synthetic Variance Swap will be approximately 0.025% and if the realized volatility of the SPX Index is greater than the Strike Level by 1%, the return on that Synthetic Variance Swap will be approximately -0.025%. These returns are approximate rather than exact because the returns on Synthetic Variance Swaps are non-linear, as described under "General — The Variance Component" above. In addition, the further that the realized volatility of the SPX Index is from the Strike Level, the less accurate this approximation will be.

If the VIX Index Level on the VIX Index Business Day that was not a Disrupted VIX Index Business Day immediately preceding a Potential Variance Swap Start Date was less than 15, which would indicate low volatility market conditions, the Variance Notional of the Synthetic Variance Swap, if any, that is to be initiated on that Potential Variance Swap Start Date will be scaled down at a rate that increases as volatility decreases in order to reduce the exposure to that Synthetic Variance Swap, if any. In the past, the VIX Index Level has typically reverted over the longer term to a level that is near the historical average level of the VIX Index. Accordingly, the Variance Component will provide decreased exposure to any Synthetic Variance Swaps in low volatility market conditions when realized volatility may be expected to increase over the longer term.

With respect to each Potential Variance Swap Start Date (which we refer to as the current Potential Variance Swap Start Date), the Index Calculation Agent will determine the Variance Notional of the Synthetic Variance Swap, if any, that is to be initiated on that Potential Variance Swap Start Date as follows:

$$\textbf{VarianceNotional(SD)} = \frac{0.025\% \times \text{VarianceComp}(t-1)}{2 \times \text{StrikeLevel(SD)}} \times \text{LowVolReductionMultiplier(SD)}$$

where:

VarianceNotional(SD)	means the Variance Notional of the Synthetic Variance Swap, if any, that is to be initiated on the current Potential Variance Swap Start Date;
VarianceComp(t-1)	means the Variance Component Level with respect to the immediately preceding Variance Component Calculation Day that was not a Disrupted Variance Component Calculation Day;
StrikeLevel(SD)	means the Strike Level of the Synthetic Variance Swap, if any, that is to be initiated on the current Potential Variance Swap Start Date; and
LowVolReductionMultiplier(SD)	means: (a) one, if the VIX Index Level on the VIX Index Business Day that was not a Disrupted VIX Index Business Day immediately preceding the current Potential Variance Swap Start Date (the "**Prior VIX Index Level**") is greater than or equal to 15; or (b) the Prior VIX Index Level *divided* by 15, if the Prior VIX Index Level is less than 15.

Accordingly, assuming that (a) each month includes twenty Potential Variance Swap Start Dates, (b) a Synthetic Variance Swap is initiated on each Potential Variance Swap Start Date and (c) the VIX Index Level does not drop below 15, in general, if the realized volatility of the SPX Index is less than the Strike Level by 1%, the return on the Variance Component will be approximately 0.50% (or 20 × 0.025%) and if the realized volatility of the SPX Index is greater than the Strike Level by 1%, the return on the Variance Component will be approximately -0.50%. These returns are approximate rather than exact because the returns on Synthetic Variance Swaps are non-linear, as described under "General — The Variance Component" above. In addition, the further that the realized volatility of the SPX Index is from the respective Strike Levels, the less accurate this approximation will be.

The Active Synthetic Variance Swap Closing Level

The Active Synthetic Variance Swap Closing Level of each Active Synthetic Variance Swap on a Variance Component Calculation Day that is not a Disrupted Variance Component Calculation Day prior to the Maturity Date for that Active Synthetic Variance Swap reflects the mark-to-market value of that Active Synthetic Variance Swap. The Active Synthetic Variance Swap Closing Level of each Active Synthetic Variance Swap on the Maturity Date for that Active Synthetic Variance Swap reflects the final value of that Active Synthetic Variance Swap. In each case, on any relevant SPX Index Business Day (as set forth below), the Active Synthetic Variance Swap Closing Level of an Active Synthetic Variance Swap is determined by multiplying the Variance Notional of that Active Synthetic Variance Swap by the difference between the variance represented by the Strike Level of that Active Synthetic Variance Swap (i.e., the Strike Level of that Active Synthetic Variance Swap squared) and the Variance Level of that Active Synthetic Variance Swap on that SPX Index Business Day (subject to the Variance Cap described below).

The Index Calculation Agent determines the Active Synthetic Variance Swap Closing Level of each Active Synthetic Variance Swap with respect to any SPX Index Business Day that is (a) a Variance Component Calculation Day that is not a Disrupted Variance Component Calculation Day or (b) the Maturity Date for that Active Synthetic Variance Swap (we refer to that SPX Index Business Day as the current SPX Index Business Day) as follows:

$$\textbf{Swap(t)} = 100 \times \text{VarianceNotional(SD)} \times (\text{StrikeLevel(SD)}^2 - \text{CappedVariance(SD,t)})$$

where:

Swap(t) means the Active Synthetic Variance Swap Closing Level of that Active Synthetic Variance Swap with respect to the current SPX Index Business Day;

VarianceNotional(SD) means the Variance Notional of that Synthetic Variance Swap;

StrikeLevel(SD) means the Strike Level of that Synthetic Variance Swap; and

CappedVariance(SD,t) means the Variance Level of that Active Synthetic Variance Swap with respect to the current SPX Index Business Day, as described under "The Variance Level of an Active Synthetic Variance Swap" below, subject to the Variance Cap calculated as follows:

$$\textbf{VarianceCap(t)} = \left(1 + \frac{4}{\text{StrikeLevel(SD)}}\right) \times \text{StrikeLevel(SD)}^2$$

The purpose of the Variance Cap is to cap the loss on each Active Synthetic Variance Swap to approximately 5% of the Variance Component Level in order to lessen the likelihood of the Variance Component Level becoming negative under extreme market conditions.

The Variance Level of an Active Synthetic Variance Swap

In general, the Variance Level of an Active Synthetic Variance Swap, which is a mark-to-market value of that Active Synthetic Variance Swap, reflects the realized volatility of the SPX Index on each SPX Index Business Day that has elapsed since that Active Synthetic Variance Swap was initiated and the implied volatility with respect to each SPX Index Business Day remaining until the Maturity Date of that Active Synthetic Variance Swap.

The Index Calculation Agent determines the Variance Level of each Active Synthetic Variance Swap with respect to any SPX Index Business Day that is (a) a Variance Component Calculation Day that is not a Disrupted Variance Component Calculation Day or (b) the Maturity Date for that Active Synthetic Variance Swap (we refer to that SPX Index Business Day as the current SPX Index Business Day) as follows:

(a) if that SPX Index Business Day is the Potential Variance Swap Start Date on which that Active Synthetic Variance Swap is initiated:

$$\textbf{VarianceLevel(t)} = \text{ImpliedLevel(t)}$$

(b) if that SPX Index Business Day occurs after the Potential Variance Swap Start Date on which that Active Synthetic Variance Swap is initiated but before the Maturity Date with respect to that Active Synthetic Variance Swap:

$$\textbf{VarianceLevel(t)} = (\text{RealizedWeight(t)} \times \text{RealizedLevel(t)}) + (\text{ImpliedWeight(t)} \times \text{ImpliedLevel(t)})$$

(c) if that SPX Index Business Day is the Maturity Date with respect to that Active Synthetic Variance Swap:

$$\textbf{VarianceLevel(t)} = \text{RealizedLevel(t)}$$

where:

VarianceLevel(t) means the Variance Level of that Active Synthetic Variance Swap with respect to the current SPX Index Business Day;

ImpliedLevel(t) means the implied variance of the SPX Index with respect to the current SPX Index Business Day determined based on (a) if the current SPX Index Business Day is a VIX Index Business Day, the VIX Index Level for the current SPX Index Business Day, divided by 100 to be expressed in percentage terms, or (b) if the current SPX Index Business Day is not a VIX Index Business Day, the VIX Index Level for the VIX Index Business Day that was not a Disrupted VIX Index Business Day immediately preceding the current SPX Index Business Day, divided by 100 to be expressed in percentage terms;

RealizedLevel(t) means the annualized realized variance of the SPX Index with respect to the current SPX Index Business Day determined based on the logarithmic daily returns of the SPX Index over the period of the SPX Index Business Days from, but excluding, the Potential Variance Swap Start Date on which that Active Synthetic Variance Swap is initiated to, and including, the current SPX Index Business Day. With respect to any SPX Index Business Day that is a Disrupted Day (other than a Deemed Maturity Date), the daily return of the SPX Index will be zero. With respect to any SPX Index Business Day that is a Deemed Maturity Date, the daily return will be calculated using the Deemed SPX Index Level and the SPX Index Level with respect to the SPX Index Business Day that was not a Disrupted SPX Index Business Day immediately preceding that Deemed Maturity Date. For more information about how the annualized realized variance of the SPX Index is calculated, see the Rules attached as Annex A to this underlying supplement;

ImpliedWeight(t) means the weight given to the implied variance of the SPX Index in determining the Variance Level of that Active Synthetic Variance Swap with respect to the current SPX Index Business Day, calculated as:

(a) the number of days, as of the Potential Variance Swap Start Date on which that Active Synthetic Variance Swap is initiated, that are scheduled to be SPX Index Business Days (irrespective of whether any such day is or becomes a Disrupted SPX Index Business Day) from, but excluding, the current SPX Index Business Day to, and including, the Scheduled Maturity Date for that Active Synthetic Variance Swap *divided* by

(b) the number of days, as of the Potential Variance Swap Start Date on which that Active Synthetic Variance Swap is initiated, that are scheduled to be SPX Index Business Days (irrespective of whether any such day is or becomes a Disrupted SPX Index Business Day) from, but excluding, that Potential Variance Swap Start Date to, and including, the Scheduled Maturity Date for that Active Synthetic Variance Swap; and

RealizedWeight(t) means the weight given to the realized variance of the SPX Index in determining the Variance Level of that Active Synthetic Variance Swap with respect to the current SPX Index Business Day, calculated as one *minus* the Implied Weight on the current SPX Index Business Day.

"**SPX Index Level**" means, with respect to the SPX Index and an SPX Index Business Day, the official closing level of the SPX Index, as published by the SPX Index Sponsor for that SPX Index Business Day.

"**Deemed SPX Index Level**" means with respect to an SPX Index Business Day that is a Deemed Maturity Date, the level of the SPX Index as of the Scheduled Closing Time (as defined under "Index Disruption Events" below) on the Deemed Maturity Date, as determined by the Index Calculation Agent in accordance with the formula for and method of calculating the SPX Index Level in effect

immediately preceding the occurrence of the first Disrupted SPX Index Business Day resulting in that Deemed Maturity Date, using (a) if an event giving rise to a Disrupted SPX Index Business Day has not occurred with respect to the relevant security on the Deemed Maturity Date, the Exchange traded or quoted price as of the Scheduled Closing Time on the Deemed Maturity Date for the relevant security in the SPX Index and (b) if an event giving rise to a Disrupted SPX Index Business Day has occurred with respect to the relevant security on that Deemed Maturity Date, the Index Calculation Agent's good faith estimate of the per security value for the relevant security as of the Scheduled Closing Time on that Deemed Maturity Date.

The Additional Variance Swap Amount

The calculation of the Variance Component Level reflects the addition of any Additional Variance Swap Amount. With respect to each Variance Component Calculation Day that is not a Disrupted Variance Component Calculation Day, the purpose of the Additional Variance Swap Amount is to adjust the Variance Component Level to reflect the change in the value of any Synthetic Variance Swap with a Maturity Date that occurs after the immediately preceding Variance Component Calculation Day that was not a Disrupted Variance Component Calculation Day but before the current Variance Component Calculation Day. The change in value is measured from the immediately preceding Variance Component Calculation Day that was not a Disrupted Variance Component Calculation Day through the applicable Maturity Date for any relevant Synthetic Variance Swap.

"**Additional Variance Swap Amount**" means with respect to each Variance Component Calculation Day and any of the Previous Active Synthetic Variance Swaps (with respect to that Variance Component Calculation Day) whose Maturity Date occurred from, but excluding, the Variance Component Calculation Day that was not a Disrupted Variance Component Calculation Day immediately preceding that Variance Component Calculation Day to, but excluding, that Variance Component Calculation Day, an amount equal to:

(a) if there is no such Previous Active Synthetic Variance Swap, zero; or

(b) if there is one or more such Previous Active Synthetic Variance Swaps (i) the sum of the Active Synthetic Variance Swap Closing Level of each of such Previous Active Synthetic Variance Swaps on the relevant Maturity Date for the relevant Active Synthetic Variance Swap *minus* (ii) the sum of the Active Synthetic Variance Swap Closing Level of each such Previous Active Synthetic Variance Swap on the Variance Component Calculation Day that was not a Disrupted Variance Component Calculation Day immediately preceding that Variance Component Calculation Day.

"**Previous Active Synthetic Variance Swaps**" means, with respect to each Variance Component Calculation Day, the set of Active Synthetic Variance Swaps with respect to the Variance Component Calculation Day that was not a Disrupted Variance Component Calculation Day immediately preceding that Variance Component Calculation Day.

Calculation of Futures Component Levels

The Futures Component Level is calculated with respect to each Futures Component Calculation Day by adjusting the Futures Component Level as of the immediately preceding Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day (as defined under "Index Disruption Events" below) to reflect the return of the Futures Component since the immediately preceding Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day. On any Futures Component Calculation Day, the return of the Futures Component reflects the following:

- the return of the synthetic long position, if activated, since the immediately preceding Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day; and

- a deduction equal to the sum of a rebalancing adjustment factor of between 0.20% and 0.50% per day (depending on the level of the VIX Index on the immediately preceding VIX Index Business Day that was not a Disrupted VIX Index Business Day) (the "**Futures Rebalancing Adjustment Factor**"), applied to both (1) the aggregate notional amount of each of the VIX futures contracts hypothetically traded that Futures Component Calculation Day (the "**Daily Rebalancing Percentage**") and (2) the amount of the change, if any, in the level of the Long Return Exposure (the "**Long Exposure Change**"). The Futures Rebalancing Adjustment Factor is not a per annum fee.

On December 18, 2007 (the "**Futures Component Base Date**"), the Futures Component Level was 100.00. With respect to each Futures Component Calculation Day after the Futures Component Base Date that was not a Disrupted Futures Component Calculation Day (which we refer to as the current Futures Component Calculation Day), the Index Calculation Agent determines the Futures Component Level as follows:

$$\textbf{FuturesComp(t)} = \text{FuturesComp(t-1)} \times (1 + \text{FuturesCompReturn(t)})$$

where:

FuturesComp(t) means the Futures Component Level with respect to the current Futures Component Calculation Day;

FuturesComp(t-1) means the Futures Component Level with respect to the immediately preceding Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day; and

FuturesCompReturn(t) means the return of the Futures Component from the immediately preceding Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day to the current Futures Component Calculation Day, calculated as follows:

$$\textbf{FuturesCompReturn(t)} = (\text{LongReturnExposure(t-1)} \times \text{LongReturn(t)}) - \text{DailyRebalAdj(t)}$$

where:

LongReturn(t) means the return of the synthetic long position from the immediately preceding Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day to the current Futures Component Calculation Day, as described under "The Long Return" below;

LongReturnExposure(t-1) means the amount of any exposure to the synthetic long position (the "**Long Return Exposure**"), which will be between 0% and 100%, as of the immediately preceding Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day, as described under "The Long Position Exposure" below; and

DailyRebalAdj(t) means the amount, if any, deducted due to the Futures Rebalancing Adjustment Factor with respect to the current Futures Component Calculation Day, as described under "The Daily Rebalancing Adjustment Amount" below. This amount will be 0% if the synthetic long position is not activated on the current Futures Component Calculation Day.

Contract Rolling and VIX Futures Contract Weights

If the synthetic long position is activated, on the Futures Component Calculation Day immediately preceding each Futures Scheduled Final Settlement Date, all of the weight of the synthetic long position will be allocated to a long position in third-month VIX futures contracts (assuming that Futures Component Calculation Day is not a Disrupted Futures Component Calculation Day). Because the first-month VIX futures contracts are settled on each Futures Scheduled Final Settlement Date, those third-month VIX futures contracts will become second-month VIX futures contracts on that day. And then, on each succeeding Futures Component Calculation Day, a fraction of the notional amount of second-month VIX futures contracts is sold, and an equivalent notional amount of third-month VIX futures contracts is purchased. The fraction, or quantity, purchased is proportional to the total number of scheduled Futures Component Calculation Days that have elapsed since the last Futures Component Calculation Day over the total number of scheduled Futures Component Calculation Days in the period from, and including, one Futures Scheduled Final Settlement Date to, and including, the Futures Component Calculation Day immediately preceding the next following Futures Scheduled Final Settlement Date in which the current Futures Component Calculation Day falls. In this way, the initial long position in second-month VIX futures contracts is progressively moved to third-month VIX futures contracts over the course of the month so that, on the Futures Component Calculation Day immediately preceding the following Futures Scheduled Final Settlement Date, all of the weight of the synthetic long position will once again be allocated to a long position in third-month VIX futures contracts (assuming that Futures Component Calculation Day is not a Disrupted Futures Component Calculation Day).

Accordingly, the weights of the VIX futures contracts included in the Futures Component on any Futures Component Calculation Day (which we refer to as the current Futures Component Calculation Day) are calculated as follows:

$$\textbf{ContractWeight(A, p)} = dr / dp,$$

$$\textbf{ContractWeight(B, p)} = 1 - \text{ContractWeight}(A, p)$$

where:

ContractWeight(A, p)	means the weight of the second-month VIX futures contract with respect to the current Futures Component Calculation Day;
ContractWeight(B, p)	means the weight of the third-month VIX futures contract with respect to the current Futures Component Calculation Day;
dr	means the total number of Futures Component Calculation Days from, but excluding, the current Futures Component Calculation Day to, but excluding, the next following Futures Scheduled Final Settlement Date (irrespective of whether any of those day(s) is or becomes a Disrupted Futures Component Calculation Day); and
dp	means the total number of Futures Component Calculation Days in the period from, and including, one Futures Scheduled Final Settlement Date to, and including, the Futures Component Calculation Day immediately preceding the next following Futures Scheduled Final Settlement Date in which the current Futures Component Calculation Day occurs (irrespective of whether any of those day(s) is or becomes a Disrupted Futures Component Calculation Day).

"**Futures Scheduled Final Settlement Date**" means, with respect to a VIX futures contract, the originally scheduled final settlement date (or howsoever it is called) as published by the Related Exchange (whether or not the effective final settlement date is the date that was originally scheduled to be the final settlement date), which is currently the Wednesday falling 30 calendar days before the S&P 500 option expiration for the following month.

The Long Return

When the market for VIX futures contracts is in backwardation, excluding other considerations, the price of VIX futures contracts will increase as the contracts move nearer to maturity. If the prices of the VIX futures contracts that compose a synthetic long position increase on any Futures Component Calculation Day, the return with respect to a synthetic long position will be positive (which will have a *positive* effect on the Futures Component Level if the synthetic long position is activated). On the other hand, when the market for VIX futures contracts is in contango, excluding other considerations, the price of VIX futures contracts will decrease as the contracts move nearer to maturity. If the prices of the VIX futures contracts that compose a synthetic long position decrease on any Futures Component Calculation Day, the return with respect to a synthetic long position will be negative (which will have a *negative* effect on the Futures Component Level if the synthetic long position is activated).

The long return reflects the weighted average return of the VIX futures contracts included in the synthetic long position from the immediately preceding Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day.

Subject to "Disruptions Relating to Futures Scheduled Final Settlement Dates" below, on any Futures Component Calculation Day that is not a Futures Monthly Rebalanced Portfolio Day (which we refer to as the current Futures Component Calculation Day), the long return is calculated as follows:

$$\textbf{Long Return(t)} = \frac{[\text{ContractWeight}(A, t\text{-}1) \times \text{ContractPrice}(2, t)] + [\text{ContractWeight}(B, t\text{-}1) \times \text{ContractPrice}(3, t)]}{[\text{ContractWeight}(A, t\text{-}1) \times \text{ContractPrice}(2, t\text{-}1)] + [\text{ContractWeight}(B, t\text{-}1) \times \text{ContractPrice}(3, t\text{-}1)]} - 1$$

where:

ContractWeight(A, t-1) means the weight of the second-month VIX futures contract with respect to the immediately preceding Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day, calculated as set forth under "Contract Rolling and VIX Futures Contract Weights" above;

ContractWeight(B, t-1) means the weight of the third-month VIX futures contract with respect to the immediately preceding Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day, calculated as set forth under "Contract Rolling and VIX Futures Contract Weights" above;

ContractPrice(i, t) means the Daily Contract Reference Price of the ith-month VIX futures contract on the current Futures Component Calculation Day; and

ContractPrice(i, t-1) means the Daily Contract Reference Price of the ith-month VIX futures contract on the immediately preceding Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day.

Subject to "Disruptions Relating to Futures Scheduled Final Settlement Dates" below, on any Futures Component Calculation Day that is a Futures Monthly Rebalanced Portfolio Day, the formula for the long return is expressed differently to reflect that the third-month VIX futures contract has become the second-month VIX futures contract. In addition, the contract weights drop away because the weight of the synthetic long position is concentrated in a single contract on the Futures Component Calculation Day immediately preceding a Futures Scheduled Final Settlement Date.

Accordingly, the long return on any Futures Component Calculation Day that is a Futures Monthly Rebalanced Portfolio Day is calculated as follows:

$$\textbf{Long Return (t)} = \frac{\text{ContractPrice}(2, t)}{\text{ContractPrice}(3, t\text{-}1)} - 1$$

"**Futures Monthly Rebalanced Portfolio Day**" means the first Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day that immediately follows a Prior Undisrupted Futures Component Calculation Day.

"**Prior Undisrupted Futures Component Calculation Day**" means a Futures Component Calculation Day (a) that immediately precedes a Futures Scheduled Final Settlement Date and (b) that was not a Disrupted Futures Component Calculation Day.

The "**Daily Contract Reference Price**" means (a) with respect to any Futures Component Calculation Day that is the effective final settlement date for a VIX futures contract, the Futures Final Settlement Value of that VIX futures contract and (b) with respect to any Futures Component Calculation Day that is not the effective final settlement date for a VIX futures contract, the Futures Contract Closing Price of that VIX futures contract.

The "**Futures Final Settlement Value**" means, with respect to a VIX futures contract and a Futures Scheduled Final Settlement Date, the final settlement value (howsoever described in the rules of the Related Exchange) for that VIX futures contract as published by the Related Exchange with respect to the effective final settlement date for that VIX futures contract.

The "**Futures Contract Closing Price**" means, with respect to a VIX futures contract and a Futures Component Calculation Day, the official settlement price (howsoever described in the rules of the Related Exchange) for that VIX futures contract as published by the Related Exchange.

The Long Position Exposure

With respect to a Futures Component Calculation Day that is not a Disrupted Futures Component Calculation Day, the Long Return Exposure that will be used in the calculation of the Futures Component Level on the following Futures Component Calculation Day will vary between 0% and 100% in 25% increments and will be adjusted based on a comparison of the level of the VIX Index on each of the three consecutive immediately preceding Futures Component Calculation Days that were not Disrupted Futures Component Calculation Days to the weighted average of the Daily Contract Reference Prices of VIX futures contracts with a maturity that is one month less than the maturity of the VIX futures contracts included in the synthetic long position (*i.e.*, the first-month and second-month VIX futures contracts), whether activated or not (the "**Weighted Average Contract Price**"), on that preceding Futures Component Calculation Day as follows:

- if the level of the VIX Index is greater than or equal to the Weighted Average Contract Price on each of the three consecutive immediately preceding Futures Component Calculation Days that were not Disrupted Futures Component Calculation Days, the Long Return Exposure will be increased by 25%, subject to a maximum exposure of 100%, on the relevant Futures Component Calculation Day;

- if the level of the VIX Index is less than the Weighted Average Contract Price on each of the three consecutive immediately preceding Futures Component Calculation Days that were not Disrupted Futures Component Calculation Days, the Long Return Exposure will be decreased by 25%, subject to a minimum exposure of 0%, on the relevant Futures Component Calculation Day; and

- if the conditions in neither of the immediately preceding bullets are satisfied on the relevant Futures Component Calculation Day, the Long Return Exposure will not be increased or decreased on that Futures Component Calculation Day.

On any Futures Component Calculation Day, the Weighted Average Contract Price is calculated as follows:

$$\text{ContractWeight}(A, t) \times \text{ContractPrice}(1, t) + \text{ContractWeight}(B, t) \times \text{ContractPrice}(2, t)$$

Because large price movements in VIX futures contracts can occur suddenly, the VIX futures contracts may rapidly move from backwardation to contango or from contango to backwardation; however, the Long Return Exposure will remain unchanged until the applicable conditions have been satisfied for three consecutive Futures Component Calculation Days that are not Disrupted Futures Component Calculation Days, after which the Long Return Exposure will change in increments of 25% per Futures Component Calculation Day, subject to a maximum exposure of 100% and a minimum exposure of 0%. Accordingly, several Futures Component Calculation Days will pass following a change in the futures market before the synthetic long position will be fully activated (*i.e.*, where the Long Return Exposure is equal to 100%) or deactivated (*i.e.*, where the Long Return Exposure is equal to 0%), by which time market conditions may have changed. No assurance can be given that the Long Return Exposure will be adjusted quickly enough for the investment strategy on which the Futures Component is based to be successful. See "Risk Factors — Risks Relating to the Futures Component — Due to the time lag inherent in the Futures Component, the Long Return Exposure may not be adjusted quickly enough in response to a change in market conditions for the investment strategy on which the Futures Component is based to be successful" in this underlying supplement.

The following table shows the Long Return Exposure on each of twenty Futures Component Calculation Days based on hypothetical VIX Index Levels and hypothetical Weighted Average Contract Prices, assuming a Long Return Exposure of 0% on Futures Component Calculation Days 0, -1 and -2.

Futures Component Calculation Day	VIX Index Level	Weighted Average Contract Price	VIX Index Level is greater than Weighted Average Contract Price	Long Return Exposure Effective on the Futures Component Calculation Day
-2	25.00	24.00	Yes	0%
-1	25.50	23.50	Yes	0%
0	26.00	25.50	Yes	0%
1	25.50	25.25	Yes	25%
2	26.00	26.50	No	50%
3	25.75	23.75	Yes	50%
4	26.50	26.00	Yes	50%
5	27.75	25.75	Yes	50%
6	31.00	34.00	No	75%
7	33.75	35.75	No	75%
8	36.00	38.00	No	75%
9	37.75	39.75	No	50%
10	39.00	41.00	No	25%
11	39.75	40.50	No	0%
12	40.00	39.75	Yes	0%
13	39.75	41.75	No	0%
14	39.00	41.00	No	0%
15	37.75	39.75	No	0%
16	36.00	38.00	No	0%
17	33.75	31.75	Yes	0%
18	31.00	29.00	Yes	0%
19	27.75	25.75	Yes	0%
20	24.00	22.00	Yes	25%

The numbers appearing in the table above are purely hypothetical, and actual VIX Index Levels and Weighted Average Contract Prices and the actual Long Return Exposure may be different. These numbers should not be taken as an indication or prediction of future VIX Index Levels or Weighted Average Contract Prices or future Long Return Exposures and are intended merely to illustrate how the Long Return Exposure may change in response to changes in VIX Index Levels and Weighted Average Contract Prices in hypothetical scenarios.

The Daily Rebalancing Adjustment Amount

On each Futures Component Calculation Day (which we refer to as the current Futures Component Calculation Day), the Futures Component Level is subject to the daily deduction of a hypothetical amount that reflects the Futures Rebalancing Adjustment Factor of between 0.20% and 0.50% per day (depending on the VIX Index Level on the immediately preceding VIX Index Business Day that was not a Disrupted VIX Index Business Day) to both (a) the aggregate notional amount of each of the VIX futures contracts hypothetically traded that day and (b) the amount of the change, if any, in the level of the Long Return Exposure, calculated as follows:

$$\textbf{DailyRebalAdj(t)} = (\text{DailyRebalPercentage}(t) + \text{LongExpChange}(t)) \times \text{FRAF}$$

where:

DailyRebalPercentage(t) means the Daily Rebalancing Percentage, if any, on the current Futures Component Calculation Day, determined as described below;

LongExpChange(t) means the Long Exposure Change, if any, on the current Futures Component Calculation Day, determined as described below; and

FRAF means the Futures Rebalancing Adjustment Factor on the current Futures Component Calculation Day, determined by reference to the VIX Index Level on the immediately preceding VIX Index Business Day that was not a Disrupted VIX Index Business Day, determined as follows:

Level of the VIX Index on the immediately preceding VIX Index Business Day that was not a Disrupted VIX Index Business Day	Futures Rebalancing Adjustment Factor
=< 35	0.20%
=< 50 and > 35	0.30%
=< 70 and > 50	0.40%
> 70	0.50%

The product of (a) the sum of the Daily Rebalancing Percentage as of the current Futures Component Calculation Day and the Long Exposure Change as of the current Futures Component Calculation Day and (b) the Futures Rebalancing Adjustment Factor is intended to approximate the VIX futures slippage costs (expressed as a percentage of the Futures Component Level as of the immediately preceding Futures Component Calculation Day) that would be experienced by a professional investor seeking to replicate the hypothetical portfolio contemplated by the Futures Component at prices that approximate the official settlement prices (which are not generally tradable) of the relevant VIX futures contracts. VIX futures slippage costs are costs that arise from deviations between the actual official settlement price of a VIX futures 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 a VIX futures contract.

On any Futures Component Calculation Day (which we refer to as the current Futures Component Calculation Day), the Daily Rebalancing Percentage is composed of the following:

(a) changes in the notional amount (expressed as a percentage of the Futures Component Level as of the immediately preceding Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day) allocated to the second-month VIX futures contract from the immediately preceding Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day to the current Futures Component Calculation Day due to the net effect of:

    (i) if the Long Return Exposure is greater than 0% on the immediately preceding Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day, the decrease in the synthetic long exposure to the second-month VIX futures contract from the immediately preceding Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day to the current Futures Component Calculation Day as a result of the roll for that day required to maintain the weighted average maturity of the synthetic long position; and

    (ii) the change, if any, in the exposure to the second-month VIX futures contract arising from the change, if any, in the Long Return Exposure (if the relevant criteria set forth above are satisfied so that the Long Return Exposure is increasing or decreasing, this amount will be equal to 25%; otherwise, it will be equal to 0%) from the immediately preceding Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day to the current Futures Component Calculation Day; and

(b) changes in the notional amount (expressed as a percentage of the Futures Component Level as of the immediately preceding Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day) allocated to the third-month VIX futures contract from the immediately preceding Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day to the current Futures Component Calculation Day due to the net effect of:

    (i) if the Long Return Exposure is greater than 0% on the immediately preceding Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day, the increase in the synthetic long exposure to the third-month VIX futures contract from the immediately preceding Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day to the current Futures Component Calculation Day as a result of the roll for that day required to maintain the weighted average maturity of the synthetic long position; and

    (ii) the change, if any, in the exposure to the third-month VIX futures contract arising from the change, if any, in the Long Return Exposure (if the relevant criteria set forth above are satisfied so that the Long Return Exposure is increasing or decreasing, this amount will be equal to 25%; otherwise, it will be equal to 0%) from the immediately preceding Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day to the current Futures Component Calculation Day.

The decrease or increase in the exposure to a VIX futures contract is, in each case, the difference between the notional exposure based on the weight of the applicable VIX futures contract on the current Futures Component Calculation Day and the notional exposure based on the weight of that VIX futures contract on the immediately preceding Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day, adjusted to reflect the change in the Daily Reference Contract Price from the immediately preceding Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day. In addition, the weights of the VIX futures contracts included in the synthetic long position are adjusted to reflect the Long Return Exposure on the relevant Futures Component Calculation Day.

On any Futures Component Calculation Day (which we refer to as the current Futures Component Calculation Day), the Long Exposure Change represents the amount of the change in the level of the Long Return Exposure (if the relevant criteria set forth above are satisfied so that the Long Return Exposure is increasing or decreasing, this amount will be equal to 25%; otherwise, it will be equal to 0%) from the immediately preceding Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day to the current Futures Component Calculation Day. While the change in the Long Return Exposure will be reflected in the Daily Rebalancing Percentage (see (a)(ii) and (b)(ii) above), the amount of the change in the level of the Long Return Exposure is also included separately as the Long Exposure Change in order to approximate the additional VIX futures slippage costs that would be incurred when hypothetically rebalancing a larger position of VIX futures contracts in connection with a 25% increase or decrease in the Long Return Exposure.

For example, assume that (a) the Daily Reference Contract Price of the second-month VIX futures contract is the same as the Daily Reference Contract Price of the third-month VIX futures contract, (b) the Daily Reference Contract Price of each VIX futures contract remains unchanged from the immediately preceding Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day to the current Futures Component Calculation Day, (c) the period from, and including, one Futures Scheduled Final Settlement Date to, and including, the Futures Component Calculation Day immediately preceding the next following Futures Scheduled Final Settlement Date consists of 20 Futures Component Calculation Days, (d) the immediately preceding Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day was a Futures Scheduled Final Settlement Date and (e) the Long Return Exposure is 75% on the immediately preceding Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day and the current Futures Component Calculation Day. Under these circumstances, 1/20, or 5%, of the VIX futures contracts included in the synthetic long position would be rolled on each Futures Component Calculation Day. The Daily Rebalancing Percentage would be calculated as follows:

$$\underbrace{|(90\% \times 75\%) - (95\% \times 75\%)|}_{A} + \underbrace{|(10\% \times 75\%) - (5\% \times 75\%)|}_{B} = \underbrace{3.75\%}_{A} + \underbrace{3.75\%}_{B} = \mathbf{7.50\%}$$

As shown above, the roll of the synthetic long position requires:

- an adjustment in the allocation of the synthetic long position to the second-month VIX futures contract from 95% to 90%, taking into account that the Long Return Exposure remains at 75% (this is captured in part "A" of the equation above), and

- an adjustment in the allocation of the synthetic long position to the third-month VIX futures contract from 5% to 10%, taking into account that the Long Return Exposure remains at 75% (this is captured in part "B" of the equation above).

The Long Exposure Change would be calculated as follows:

$$|75\% - 75\%| = \mathbf{0\%}$$

Because the Long Return Exposure remains unchanged at 75%, the Long Exposure Change is 0%.

The percentage reduction in the Futures Component Level due to the Futures Rebalancing Adjustment Factor is equal to the product of (a) the sum of the Daily Rebalancing Percentage and the Long Exposure Change and (b) the Futures Rebalancing Adjustment Factor. Assuming that the VIX Index Level on the previous Futures Component Calculation Day that was not a Disrupted VIX Index Business Day is less than or equal to 35, so that the Futures Rebalancing Adjustment Factor on the current Futures Component Calculation Day is equal to 0.20%, the percentage reduction in the Futures Component Level due to the Futures Rebalancing Adjustment Factor with respect to the current Futures Component Calculation Day would be calculated as follows:

$$(7.50\% + 0\%) \times 0.20\% = \mathbf{0.015\%}$$

Given the assumptions stated above, the percentage reduction in the Futures Component Level due to the Futures Rebalancing Adjustment Factor over the course of a one-month roll period would be equal to 0.30% (or 3.60% over the course of a year).

If, however, the VIX Index Level were greater than 70, the Futures Rebalancing Adjustment Factor on the current Futures Component Calculation Day would be equal to 0.50%, and the percentage reduction in the Futures Component Level due to the Futures Rebalancing Adjustment Factor with respect to the current Futures Component Calculation Day would be calculated as follows:

$$(7.50\% + 0\%) \times 0.50\% = \mathbf{0.0375\%}$$

The Daily Rebalancing Percentage is significantly greater on Futures Component Calculation Days on which the Long Return Exposure changes than on Futures Component Calculation Days on which no such change occurs. If, on the Futures Component Calculation Day described above, the Long Return Exposure had decreased by 25% instead of remaining unchanged, the Daily Rebalancing Percentage would be calculated as follows:

$$\underbrace{|(90\% \times 50\%) - (95\% \times 75\%)|}_{A} + \underbrace{|(10\% \times 50\%) - (5\% \times 75\%)|}_{B} = \underbrace{26.25\%}_{A} + \underbrace{1.25\%}_{B} = \mathbf{27.50\%}$$

As shown above, to effect the roll of the synthetic long position as well as to effect the reduction of the Long Return Exposure requires:

- an adjustment in the allocation of the synthetic long position to the second-month VIX futures contract from 95% to 90%, taking into account that the Long Return Exposure is also adjusted from 75% to 50% (this is captured in part "A" of the equation above), and
- an adjustment in the allocation of the synthetic long position to the third-month VIX futures contract from 5% to 10%, taking into account that the Long Return Exposure is also adjusted from 75% to 50% (this is captured in part "B" of the equation above).

The Long Exposure Change would be calculated as follows:

$$|50\% - 75\%| = \mathbf{25\%}$$

Because the Long Return Exposure is reduced from 75% to 50%, the Long Exposure Change is 25%.

Assuming that the VIX Index Level on the previous Futures Component Calculation Day that was not a Disrupted VIX Index Business Day is less than or equal to 35, so that the Futures Rebalancing Adjustment Factor on the current Futures Component Calculation Day is equal to 0.20%, the percentage reduction in the Futures Component Level due to the Futures Rebalancing Adjustment Factor with respect to the current Futures Component Calculation Day would be calculated as follows:

$$(27.50\% + 25\%) \times 0.20\% = \mathbf{0.105\%}$$

If, however, the VIX Index Level were greater than 70, the Futures Rebalancing Adjustment Factor on the current Futures Component Calculation Day would be equal to 0.50%, and the percentage reduction in the Futures Component Level due to the Futures Rebalancing Adjustment Factor with respect to the current Futures Component Calculation Day would be calculated as follows:

$$(27.50\% + 25\%) \times 0.50\% = \mathbf{0.2625\%}$$

As shown above, the sum of the Daily Rebalancing Percentage and the Long Exposure Change is significantly greater on Futures Component Calculation Days on which the Long Return Exposure changes than on Futures Component Calculation Days on which no such change occurs. In addition, the Futures Rebalancing Adjustment Factor increases as the VIX Index Level increases, and the Futures

Rebalancing Adjustment Factor can be as high as 0.50% on any given Futures Component Calculation Day. These examples are purely hypothetical, and the actual percentage reduction in the Futures Component Level due to the Futures Rebalancing Adjustment Factor on any Futures Component Calculation Day may be different from the percentages shown above. See "Risk Factors — Risks Relating to the Futures Component — The daily rebalancing adjustment amount is likely to have a substantial adverse effect on the level of the Futures Component over time" in this underlying supplement.

For more information about how the Daily Rebalancing Percentage and the Long Exposure Change are calculated for purposes of determining the percentage reduction in the Futures Component Level due to the Futures Rebalancing Adjustment Factor, see the Rules attached as Annex A to this underlying supplement.

Disruptions Relating to Futures Scheduled Final Settlement Dates

If any Futures Component Calculation Day is a Disrupted Futures Component Calculation Day, then the relevant Futures Component Calculation Day will be deemed to be the first following Futures Component Calculation Day that is not a Disrupted Futures Component Calculation Day (the "**First Following Undisrupted Futures Component Calculation Day**").

On the First Following Undisrupted Futures Component Calculation Day following one or more consecutive Disrupted Futures Component Calculation Days (the first such Disrupted Futures Component Calculation Day being the "**First Disrupted Futures Component Calculation Day**"), the Index Calculation Agent will determine the Futures Component Level in accordance with the methodology set out under "Calculation of Futures Component Levels."

If the First Following Undisrupted Futures Component Calculation Day occurs on or after a Futures Scheduled Final Settlement Date and the relevant First Disrupted Futures Component Calculation Day occurs before that Futures Scheduled Final Settlement Date, then for the purposes of calculating the Futures Component Level with respect to that First Following Undisrupted Futures Component Calculation Day:

- except with respect to ContractPrice(1, t), references to ContractPrice(i, t) will be deemed to be references to ContractPrice(i-1, t); and
- ContractPrice(1, t) will be deemed to be the Futures Final Settlement Value of the relevant VIX futures contract scheduled to expire on that Futures Scheduled Final Settlement Date (as published by the Related Exchange).

If the First Following Undisrupted Futures Component Calculation Day occurs on or after a Futures Scheduled Final Settlement Date and the relevant First Disrupted Futures Component Calculation Day occurs before that Futures Scheduled Final Settlement Date, the Index Calculation Agent will make such adjustments to the methodology for determining the Daily Rebalancing Percentage, as the Index Calculation Agent determines in good faith are appropriate, in order to determine a Daily Rebalancing Percentage that accounts for the aggregate notional percentage of VIX futures contracts rebalanced in respect of that First Following Undisrupted Futures Component Calculation Day.

If the period from, and including, the First Disrupted Futures Component Calculation Day to, but excluding, the First Following Undisrupted Futures Rebalancing Day includes more than one Futures Scheduled Final Settlement Date, the Index Calculation Agent will make such adjustments to the Rules, as it determines in good faith are appropriate, to account for that fact.

Index Disruption Events

"**Disrupted Index Calculation Day**" means any day that is a Disrupted Variance Component Calculation Day or a Disrupted Futures Component Calculation Day.

"**Disrupted Variance Component Calculation Day**" means any Variance Component Calculation Day that is (a) a Disrupted SPX Index Business Day or (ii) a Disrupted VIX Index Business Day.

"**Disrupted SPX Index Business Day**" means any SPX Index Business Day on which (a) a Market Disruption Event has occurred or is continuing with respect to the SPX Index or (b) any Exchange or Related Exchange for the SPX Index fails to open for trading during its regular trading session.

"**Disrupted VIX Index Business Day**" means any VIX Index Business Day on which (a) a Market Disruption Event has occurred or is continuing with respect to the VIX Index or (b) any Related Exchange for the VIX Index fails to open for trading during its regular trading session.

"**Disrupted Futures Component Calculation Day**" means any Futures Component Calculation Day on which (a) a Market Disruption Event has occurred or is continuing with respect to any VIX futures contract, (b) any Related Exchange for any VIX futures contract fails to open for trading during its regular trading session, which Related Exchange is specified with respect to any VIX futures contract, (c) a Market Disruption Event has occurred or is continuing with respect to the VIX Index or (d) any Related Exchange for the VIX Index fails to open for trading during its regular trading session.

"**Market Disruption Event**" means the occurrence of one or more of the following events that, in the determination of the Index Calculation Agent in its sole discretion, materially interferes with the ability of market participants to transact in positions with respect to the Index or any Constituent:

(a) with respect to the SPX Index and an SPX Index Business Day:

(i) a failure by Standard & Poor's Financial Services LLC (the "**SPX Index Sponsor**") to calculate and publish the SPX Index Level for that day within the scheduled or usual timeframe for publication; or

(ii) the occurrence or existence of (x) at any time during the one-hour period that ends at the Scheduled Closing Time, (1) a Trading Disruption or (2) an Exchange Disruption, in either case that the Index Calculation Agent determines is material, or (y) an Early Closure.

For the purposes of determining whether a Market Disruption Event with respect to the SPX Index exists at any time, if a Market Disruption Event occurs with respect to a security included in the SPX Index at any time, then the relevant percentage contribution of that security to the level of the SPX Index will be the percentage contribution of that security as of the Scheduled Closing Time on the immediately preceding SPX Index Business Day, as published by Bloomberg Financial Markets (or if Bloomberg Financial Markets ceases to publish such percentage contributions, a replacement therefor acceptable to the Index Calculation Agent) (the "**Percentage Publisher**"); *provided* that if the Percentage Publisher does not publish such a percentage contribution at that time, the relevant percentage contribution will be determined by the Index Calculation Agent based on the price for the securities included in the SPX Index as of the Scheduled Closing Time on the immediately preceding SPX Index Business Day, as reported in the official real-time price dissemination mechanism for the relevant Exchange (or, if trading in a security included in the SPX Index is disrupted at that time, based on the Index Calculation Agent's estimate of the price of the relevant security at that time);

(b) with respect to a VIX futures contract and a Futures Component Calculation Day:

(i) a failure by the Related Exchange to publish the Futures Contract Closing Price for that VIX futures contract;

(ii) a failure by the Related Exchange to publish the Futures Final Settlement Value on any of (x) the Futures Scheduled Final Settlement Date, (y) a later date to which the final settlement date for that VIX futures contract has been postponed, but that is not the effective final settlement date for that VIX futures contract or (z) the effective final settlement date for that VIX futures contract;

(iii) the occurrence or existence of a suspension, absence or material limitation of trading for that VIX futures contract or any futures or options contracts relating to the VIX Index on the Related Exchange during the last one-hour period preceding the close of the principal trading session on the Related Exchange;

(iv) a breakdown or failure in the price and trade reporting systems of the Related Exchange as a result of which the reported trading prices for that VIX futures contract or any futures or options contracts relating to the VIX Index are materially inaccurate during the last one-hour period preceding the close of the principal trading session on the Related Exchange; or

(v) any event that disrupts or impairs the ability of market participants generally to effect transactions in or obtain market values for that VIX futures contract or the VIX Index on that Futures Component Calculation Day during the last one-hour period preceding the close of the principal trading session on the Related Exchange. Such events may include, but are not limited to, the occurrence with respect to that VIX futures contract of a Trading Disruption, Exchange Disruption or Early Closure; and

(c) with respect to the VIX Index and either a VIX Index Business Day or a Futures Component Calculation Day (as the case may be), a failure by the VIX Index Sponsor to calculate and publish the VIX Index Level for that day within the scheduled or usual timeframe for publication.

"**Trading Disruption**" means

(a) with respect to the SPX Index, any suspension of or limitation imposed on trading by any Exchange or Related Exchange or otherwise and whether by reason of movements in price exceeding limits permitted by the relevant Exchange or Related Exchange or otherwise (i) relating to securities that compose 20% or more of the level of the SPX Index or (ii) in futures or options contracts relating to the SPX Index on the Related Exchange; and

(b) with respect to a VIX futures contract, any suspension of or limitation imposed on trading by the Related Exchange or otherwise and whether by reason of movements in price exceeding limits permitted by the Related Exchange or otherwise relating to that VIX futures contract or options contracts on that VIX futures contract.

"**Exchange Disruption**" means:

(a) with respect to the SPX Index, any event (other than an Early Closure) that disrupts or impairs (as determined by the Index Calculation Agent) the ability of market participants in general (i) to effect transactions in, or obtain market values for, securities that compose 20% or more of the level of the SPX Index or (ii) to effect transactions in, or obtain market values for, futures or options contracts relating to the SPX Index on the Related Exchange; and

(b) with respect to a VIX futures contract, any event (other than an Early Closure) that disrupts or impairs (as determined by the Index Calculation Agent) the ability of market participants in general to effect transactions in, or obtain market values for that VIX futures contract or options contracts on that VIX futures contract on the Related Exchange.

"**Early Closure**" means:

(a) with respect to the SPX Index, the closure on any SPX Index Business Day of any Exchange(s) relating to securities that compose 20% or more of the level of the SPX Index or the Related Exchange prior to its Scheduled Closing Time unless t earlier closing is announced by such Exchange(s) or Related Exchange (as the case may be) at least one hour prior to the earlier of (i) the actual closing time for the regular trading session of that Exchange or Related Exchange (as the case may be) on that SPX Index Business Day and (ii) if applicable, the submission deadline for orders to be entered into that Exchange or Related Exchange system for execution at the Scheduled Closing Time on that SPX Index Business Day; and

(b) with respect to a VIX futures contract, the closure on any Futures Component Calculation Day of the Related Exchange prior to its Scheduled Closing Time unless that earlier closing time is announced by the Related Exchange at least one hour prior to the actual closing time for the regular trading session on such exchange(s) on that Futures Component Calculation Day.

"**Scheduled Closing Time**" means:

(a) with respect to the SPX Index, the scheduled weekday closing time of the applicable Exchange or Related Exchange on an SPX Index Business Day, without regard to after hours or any other trading outside of the regular trading session hours; and

(b) with respect to a VIX futures contract, the scheduled weekday closing time of the applicable Related Exchange on a Futures Component Calculation Day, without regard to after hours or any other trading outside of the regular trading session hours.

"**Constituent**" means (1) the SPX Index, (2) each VIX futures contract and (3) the VIX Index.

Extraordinary Events

Certain events, which we refer to as "Extraordinary Events," will cause the Index Calculation Agent to replace or remove a Constituent, make an adjustment to the Rules as it determines in good faith is appropriate or cease publication of the Index.

Successor Constituent

If:

- a Constituent that is not a VIX futures contract is (a) not calculated and announced by the applicable Constituent Sponsor but is calculated and announced by a successor sponsor acceptable to the Index Calculation Agent; or (b) replaced by a successor index using, in the determination of the Index Calculation Agent, the same or a substantially similar formula for and method of calculation as used in the calculation of that Constituent; or

- a Constituent that is a VIX futures contract is (a) not calculated and quoted by the Related Exchange but is calculated and quoted by a successor exchange acceptable to the Index Calculation Agent; or (b) replaced by a successor futures contract using, in the determination of the Index Calculation Agent, the same or substantially similar contract specifications, formula and method of calculation as used for the relevant VIX futures contract,

(each such Constituent, for purposes of this paragraph, the "**Affected Constituent**"), then the Index Calculation Agent may (a) determine that index or futures contract, as the case may be (the "**Successor Constituent**"), to be or continue to be, as the case may be, the Constituent with effect from a date determined by the Index Calculation Agent and (b) make such adjustments to the Rules as it determines are appropriate to account for that change.

"**Constituent Sponsor**" means, with respect to the SPX Index or the VIX Index, the SPX Index Sponsor and the VIX Index Sponsor, respectively.

Material Change to a Constituent* or *Cancellation or Non-Publication of a Constituent

If, on or prior to any Index Calculation Day:

- with respect to the SPX Index or the VIX Index, the relevant Constituent Sponsor (a) makes a material change in the formula for or the method of calculating that Constituent or in any other way materially modifies that Constituent (other than a modification prescribed in that formula or method to maintain that Constituent in the event of changes in components or other routine events); (b) permanently cancels that Constituent and no Successor Constituent exists; or (c) announces that it is unable or unwilling to publish a level for that Constituent; or

- with respect to a VIX futures contract, (a) the terms of that VIX futures contract are materially changed or modified, including, but not limited to, a change in the scheduled final settlement date of that VIX futures contract, (b) trading in that VIX futures contract is permanently discontinued or relocates to an exchange or quotation system on which there is not comparable liquidity relative to that VIX futures contract as on the original Related Exchange for that VIX futures contract, and no Successor Constituent for that Constituent exists or (c) the Related Exchange announces its intention to cease publishing a level for that VIX futures contract, and no Successor Constituent exists,

(each such Constituent, for purposes of this paragraph, the "**Affected Constituent**"), then the Index Calculation Agent may (a) exclude the Affected Constituent from the Index or substitute for the Affected Constituent in the Index, and in either case may adjust the Rules as it determines to be appropriate to account for such change(s) including, without limitation, in the case of substitution, selecting (i) a replacement equity index, futures contract and/or volatility index (as the case may be) having characteristics similar to the equity index, futures contract and/or volatility index (as the case may be) being replaced and (ii) the date such replacement is effective, or (b) cease publication of the Index on such date as is determined by the Index Calculation Agent.

Cancellation of License or Permission

If, with respect to the Index, at any time, any license granted (if required) to the Index Sponsor or the Index Calculation Agent (or any of their affiliates) to use any Constituent (for purposes of this paragraph, the "**Affected Constituent**") for the purposes of the Index terminates, or the rights of the Index Sponsor or the Index Calculation Agent (or any of their affiliates) to use the Affected Constituent for the purposes of the Index is otherwise disputed, impaired or ceases (for any reason), then the Index Calculation Agent may (a) exclude the Affected Constituent from the Index or substitute for the Affected Constituent in the Index, and in either case may adjust the Rules as it determines to be appropriate to account for that event including, without limitation, in the case of substitution selecting (i) a replacement equity index, futures contract and/or volatility index having characteristics similar to the equity index, futures contract and/or volatility index (as the case may be) being replaced and (ii) the date such replacement is effective or (b) cease publication of the Index on such date as is determined by the Index Calculation Agent.

Change in Law

Without prejudice to the ability of the Index Sponsor or the Index Calculation Agent to amend or adjust the Rules, upon the occurrence of a Change in Law that affects any Constituent (for purposes of this paragraph, the "**Affected Constituent**"), the Index Calculation Agent may (a) exclude the Affected Constituent from the Index or substitute for the Affected Constituent in the Index, and in either case may adjust the Rules as it determines to be appropriate to account for such change(s) including, without limitation, in the case of substitution, selecting (i) a replacement equity index, futures contract and/or volatility index having characteristics similar to the equity index, futures contract and/or volatility index (as the case may be) being replaced and (ii) the date such replacement is effective, or (b) cease publication of the Index on such date as is determined by the Index Calculation Agent.

"**Change in Law**" means on or after May 29, 2013 due to (a) the adoption of, or any change in, any applicable law, regulation, order or rule (including, without limitation, any tax law or adoption or promulgation of new regulations authorized or mandated by existing statute) or (b) the promulgation of, or any change in, the announcement or statement of a formal or informal interpretation, application, exercise or operation by any court, tribunal or regulatory authority with competent jurisdiction of any applicable law, regulation, order or rule (including, without limitation, rules or regulations promulgated or implemented by the U.S. Commodity and Futures Trading Commission, the U.S. Securities and Exchange Commission or any exchange or trading facility), whether in the case of clause (a) or (b) of this definition the Index Calculation Agent determines that (i) it is contrary to that law, regulation, order or rule for any market participants that are brokers or financial intermediaries (individually or collectively) to hold, acquire or dispose of (in whole or in part) any financial asset,

transaction or interest in or relating to a Constituent or any component of a Constituent or (ii) holding a position in any financial asset, transaction or interest in or relating to a Constituent or any component of a Constituent is (or, but for the consequent disposal or termination thereof, would otherwise be) in excess of any allowable position limit(s) applicable to any market participants that are brokers or financial intermediaries (individually or collectively) under any such law, regulation, order or rule.

Amendments to the Rules

The Rules may be amended from time to time at the discretion of the Index Sponsor and will be re-published (in a manner determined by the Index Sponsor from time to time) no later than one calendar month following that amendment.

Although the Rules are intended to be comprehensive, ambiguities may arise. If ambiguities arise, the Index Calculation Agent (if necessary, in consultation with the Index Sponsor) will resolve such ambiguities in its discretion and, if necessary, the Index Sponsor will amend the Rules to reflect such resolution.

Corrections

If, with respect to the Index:

- the level or price of the SPX Index, any VIX futures contract, the VIX Index or any other variable, input or other parameter that is used to calculate the Index Level for any Index Calculation Day is subsequently corrected and the correction is published by the relevant Constituent Sponsor for the SPX Index or the VIX Index, the Related Exchange for any VIX futures contract or the relevant publication source; or

- the Index Calculation Agent identifies an error or omission in any of its calculations or determinations with respect to the Index Level for any Index Calculation Day,

then the Index Calculation Agent may, if practicable and if it considers that correction, error or omission material, correct the published Index Level for that day and/or each subsequent Index Calculation Day. The Index Calculation Agent will publish (in the manner determined by the Index Calculation Agent) such corrected Index Level(s) as soon as reasonably practicable.

BACKGROUND ON FUTURES CONTRACTS ON THE CBOE VOLATILITY INDEX®

Futures contracts on the VIX Index ("VIX futures contracts") were first launched for trading by the CBOE in 2004. VIX futures contracts have expirations ranging from the front month consecutively out to the tenth month. VIX futures contracts allow investors the ability to invest in forward market volatility based on their view of the future direction or movement of the VIX Index. Investors who believe the implied volatility of the S&P 500® Index will increase may buy VIX futures contracts, expecting that the level of the VIX Index will increase. Conversely, investors who believe that the implied volatility of the S&P 500® Index will decline may sell VIX futures contracts, expecting that the level of the VIX Index will fall.

VIX futures contracts are reported by Bloomberg L.P. under the ticker symbol "VX."

Overview of Futures Markets

When the synthetic long position is activated, the Futures Component maintains a synthetic long position in second-month and third-month VIX futures contracts. VIX futures contracts are traded on regulated futures exchanges, in the over-the-counter market and on various types of electronic trading facilities and markets. At present, all of the VIX futures contracts included in the Futures Component are exchange-traded futures contracts. An exchange-traded futures contract provides for the purchase and sale of a specified type and quantity of an underlying asset or financial instrument during a stated delivery month for a fixed price. Because the VIX Index is not a tangible item that can be purchased and sold directly, a VIX futures contract provides for the payment and receipt of cash based on the level of the VIX Index at settlement or liquidation of the VIX futures contract. A futures contract provides for a specified settlement month in which the cash settlement is made or in which the underlying asset or financial instrument is to be delivered by the seller (whose position is therefore described as "short") and acquired by the purchaser (whose position is therefore described as "long").

No purchase price is paid or received on the purchase or sale of a futures contract. Instead, an amount of cash or cash equivalents must be deposited with the broker as "initial margin." This amount varies based on the requirements imposed by the exchange clearing houses, but it may be lower than 5% of the notional value of the contract. This margin deposit provides collateral for the obligations of the parties to the futures contract.

By depositing margin, which may vary in form depending on the exchange, with the clearing house or broker involved, a market participant may be able to earn interest on its margin funds, thereby increasing the total return that it may realize from an investment in futures contracts.

In the United States, futures contracts are traded on organized exchanges, known as "designated contract markets." At any time prior to the expiration of a futures contract, a trader may elect to close out its position by taking an opposite position on the exchange on which the trader obtained the position, subject to the availability of a liquid secondary market. This operates to terminate the position and fix the trader's profit or loss. Futures contracts are cleared through the facilities of a centralized clearing house and a brokerage firm, referred to as a "futures commission merchant," which is a member of the clearing house.

Unlike equity securities, futures contracts, by their terms, have stated expirations at a specified point in time prior to expiration. At a specific point in time prior to expiration, trading in a futures contract for the current delivery month will cease. As a result, a market participant wishing to maintain its exposure to a futures contract on a particular asset or financial instrument with the nearest expiration must close out its position in the expiring contract and establish a new position in the contract for the next delivery month, a process referred to as "rolling." For example, a market participant with a long position in a VIX futures contract expiring in November who wishes to maintain a position in the nearest delivery month will, as the November contract nears expiration, sell the November contract, which serves to close out the existing long position, and buy a VIX futures contract expiring in December. This will "roll" the November position into a December position, and, when the November contract expires, the market participant will still have a long position in the nearest delivery month.

Futures exchanges and clearing houses in the United States are subject to regulation by the Commodity Futures Trading Commission. Exchanges may adopt rules and take other actions that affect trading, including imposing speculative position limits, maximum price fluctuations and trading halts and suspensions and requiring liquidation of contracts in certain circumstances. Futures markets outside the United States are generally subject to regulation by comparable regulatory authorities. The structure and nature of trading on non-U.S. exchanges, however, may differ from this description.

BACKGROUND ON THE CBOE VOLATILITY INDEX®

We have derived all information contained in this underlying supplement regarding the CBOE Volatility Index® (the "VIX Index") including, without limitation, its make-up, method of calculation and changes in its components, from publicly available information, without independent verification. This information reflects the policies of, and is subject to change by, the Chicago Board Options Exchange, Incorporated (the "CBOE"). The VIX Index was developed by the CBOE and is calculated, maintained and published by the CBOE. The CBOE has no obligation to continue to publish, and may discontinue the publication of, the VIX Index.

The VIX Index is reported by Bloomberg L.P. under the ticker symbol "VIX."

Index Overview

The VIX Index is a benchmark index designed to measure the market price of 30-day expected volatility of large cap U.S. stocks, and is calculated based on the prices of certain put and call options on the S&P 500® Index. For more information about the S&P 500® Index, please see "Background on the S&P 500® Index" in this underlying supplement.

The VIX Index measures the premium paid by investors for certain options linked to the level of the S&P 500® Index. During periods of market instability, the implied level of volatility of the S&P 500® Index typically increases and, consequently, the prices of options linked to the S&P 500® Index typically increase (assuming all other relevant factors remain constant or have negligible changes). This, in turn, causes the level of the VIX Index to increase. The VIX Index has historically had negative correlations to the S&P 500® Index.

The calculation of the VIX Index involves a formula that uses the prices of a weighted series of out-of-the money put and call options on the level of the S&P 500® Index ("SPX Options") with two adjacent expiry terms to derive a constant 30-day measure of expected market volatility. The VIX Index is calculated independent of any particular option pricing model.

Calculation of the VIX Index Level

To arrive at the VIX Index Level, a broad range of out-of-the money SPX Options expiring on two different dates between 23 and 37 days from the measurement date ("near-term options" and "next-term options," respectively) are selected to bracket a 30-day period from the measurement date. Once each week, the SPX Options "roll" to new contract maturities to capture a new near-term and next-term option. The model-free implied volatility using prices of the near-term options and next-term options are then calculated on a strike price weighted average basis to arrive at a single average implied volatility value for each. Those two results are then interpolated to arrive at a single value with a constant maturity of 30 days to expiration. The VIX Index Level is expressed in percentage points.

Stock indices, such as the S&P 500® Index, are calculated using the prices of their component stocks. Each index employs rules that govern the selection of component securities and a formula to calculate index values. The VIX Index is a volatility index comprised of options rather than stocks, with the price of each option reflecting the market's expectation of future volatility. Like conventional indices, the VIX Index employs rules for selecting component options and a formula to calculate index values.

The generalized formula used in the VIX Index Level calculation is:

$$\sigma^2 = \frac{2}{T}\sum_i \frac{\Delta K_i}{K_i^2} e^{RT} Q(K_i) - \frac{1}{T}\left[\frac{F}{K_0} - 1\right]^2$$

where:

σ is	VIX Index Level/100 ⇨ VIX Index Level = $\sigma \times 100$
T	Time to expiration
F	Forward index level derived from index option prices
K_0	First strike below the forward index level, F
K_i	Strike price of ith out-of-the-money option; a call if $K_i > K_0$ and a put if $K_i < K_0$; both put and call if $K_i = K_0$
ΔK_i	Interval between strike prices - half the distance between the strike on either side of K_i: $$\Delta K_i = \frac{K_{i+1} - K_{i-1}}{2}$$ (Note: ΔK for the lowest strike is simply the difference between the lowest strike and the next higher strike. Likewise, ΔK for the highest strike is the difference between the highest strike and the next lower strike.)
R	Risk-free interest rate to expiration
$Q(K_i)$	The midpoint of the bid-ask spread for each option with strike K_i.

Hypothetical Calculation of VIX Index Level

The following example illustrates how the VIX Index Level may be calculated in a hypothetical scenario.

Getting Started

The VIX Index measures 30-day expected volatility of the S&P 500® Index. The components of the VIX Index calculation are near-term and next-term put and call options with more than 23 days and less than 37 days to expiration. These include SPX Options with "standard" third Friday expiration dates and "weekly" SPX Options that expire every Friday, except the third Friday of each month. Once each week, the SPX Options used to calculate VIX "roll" to new contract maturities. For example, on the second Tuesday in October, the VIX Index would be calculated using SPX Options expiring 24 days later (*i.e.*, the near-term options) and 31 days later (*i.e.*, the next-term options). On the following day, the SPX Options that expire in 30 calendar days would become the near-term options and the SPX Options that expire in 37 calendar days would be the next-term options.

In this hypothetical example, the near-term options are "standard" SPX Options with 25 days to expiration, the next-term options are P.M.-settled "weekly" SPX Options with 32 days to expiration; and the calculation reflects prices observed at 9:46 a.m. Chicago time. For the purpose of calculating time to expiration, "standard" SPX Options are deemed to "expire" at the open of trading on SPX Option settlement day - the third Friday of the month, and "weekly" SPX Options are deemed to expire at the close of trading (*i.e.*, 3:00 p.m. CT).

Technically, the expiration date for the "standard" SPX Options is the "Saturday following the third Friday of the expiration month." In this example, however, expiration is deemed to take place at the determination of the exercise settlement value of the SPX Option, which is based on the opening prices of component securities of the S&P 500® Index.

The VIX Index calculation measures time to expiration, T, in calendar days and divides each day into minutes in order to replicate the precision that is commonly used by professional option and volatility traders. The time to expiration is given by the following expression:

$$T = \{M_{Current\ day} + M_{Settlement\ day} + M_{Other\ days}\}/\text{Minutes in a year}$$

where:

$M_{Current\ day}$ = number of minutes remaining until midnight of the current day

$M_{Settlement\ day}$ = number of minutes from midnight until 8:30 a.m. on SPX settlement day

$M_{Other\ days}$ = total number of minutes in the days between current day and settlement day

Using 9:46 a.m. as the time of the calculation, T for the near-term and next-term options, T_1 and T2, respectively, is:

$$T_1 = \{854 + 510 + 34{,}560\} / 525{,}600 = \mathbf{0.0683486}$$
$$T_2 = \{854 + 900 + 44{,}640\} / 525{,}600 = \mathbf{0.0882686}$$

The risk-free interest rates, R_1 and R_2, are the bond-equivalent yields of the U.S. T-bill maturing closest to the expiration dates of relevant SPX Options. As such, the VIX Index calculation may use different risk-free interest rates for near-term and next-term options. In this example, assume that R_1 = 0.0305% for the near-term options and that R_2 = 0.0286% for the next term options. Note that in this example, T_2 uses a value of 900 for $M_{Settlement\ day}$, which reflects the 3:00 p.m. expiration time of the next-term "weekly" SPX Options

Since many of the interim calculations are repetitive, only representative samples appear below.

Step 1: Select the options to be used in the VIX Index Level calculation

The selected options are out-of-the-money SPX calls and out-of-the-money SPX puts centered around an at-the-money strike price, K0. Only SPX Options quoted with non-zero bid prices are used in the VIX Index Level calculation.

As volatility rises and falls, the strike price range of options with non-zero bids tends to expand and contract. As a result, the number of options used in the VIX Index Level calculation may vary from month-to-month, day-to-day and possibly, even minute-to-minute.

For each of the near-term options and next-term options:

- Determine the forward SPX level, F, by identifying the strike price at which the absolute difference between the call and put prices is smallest. The call and put prices in the following table reflect the average of each option's bid / ask quotation. As shown below, the difference between the call and put prices is smallest at the **1965** strike for the near-term options and the 1960 strike for the next-term options.

Near-term options				**Next-term options**			
Strike Price	**Call**	**Put**	**Difference**	**Strike Price**	**Call**	**Put**	**Difference**
1940	38.45	15.25	23.20	1940	41.05	18.80	22.25
1945	34.70	16.55	18.15	1945	37.45	20.20	17.25

Near-term options				Next-term options			
Strike Price	**Call**	**Put**	**Difference**	**Strike Price**	**Call**	**Put**	**Difference**
1950	31.10	18.25	12.85	1950	34.05	21.60	12.45
1955	27.60	19.75	7.85	1955	30.60	23.20	7.40
1960	24.25	21.30	2.95	***1960***	***27.30***	***24.90***	***2.40***
1965	***21.05***	***23.15***	***2.10***	1965	24.15	26.90	2.75
1970	18.10	25.05	6.95	1970	21.10	28.95	7.85
1975	15.25	27.30	12.05	1975	18.30	31.05	12.75
1980	12.75	29.75	17.00	1980	15.70	33.50	17.80

Using the 1965 call and put in the near-term option and the 1960 call and put in the next-term option applied to the formula

$$F = \text{Strike Price} + e^{RT} \times (\text{Call Price} - \text{Put Price}),$$

the forward index prices, F_1 and F_2, for the near-term and next-term options, respectively, are:

$$F_1 = 1965 + e^{(0.000305 \times 0.0683486)} \times (21.05 - 23.15) = \mathbf{1962.89996}$$
$$F_2 = 1960 + e^{(0.000286 \times 0.0882686)} \times (27.30 - 24.90) = \mathbf{1962.40006}$$

- Next, determine K_0 - the strike price immediately below the forward index level, F - for the near-term and next-term options. In this example, $K_{0,1} = 1960$ and $K_{0,2} = 1960$.

- Select out-of-the-money put options with strike prices < K_0. Start with the put strike immediately lower than K_0 and move to successively lower strike prices. Exclude any put option that has a bid price equal to zero (*i.e.*, no bid). As shown below, once two puts with consecutive strike prices are found to have zero bid prices, no puts with lower strikes are considered for inclusion. (Note that the 1350 and 1355 put options are not included despite having non-zero bid prices)

Put Strike	Bid	Ask	Include?
1345	0.00	0.15	*Not considered following two zero bids*
1350	**0.05**	**0.15**	
1355	**0.05**	**0.35**	
1360	0.00	0.35	No
1365	0.00	0.35	No
1370	0.05	0.35	Yes
1375	0.10	0.15	Yes
1380	0.10	0.20	Yes

- Next, select out-of-the-money call options with strike prices > K_0. Start with the call strike immediately higher than K_0 and move to successively higher strike prices, excluding call options that have a bid price of zero. As with the puts, once two consecutive call options are found to

have zero bid prices, no calls with higher strikes are considered. (Note that the 2225 call option is not included despite having a nonzero bid price.)

Call Strike	Bid	Ask	Include?
2095	0.05	0.35	Yes
2100	0.05	0.15	Yes
2120	0.00	0.15	No
2125	0.05	0.15	Yes
2150	0.00	0.10	No
2175	0.00	0.05	No
2200	0.00	0.05	*Not considered following two zero bids*
2225	***0.05***	***0.10***	
2250	0.00	0.05	

- Finally, select **both** the put and call with strike price K_0. Notice that two options are selected at K_0, while a single option, either a put or a call, is used for every other strike price.

The following table contains the options used to calculate the VIX Index Level in this example. The VIX Index Level uses the average of quoted bid and ask, or mid-quote, prices for each option selected. The K_0 put and call prices are averaged to produce a single value. The price used for the 1960 strike in the near-term is, therefore, (24.25 + 21.30)/2 = 22.775; and the price used in the next-term is (27.30 + 24.90)/2 = 26.10.

Near-term Strike	Option Type	Mid-quote price	Next-term Strike	Option Type	Mid-quote Price
1370	Put	0.20	1275	Put	0.075
1375	Put	0.125	1325	Put	0.15
1380	Put	0.15	1350	Put	0.15
-	-	-	-	-	-
1950	Put	18.25	1950	Put	21.60
1955	Put	19.75	1955	Put	23.20
1960	***Put/Call Average***	***22.775***	***1960***	***Put/Call Average***	***26.10***
1965	Call	21.05	1965	Call	24.15
1970	Call	18.10	1970	Call	21.10
-	-	-	-	-	-
2095	Call	0.20	2125	Call	0.10
2100	Call	0.10	2150	Call	0.10
2125	Call	0.10	2200	Call	0.08

Step 2: Calculate the volatility for both near-term and next-term options

Applying the VIX Index formula described under "— Calculation of the VIX Index Level" to the near-term and next-term options with time to expiration of T_1 and T_2, respectively, yields:

$$\sigma^2{}_1 = \frac{2}{T_1}\sum_i \frac{\Delta K_i}{K_i^2} e^{R_1 T_1} Q(K_i) \; - \; \frac{1}{T_1}\left[\frac{F_1}{K_0} - 1\right]^2$$

$$\sigma^2{}_2 = \frac{2}{T_2}\sum_i \frac{\Delta K_i}{K_i^2} e^{R_2 T_2} Q(K_i) \; - \; \frac{1}{T_2}\left[\frac{F_2}{K_0} - 1\right]^2$$

The VIX Index is an amalgam of the information reflected in the prices of all of the selected options. The contribution of a single option to the VIX Index value is proportional to ΔK and the price of that option, and inversely proportional to the square of the option's strike price.

Generally, ΔK_i is half the difference between the strike prices on either side of K_i. For example, ΔK for the next-term 1325 Put is 37.5: $\Delta K_{1325\ Put}$ = (1350 – 1275)/2. At the upper and lower edges of any given strip of options, ΔK_i is simply the difference between K_i and the adjacent strike price. In this example, the 1370 Put is the lowest strike in the strip of near-term options and 1375 is the adjacent strike price. Therefore, $\Delta K_{1370\ Put}$ = 5, *i.e.*, 1375 – 1370.

The contribution of the near-term 1370 Put is given by:

$$\frac{\Delta K_{1370Put}}{K^2_{1370\ Put}} e^{R_1 T_1} Q(1370Put)$$

$$\frac{\Delta K_{1370\,Put}}{K^2_{1370\,Put}} e^{R_1 T_1} Q(1370Put) = \frac{5}{1370^2} e^{0.000305(0.0683486)} (0.20) = 0.0000005328$$

A similar calculation is performed for each option. The resulting values for the near-term options are then summed and multiplied by $2/T_1$. Likewise, the resulting values for the next-term options are summed and multiplied by $2/T_2$. The table below summarizes the results for each strip of options in our example:

Near-term Strike	Option Type	Mid-quote Price	Contribution by Strike	Next-term Strike	Option Type	Mid-quote Price	Contribution by Strike
1370	Put	0.20	0.0000005328	1275	Put	0.075	0.0000023069
1375	Put	0.125	0.0000003306	1325	Put	0.15	0.0000032041
1380	Put	0.15	0.0000003938	1350	Put	0.15	0.0000020577
-	-	-	-	-	-	-	-
1950	Put	18.25	0.0000239979	1950	Put	21.60	0.0000284031
1955	Put	19.75	0.0000258376	1955	Put	23.20	0.0000303512
1960	***Put/Call Average***	***22.775***	***0.0000296432***	***1960***	***Put/Call Average***	***26.10***	***0.0000339711***
1965	Call	21.05	0.0000272588	1965	Call	24.15	0.0000312732

Near-term Strike	Option Type	Mid-quote Price	Contribution by Strike
1970	Call	18.10	0.0000233198
-	-	-	-
2095	Call	0.20	0.0000002278
2100	Call	0.10	0.0000003401
2125	Call	0.10	0.0000005536

$$\frac{2}{T}\sum_i \frac{\Delta K_i}{K_i^2} e^{RT} Q(K_i) = \mathbf{0.000632052}$$

Next-term Strike	Option Type	Mid-quote Price	Contribution by Strike
1970	Call	21.10	0.0000271851
-	-	-	-
2125	Call	0.10	0.0000005536
2150	Call	0.10	0.0000008113
2200	Call	0.075	0.0000007748

$$\frac{2}{T}\sum_i \frac{\Delta K_i}{K_i^2} e^{RT} Q(K_i) = \mathbf{0.000831402}$$

Next, calculate $\frac{1}{T}\left[\frac{F}{K_0}-1\right]^2$ for the near-term (T_1) and next-term (T_2):

$$\frac{1}{T_1}\left[\frac{F_1}{K_0}-1\right]^2 = \frac{1}{0.0683486}\left[\frac{1962.89996}{1960}-1\right]^2 = 0.00003203$$

$$\frac{1}{T_2}\left[\frac{F_2}{K_0}-1\right]^2 = \frac{1}{0.0882686}\left[\frac{1962.40006}{1960}-1\right]^2 = 0.00001699$$

Now calculate σ^2_1 and σ^2_2*:*

$$\boldsymbol{\sigma^2_1} = \frac{2}{T_1}\sum_i \frac{\Delta K_i}{K_i^2} e^{R_1T_1} Q(K_i) - \frac{1}{T_1}\left[\frac{F_1}{K_0}-1\right]^2 = 0.018495 - 0.00003203 = \mathbf{0.01846292}$$

$$\boldsymbol{\sigma^2_2} = \frac{2}{T_2}\sum_i \frac{\Delta K_i}{K_i^2} e^{R_2T_2} Q(K_i) - \frac{1}{T_2}\left[\frac{F_2}{K_0}-1\right]^2 = 0.018838 - 0.00001699 = \mathbf{0.01882101}$$

Step 3: Calculate the 30-day weighted average of σ^2_1 and σ^2_2. Then take the square root of that value and multiply by 100 to get the VIX Index Level

$$VIX\ Index\ Level = 100 \times \sqrt{\left\{T_1\sigma_1^2\left[\frac{N_{T_2}-N_{30}}{N_{T_2}-N_{T_1}}\right] + T_2\sigma_2^2\left[\frac{N_{30}-N_{T_1}}{N_{T_2}-N_{T_1}}\right]\right\} \times \frac{N_{365}}{N_{30}}}$$

The inclusion of "weekly" SPX Options in the VIX Index Level calculation means that the near-term options will always have more than 23 days to expiration and the next-term options will always have less than 37 days to expiration, so the resulting VIX Index value will always reflect an interpolation of σ^2_1 and σ^2_2; each individual weight is less than or equal to 1 and the sum of the weights equals 1.

Returning to the example…

N_{T1} = number of minutes to settlement of the near-term options (35,924)

N_{T2} = number of minutes to settlement of the next-term options (46,394)
N_{30} = number of minutes in 30 days (30 × 1,440 = 43,200)
N_{365} = number of minutes in a 365-day year (365 × 1,440 = 525,600)

$$\text{VIX Index Level} = 100 \times \sqrt{\left\{0.0683486 \times 0.0184629 \times \left[\frac{43{,}394 - 43{,}200}{46{,}394 - 35{,}942}\right] + 0.0882686 \times 0.018821 \times \left[\frac{43{,}200 - 35{,}924}{46{,}394 - 35{,}924}\right]\right\} \times \frac{525{,}600}{43{,}200}}$$

VIX Index Level = 100 × 0.13685821 = 13.69

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The S&P 500® Index is reported by Bloomberg L.P. under the ticker symbol "SPX."

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ANNEX A

J.P. Morgan Volemont Strategy – U.S. Equity Series

Strategy Rules

J.P.Morgan

May 29, 2013

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PART A

General Rules

1. This Document

1.1 Publication and availability of the Strategy Rules

This document comprises the rules of the J.P. Morgan Volemont Strategy – U.S. Equity Series (the "**Series**"), a family of notional rules-based proprietary indices.

The Strategy Rules for each Strategy in the Series is composed of:

(a) this Part A, which sets out the general rules and general definitions applicable to each Strategy within the Series;

(b) the Applicable Part, which sets out the rules applicable to a specific Strategy within the Series. Additional definitions for a specific Strategy are also contained in the Applicable Part; and

(c) the Applicable Module, which sets out information relating to a Strategy, including (among other things): (1) the name of the Strategy and the Bloomberg ticker, (2) the Currency of the Strategy, (3) the Constituents of the Strategy and (4) other specific rules or information applicable to the Strategy.

The table below sets out certain of the Strategies included in the J.P. Morgan Volemont Strategy – U.S. Equity Series and relevant Parts and Modules of this document that compose the Strategy Rules for each Strategy:

Strategy	Strategy Rules – applicable Parts and Module
J.P. Morgan U.S. Volemont Strategy – U.S. Equity (Series 1) (USD)	Part A, Part B and Module B1.0

1.2 Publication and availability of the Strategy Rules

The Strategy Rules are published by J.P. Morgan Securities plc of 25 Bank Street, Canary Wharf, London E14 5JP, in its capacity as Strategy Sponsor.

The Strategy Sponsor may, in its discretion, publish only the Strategy Rules applicable to one or more of the Strategies by removing the Parts and Modules from this document that do not apply to such Strategies and amending Section 1.1 above as necessary.

Copies of the Strategy Rules may be obtained by holders of investments linked to one or more Strategies free of charge on request from the Strategy Sponsor.

1.3 Amendments

The Strategy Rules for a Strategy may be amended from time to time at the discretion of the Strategy Sponsor and will be re-published (in a manner determined by the Strategy Sponsor from time to time) no later than one calendar month following such amendment.

Although the Strategy Rules are intended to be comprehensive, ambiguities may arise. If ambiguities arise, the Strategy Calculation Agent (if necessary, in consultation with the Strategy Sponsor) will resolve such ambiguities in its discretion and, if necessary, the Strategy Sponsor will amend the Strategy Rules to reflect such resolution.

1.4 No advice or offer of securities

The Strategy Rules do not constitute investment, taxation, legal, accounting or other advice, including within the meaning of Article 53 of the Financial Services and Markets Act 2000 (Regulated Activities) Order 2001 or Article 4(4) of the Markets in Financial Instruments Directive 2004/39/EC.

In constructing, calculating or otherwise performing any activity with respect to a Strategy, the Strategy Sponsor or the Strategy Calculation Agent (as the case may be) is solely using information that is already in the public domain.

The Strategy Rules neither constitute an offer to purchase or sell securities nor constitute specific advice of whatever form (tax, legal, accounting or regulatory) in respect of any investment strategy or investment that may be linked to any Strategy.

1.5 Each Strategy is synthetic

Each Strategy references a "notional" or synthetic exposure to certain Constituents and there is no actual portfolio of assets to which any person is entitled or in which any person has any ownership interest. Each Strategy merely identifies the Constituents and a rules-based trading strategy, the performance of which is used as a reference point for calculating Strategy Levels.

2. Strategy Sponsor and Strategy Calculation Agent

2.1 Identity

J.P. Morgan Securities plc is the sponsor of each Strategy (the "**Strategy Sponsor**").

In respect of the Strategy, the Strategy Sponsor may designate any entity (including a non-related third party) from time to time to act as calculation agent in connection with such Strategy (the "**Strategy Calculation Agent**"). As of the Strategy Live Date, unless otherwise indicated in the relevant Module for the relevant Strategy, the Strategy Sponsor has initially designated itself as the Strategy Calculation Agent for such Strategy.

2.2 Strategy Sponsor and Strategy Calculation Agent standards

Each of the Strategy Sponsor and the Strategy Calculation Agent shall act in good faith and in a commercially reasonable manner in respect of determinations, interpretations and calculations made by it pursuant to the Strategy Rules.

2.3 Strategy Sponsor and Strategy Calculation Agent determinations

All determinations, interpretations and calculations of the Strategy Sponsor and the Strategy Calculation Agent relating to the Strategy Rules shall be final, conclusive and binding and no person shall be entitled to make any claim against the Strategy Sponsor, the Strategy Calculation Agent or any other Relevant Person in respect thereof. None of the Strategy Sponsor, the Strategy Calculation Agent and any other Relevant Person shall:

(a) be under any obligation to revise any determination, interpretation or calculation made or action taken for any reason in connection with the Strategy Rules or any Strategy; or

(b) have any responsibility to any person for any determination, interpretation or calculation made or anything done (or omitted to be done) (whether as a result of negligence or otherwise) in respect of any Strategy or in respect of the publication of the Strategy Level (or failure to publish such level) or any use to which any person may put a Strategy or the Strategy Levels.

3. Strategy Levels

3.1 Strategy Base Level and Strategy Base Date

The Strategy Base Level and the Strategy Base Date for each Strategy are specified in the Applicable Module.

3.2 Publication of Strategy Levels

Unless a Strategy Calculation Day is a Disrupted Strategy Calculation Day, the Strategy Calculation Agent shall calculate and publish (in a manner determined by the Strategy Calculation Agent from time to time) the level of each Strategy (the "**Strategy Level**") in respect of each Strategy Calculation Day in accordance with the Strategy Rules.

All Strategy Levels are rounded to 2 decimal places only for purposes of publication before being published in the Currency of the Strategy.

4. Corrections in respect of a Strategy

If, in respect of a Strategy:

(a) the level or price of the Equity Index, any Futures Contract, the Volatility Index or any other variable, input or other parameter that is used to calculate the Strategy Level for any Strategy Calculation Day is subsequently corrected and the correction is published by the relevant Constituent Sponsor for the Equity Index or the Volatility Index, the Related Exchange for any Futures Contract or the relevant publication source; or

(b) the Strategy Calculation Agent identifies an error or omission in any of its calculations or determinations with respect to the Strategy Level of a Strategy for any Strategy Calculation Day,

then the Strategy Calculation Agent may, if practicable and if it considers such correction, error or omission material, correct the published Strategy Level for such day and/or each subsequent Strategy Calculation Day. The Strategy Calculation Agent shall publish (in such manner determined by the Strategy Calculation Agent) such corrected Strategy Level(s) as soon as reasonably practicable.

5. Market Disruption Events

If a Strategy Calculation Day is a Disrupted Strategy Calculation Day, then the Strategy Calculation Agent will not calculate or publish the Strategy Level for such Strategy Calculation Day and will suspend the calculation and publication of the Strategy Level until the first succeeding Strategy Calculation Day that is not a Disrupted Strategy Calculation Day.

6. Extraordinary Events

6.1 Successor Constituent

If, in respect of a Strategy:

(a) a Constituent that is not a Futures Contract is (i) not calculated and announced by the applicable Constituent Sponsor, but is calculated and announced by a successor sponsor acceptable to the Strategy Calculation Agent, or (ii) replaced by a successor index using, in the determination of the Strategy Calculation Agent, the same or a substantially similar formula for and method of calculation as used in the calculation of that Constituent; or

(b) a Constituent that is a Futures Contract is (i) not calculated and quoted by the Related Exchange but is calculated and quoted by a successor exchange acceptable to the Strategy Calculation Agent, or (ii) replaced by a successor futures contract using, in the determination of the Strategy Calculation Agent, the same or substantially similar contract specifications, formula and method of calculation as used for the relevant Futures Contract;

(each such Constituent, for purposes of this Section 6.1, the "**Affected Constituent**"), then the Strategy Calculation Agent may (x) determine that index or futures contract, as the case may be, (the "**Successor Constituent**") to be or continue to be, as the case may be, the Constituent with effect from a date determined by the Strategy Calculation Agent and (y) make such adjustments to the Strategy Rules as it determines are appropriate to account for such change.

6.2 Material change to a Constituent, or cancellation or non-publication of a Constituent

If, on or prior to any Strategy Calculation Day:

(a) in respect of a Constituent that is not a Futures Contract, the relevant Constituent Sponsor (i) makes a material change in the formula for or the method of calculating such Constituent or in any other way materially modifies that Constituent (other than a modification prescribed in that formula or method to maintain that Constituent in the event of changes in components or other routine events), (ii) permanently cancels such Constituent and no Successor Constituent exists or (iii) announces that it is unable or unwilling to publish a level for such Constituent; or

(b) in respect of a Constituent that is a Futures Contract, (i) the terms of such Futures Contract are materially changed or modified, including, but not limited to, a change in the scheduled final settlement date of such Futures Contract, (ii) trading in such Futures Contract is permanently discontinued or relocates to an exchange or quotation system on which there is not comparable liquidity relative to such Futures Contract as on the original Related Exchange for such Futures Contract, and no Successor Constituent for such Constituent exists or (iii) the Related Exchange announces its intention to cease publishing a level for such Futures Contract, and no Successor Constituent exists,

(each such Constituent, for purposes of this Section 6.2, the "**Affected Constituent**"), then the Strategy Calculation Agent may (i) exclude the Affected Constituent from the Strategy or substitute for the Affected Constituent in the Strategy, and in either case may adjust the Strategy Rules as it determines to be appropriate to account for such change(s) including, without limitation, in the case of substitution, selecting (a) a replacement equity index, futures contract and/or volatility index (as the case may be) having characteristics similar to the equity index, futures contract and/or volatility index (as the case may be) being replaced and (b) the date such replacement is effective, or (ii) cease publication of the Strategy on such date as is determined by the Strategy Calculation Agent.

6.3 Cancellation of relevant license

If, in respect of a Strategy, at any time, any license granted (if required) to the Strategy Sponsor or the Strategy Calculation Agent (or any of their affiliates) to use any Constituent (for purposes of this Section 6.3, the "**Affected Constituent**") for the purposes of such Strategy terminates, or the rights of the Strategy Sponsor or the Strategy Calculation Agent (or any of their affiliates) to use the Affected Constituent for the purposes of such Strategy is otherwise disputed, impaired or ceases (for any reason), then the Strategy Calculation Agent may (i) exclude the Affected Constituent from the Strategy or substitute for the Affected Constituent in the Strategy, and in either case may adjust the Strategy Rules as it determines to be appropriate to account for such event including, without limitation, in the case of substitution selecting (a) a replacement equity index, futures contract and/or volatility index having characteristics similar to the equity index, futures contract and/or volatility index (as the case may be) being replaced and (b) the date such replacement is effective or (ii) cease publication of the Strategy on such date as is determined by the Strategy Calculation Agent.

6.4 Change in Law

Without prejudice to the ability of the Strategy Sponsor or the Strategy Calculation Agent to amend or adjust the Strategy Rules, upon the occurrence of a Change in Law that affects any Constituent (for purposes of this Section 6.4, the "**Affected Constituent**"), the Strategy Calculation Agent may (i) exclude the Affected Constituent from the Strategy or substitute for the Affected Constituent in the Strategy, and in either case may adjust the Strategy Rules as it determines to be appropriate to account for such change(s) including, without limitation, in the case of substitution, selecting (a) a replacement equity index, futures contract and/or volatility index having characteristics similar to the equity index, futures contract and/or volatility index (as the case may be) being replaced and (b) the date such replacement is effective, or (ii) cease publication of the Strategy on such date as is determined by the Strategy Calculation Agent.

7. General Definitions

Capitalized terms defined below shall have the following meanings in the Strategy Rules (Please note that additional defined terms are defined in Part B, Section 2):

"**Affected Constituent**" means the Constituent affected by the relevant event or circumstance, as described in Part A, Section 6.1, 6.2, 6.3 or 6.4.

"**Applicable Module**" means the module that is applicable to a Strategy.

"**Applicable Parts**" means the Part(s) that are applicable to a Strategy as specified in the table in Part A, Section 1.1.

"**Applicable Parts / Module**" means the Parts and Module that are applicable to a Strategy as specified in the table in Part A, Section 1.1.

"**Change in Law**" means on or after May 29, 2013 due to (i) the adoption of, or any change in, any applicable law, regulation, order or rule (including, without limitation, any tax law or adoption or promulgation of new regulations authorized or mandated by existing statute) or (ii) the promulgation of, or any change in, the announcement or statement of a formal or informal interpretation, application, exercise or operation by any court, tribunal or regulatory authority with competent jurisdiction of any applicable law, regulation, order or rule (including, without limitation, rules or regulations promulgated or implemented by the U.S. Commodity and Futures Trading Commission, the U.S. Securities and Exchange Commission or any exchange or trading facility), whether in the case of clause (i) or (ii) of this definition the Strategy Calculation Agent determines that (x) it is contrary to such law, regulation, order or rule for any market participants that are brokers or financial intermediaries (individually or collectively) to hold, acquire or dispose of (in whole or in part) any financial asset, transaction or interest in or relating to a Constituent or any component of a Constituent or (y) holding a position in any financial asset, transaction or interest in or relating to a Constituent or any component of a Constituent is (or, but for the consequent disposal or termination thereof, would otherwise be) in excess of any allowable position limit(s) applicable to any market participants that are brokers or financial intermediaries (individually or collectively) under any such law, regulation, order or rule.

"**Constituent Sponsor**" means, in respect of the Equity Index or the Volatility Index of a Strategy, the Equity Index Sponsor for such Equity Index or the Volatility Index Sponsor for such Volatility Index.

"**Constituents**" means (1) the Equity Index, (2) each Futures Contract and (3) the Volatility Index (each, a "**Constituent**").

"**Currency of the Strategy**" means, in respect of a Strategy, the currency of that Strategy, as specified in the Applicable Module.

"**Disrupted Strategy Calculation Day**" means, in respect of a Strategy, any day that is a Disrupted Variance Component Calculation Day (as defined in the Applicable Part) or a Disrupted Futures Component Calculation Day (as defined in the Applicable Part).

"**Equity Index**" means, in respect of a Strategy, the equity index specified as such in the Applicable Module.

"**Equity Index Sponsor**" means, in respect of the Equity Index for a Strategy, the entity specified as such in the Applicable Module.

"**Futures Contract**" means the futures contract(s) referencing the Volatility Index, specified in Part A, Section 8. Each Futures Contract is identified by a contract letter that corresponds to the month in which the Futures Scheduled Final Settlement Date for that Futures Contract occurs. In respect of the period from, and including, one Futures Scheduled Final Settlement Date to, and including, the Futures Component Calculation Day immediately preceding the next following Futures Scheduled Final Settlement Date, the number applicable to a Futures Contract (i.e., i=1, 2, 3) applies to such Futures Contract.

"**Futures Scheduled Final Settlement Date(s)**" means, in respect of a Futures Contract, the originally scheduled final settlement date (or howsoever it is called) as published by the Related Exchange (whether or not the effective final settlement date is the date that was originally scheduled to be the final settlement date).

"**Related Exchange**" means, in respect of a Constituent, each exchange or quotation system specified as such for the Constituent in the Applicable Module, any successor to such exchange or quotation system or any substitute exchange or quotation system to which trading in (i) futures or option contracts relating to the Equity Index, (ii) a Futures Contract or (iii) the Volatility Index, as applicable, has temporarily relocated (provided that the Strategy Calculation Agent has determined that there is comparable liquidity relative to the relevant futures or option contracts relating to the Equity Index, the relevant Futures Contract or the relevant Volatility Index (as the case may be) on such temporary substitute exchange or quotation system as on the original exchange or quotation system).

"**Relevant Period**" has the meaning given to it in Part A, Section 8.

"**Relevant Person**" means each of the Strategy Sponsor, the Strategy Calculation Agent and each of their respective affiliates and subsidiaries and their respective directors, officers, employees, representatives, delegates and agents.

"**Strategy Base Date**" means, in respect of a Strategy, the date specified as such in the Applicable Module.

"**Strategy Base Level**" means, in respect of a Strategy, the level specified as such in the Applicable Module.

"**Strategy Calculation Agent**" has the meaning given to it in Part A, Section 2.1.

"**Strategy Calculation Day**" means, in respect of a Strategy, any day that is a Variance Component Calculation Day (as defined in the Applicable Part) and a Futures Component Calculation Day (as defined in the Applicable Part).

"**Strategy Level**" means the strategy level as determined in accordance with the Applicable Part.

"**Strategy Rules**" means, in respect of a Strategy, the relevant Parts and Module that compose the Strategy Rules for the Strategy as specified in the table in Part A, Section 1.1.

"**Strategy Sponsor**" has the meaning given to it in Part A, Section 2.1.

"**Successor Constituent**" has the meaning given to it in Part A, Section 6.1.

"**Volatility Index**" means, in respect of a Strategy, the volatility index specified as such in the Applicable Module.

"**Volatility Index Sponsor**" means, in respect of the Volatility Index for a Strategy, the entity specified as such in the Applicable Module.

8. Futures Contracts

The table below sets out the futures contracts referencing the Volatility Index (each a "**Futures Contract**"), together with the applicable "**Contract Letter**" and "**Settlement Month**".

Each Futures Contract is scheduled to expire on the Futures Scheduled Final Settlement Date occurring in the Settlement Month specified in the first table below. For example, a Futures Contract with the Contract Letter "J" is scheduled to expire in Settlement Month April.

In respect of the period from, and including, one Futures Scheduled Final Settlement Date to, and including, the Futures Component Calculation Day immediately preceding the next following Futures Scheduled Final Settlement Date (the "**Relevant Period**"), each row in the first table below provides the applicable Contract Letter for each Futures Contract (i=1, 2, 3) by reference to the month in which such next following Futures Scheduled Final Settlement Date is scheduled to occur. For example, if the month in which such next following Futures Scheduled Final Settlement Date is scheduled to occur is June, the Contract Letter for Futures Contract i=3 is "Q".

In respect of the Relevant Period, in the first table below, references to Futures Contract(s) (i=1, 2, 3) are to the futures contract(s) by reference to the month in which such next following Futures Scheduled Final Settlement Date is scheduled to occur. For example, Futures Contract i=1 means the Futures Contract scheduled to expire on such next following Futures Scheduled Final Settlement Date and Futures Contract i=2 means the Futures Contract scheduled to expire on the second following Futures Scheduled Final Settlement Date.

Each Futures Contract is identified by a Contract Letter that corresponds to the Futures Scheduled Final Settlement Date on which that Futures Contract is scheduled to expire.

In respect of the Relevant Period, the number applicable to a Futures Contract (i.e., i=1, 2, 3) applies to such Futures Contract to, and including, the Futures Component Calculation Day immediately preceding such next following Futures Scheduled Final Settlement Date.

Table: Futures Contracts

Futures Contract(s)	In respect of the period from, and including, one Futures Scheduled Final Settlement Date to, and including, the Futures Component Calculation Day immediately preceding the next following Futures Scheduled Final Settlement Date, the month in which that next following Futures Scheduled Final Settlement Date is scheduled to occur											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Futures Contract (i=1)	F	G	H	J	K	M	N	Q	U	V	X	Z
Futures Contract (i=2)	G	H	J	K	M	N	Q	U	V	X	Z	F
Futures Contract (i=3)	H	J	K	M	N	Q	U	V	X	Z	F	G

Contract Letter	F	G	H	J	K	M	N	Q	U	V	X	Z
Settlement Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Part B

1. Introduction

The rules set out in this Part B apply to each of the Strategies specified in the Applicable Modules to this Part B. The Strategy Rules for each Strategy are composed of Part A of this document, this Part B and the Applicable Module to this Part B.

Under certain market conditions, the Strategy synthetically sells variance swaps on the S&P 500® Index in order to be exposed to the potential performance arising from the difference between the implied volatility of index options on the S&P 500® Index and the realized volatility of the S&P 500® Index. By synthetically selling variance swaps, the Strategy will generally reflect a positive return in time periods when the realized volatility of the S&P 500® Index is consistently less than the implied volatility of S&P 500® Index options. Specifically, the Strategy synthetically sells variance swaps on a daily basis, with the exception of days when a signal that measures the difference between the implied volatility of S&P 500® Index options and the realized volatility of the S&P 500® Index is not positive.

In addition, when the VIX futures term structure is in "backwardation" (meaning that the price of a VIX futures contract with a later expiration is lower than the price of a VIX futures contract with an earlier expiration), in order to attempt to provide positive sensitivity to the volatility of the S&P 500® Index, the Strategy additionally reflects the returns that would result from establishing a synthetic long position in Futures Contracts and rolling that position throughout the month. Specifically, the Strategy maintains or increases the synthetic exposure to the VIX futures contracts when an indicator signals that the VIX futures curve for the preceding three relevant days is in "backwardation". When the VIX futures term structure is in "contango" (meaning that the price of a VIX futures contract with a later expiration is higher than the price of a VIX futures contract with an earlier expiration), the strategy will generally reduce synthetic exposure to the VIX futures contracts in a stepwise fashion. Specifically, the Strategy reduces the synthetic exposure to the VIX futures contracts when an indicator signals that the VIX futures curve for the preceding three relevant days is in "contango". Under normal market conditions, VIX futures contracts are expected to be in "contango".

2. Definition of Terms

In respect of each Strategy, the capitalized terms defined below shall have the following meanings in the Strategy Rules (Please note that additional defined terms are defined in Part A, Section 7):

"**Active Synthetic Variance Swap**" means in respect of an Equity Index Business Day, each Synthetic Variance Swap (x) that is initiated on a Potential Variance Swap Start Date and (y) whose Maturity Date occurs on or after such Equity Index Business Day.

"**Active Synthetic Variance Swap Closing Level**" means the closing level for an Active Synthetic Variance Swap as determined in accordance with Part B, Section 5.6.

"**Additional Long Related Rebalancing Deduction**" means the additional long related rebalancing deduction as determined in accordance with Part B, Section 4.7.

"**Adjustment Factor**" means, in respect of a Strategy, the adjustment factor specified as such in the Applicable Module.

"**Carry Signal**" means the carry signal as determined in accordance with Part B, Section 5.2.

"**Contract Weight**" means the contract weight as determined in accordance with Part B, Section 4.4.

"**Daily Contract Reference Price**" means, (a) in respect of any Futures Component Calculation Day that is the effective final settlement date for a Futures Contract, the Futures Final Settlement Value of such Futures Contract, and (b) in respect of any Futures Component Calculation Day that is not the effective final settlement date for a Futures Contract, the Futures Contract Closing Price of such Futures Contract.

"**Deemed Maturity Date**" has the meaning given to it in the definition of "Maturity Date".

"**Disrupted Equity Index Business Day**" means any Equity Index Business Day on which (i) a Market Disruption Event has occurred or is continuing in respect of the Equity Index or (ii) any Exchange or Related Exchange for the Equity Index fails to open for trading during its regular trading session.

"**Disrupted Futures Component Calculation Day**" means any Futures Component Calculation Day on which (i) a Market Disruption Event has occurred or is continuing in respect of any Futures Contract, (ii) any Related Exchange for any of the Futures Contracts fails to open for trading during its regular trading session, which Related Exchange is specified in respect of any Futures Contract, (iii) a Market Disruption Event has occurred or is continuing in respect of the Volatility Index or (iv) any Related Exchange for the Volatility Index fails to open for trading during its regular trading session.

"**Disrupted Variance Component Calculation Day**" means any Variance Component Calculation Day that is (i) a Disrupted Equity Index Business Day or (ii) a Disrupted Volatility Index Business Day.

"**Disrupted Volatility Index Business Day**" means any Volatility Index Business Day on which (i) a Market Disruption Event has occurred or is continuing in respect of the Volatility Index or (ii) any Related Exchange for the Volatility Index fails to open for trading during its regular trading session.

"**Early Closure**" means:

(a) in respect of the Equity Index, the closure on any Equity Index Business Day of any Exchange(s) relating to securities that comprise 20 percent or more of the level of the Equity Index or the Related Exchange prior to its Scheduled Closing Time unless such earlier closing is announced by such Exchange(s) or Related Exchange (as the case may be) at least one hour prior to the earlier of: (i) the actual closing time for the regular trading session of such Exchange or Related Exchange (as the case may be) on such Equity Index Business Day and (ii) if applicable, the submission deadline for orders to be entered into such Exchange or Related Exchange system for execution at the Scheduled Closing Time on such Equity Index Business Day; and

(b) in respect of a Futures Contract, the closure on any Futures Component Calculation Day of the Related Exchange prior to its Scheduled Closing Time unless such earlier closing time is announced by such Related Exchange at least one hour prior to the actual closing time for the regular trading session on such exchange(s) on such Futures Component Calculation Day.

"**Equity Index Business Day**" means, in respect of the Equity Index, any day on which each Exchange and each Related Exchange are scheduled to be open for trading for their respective regular trading sessions.

"**Equity Index Level**" means, in respect of the Equity Index and an Equity Index Business Day, the official closing level of the Equity Index, as published by the Equity Index Sponsor for that Equity Index Business Day.

"**Exchange**" means, in respect of a Constituent, each exchange or quotation system specified as such for such Constituent in the Applicable Module, any successor to such exchange or quotation system or any substitute exchange or quotation system to which trading in the shares or other components underlying such Constituent has temporarily relocated (provided that the Strategy Calculation Agent has determined that there is comparable liquidity relative to such shares or other components underlying such Constituent on such temporary substitute exchange or quotation system as on the original Exchange).

"**Exchange Disruption**" means:

(a) in respect of the Equity Index, any event (other than an Early Closure) that disrupts or impairs (as determined by the Strategy Calculation Agent) the ability of market participants in general (i) to effect transactions in, or obtain market values for, securities that comprise 20 percent or more of the level of the Equity Index, or (ii) to effect transactions in, or obtain market values for, futures or options contracts relating to the Equity Index on the Related Exchange; and

(b) in respect of a Futures Contract, any event (other than an Early Closure) that disrupts or impairs (as determined by the Strategy Calculation Agent) the ability of market participants in general to effect transactions in, or obtain market values for such Futures Contract or options contracts on such Futures Contract on the Related Exchange.

"**First Disrupted Futures Component Calculation Day**" has the meaning given to such term in Part B, Section 4.8.

"**First Following Undisrupted Futures Component Calculation Day**" has the meaning given to such term in Part B, Section 4.8.

"**Futures Component Base Date**" means the date specified as such in the Applicable Module.

"**Futures Component Base Level**" means the level specified as such in the Applicable Module.

"**Futures Component Calculation Day**" means each day (other than a Saturday or Sunday) on which the Related Exchange(s) in respect of each Futures Contract and the Volatility Index are all scheduled to be open for trading during their respective regular trading sessions.

"**Futures Component Level**" means the futures component level as determined in accordance with Part B, Section 4.2

"**Futures Component Vega**" means the futures component vega as determined in accordance with Part B, Section 3.4.

"**Futures Component Weight**" means the futures component weight as determined in accordance with Part B, Section 3.3.

"**Futures Contract Closing Price**" means, in respect of a Futures Contract and a Futures Component Calculation Day, the official settlement price (howsoever described in the rules of the Related Exchange) for such Futures Contract as published by the Related Exchange.

"**Futures Final Settlement Value**" means, in respect of a Futures Contract and a Futures Scheduled Final Settlement Date, the final settlement value (howsoever described in the rules of the Related Exchange) for the Futures Contract as published by the Related Exchange in respect of the effective final settlement date for such Futures Contract.

"**Futures Monthly Rebalanced Portfolio Day**" has the meaning given to such term in Part B, Section 4.3.

"**Futures Rebalancing Notional**" means the futures rebalancing notional as determined in accordance with Part B, Section 4.6 or in accordance with Part B, Section 4.8.

"**Gross Strategy Level**" means the gross strategy level as determined in accordance with Part B, Section 3.2.

"**Long Return**" means the long return as determined in accordance with Part B, Section 4.3.

"**Long Return Exposure**" means the long return exposure as determined in accordance with Part B, Section 4.5.

"**Market Disruption Event**" means the occurrence of one or more of the following events that, in the determination of the Strategy Calculation Agent in its sole discretion, materially interferes with the ability of market participants to transact in positions with respect to the relevant Strategy or any Constituent relevant to such Strategy:

(a) in respect of a Constituent that is the Equity Index and an Equity Index Business Day:

(i) a failure by the Equity Index Sponsor to calculate and publish the Equity Index Level for such day within the scheduled or usual timeframe for publication; or

(ii) the occurrence or existence of (A) at any time during the one-hour period that ends at the Scheduled Closing Time, (1) a Trading Disruption or (2) an Exchange Disruption, in either case that the Strategy Calculation Agent determines is material, or (B) an Early Closure.

For the purposes of determining whether a Market Disruption Event in respect of the Equity Index exists at any time, if a Market Disruption Event occurs in respect of a security included in the Equity Index at any time, then the relevant percentage contribution of that security to the level of the Equity Index shall be the percentage contribution of that security as of the Scheduled Closing Time on the immediately preceding Equity Index Business Day, as published by Bloomberg

Financial Markets (or if Bloomberg Financial Markets ceases to publish such percentage contributions, a replacement therefor acceptable to the Strategy Calculation Agent) (the "**Percentage Publisher**"); provided that if the Percentage Publisher does not publish such a percentage contribution at that time, the relevant percentage contribution will be determined by the Strategy Calculation Agent based on the price for the securities included in the Equity Index as of the Scheduled Closing Time on the immediately preceding Equity Index Business Day, as reported in the official real-time price dissemination mechanism for the relevant Exchange (or, if trading in a security included in the Equity Index is disrupted at that time, based on the Strategy Calculation Agent's estimate of the price of the relevant security at that time);

(b) in respect of a Constituent that is a Futures Contract and a Futures Component Calculation Day:

(i) a failure by the Related Exchange to publish the Futures Contract Closing Price for such Futures Contract;

(ii) a failure by the Related Exchange to publish the Futures Final Settlement Value on any of (x) the Futures Scheduled Final Settlement Date, (y) a later date to which the final settlement date for any such Futures Contract has been postponed, but that is not the effective final settlement date for the relevant Futures Contract or (z) the effective final settlement date for such Futures Contract;

(iii) the occurrence or existence of a suspension, absence or material limitation of trading for such Futures Contract or any futures or options contracts relating to the Volatility Index on the Related Exchange during the last one-hour period preceding the close of the principal trading session on such Related Exchange;

(iv) a breakdown or failure in the price and trade reporting systems of the Related Exchange as a result of which the reported trading prices for such Futures Contract or any futures or options contracts relating to the Volatility Index are materially inaccurate during the last one-hour period preceding the close of the principal trading session on the Related Exchange; or

(v) any event that disrupts or impairs the ability of market participants generally to effect transactions in or obtain market values for such Futures Contract or the Volatility Index on such Futures Component Calculation Day during the last one-hour period preceding the close of the principal trading session on the Related Exchange. Such events may include, but are not limited to, the occurrence in respect of such Futures Contract of a Trading Disruption, Exchange Disruption or Early Closure; and

(c) in respect of a Constituent that is a Volatility Index and either a Volatility Index Business Day or a Futures Component Calculation Day (as the case may be), a failure by the Volatility Index Sponsor to calculate and publish the Volatility Index Level for such day within the scheduled or usual timeframe for publication.

"**Maturity Date**" means, in respect of an Active Synthetic Variance Swap, (x) the 30th calendar day following the Potential Variance Swap Start Date for such Active Synthetic Variance Swap if such calendar day is an Equity Index Business Day or (y) if such calendar day is not an Equity Index Business Day, the immediately following Equity Index Business Day (such day specified in clause (x) or clause (y), the "**Scheduled Maturity Date**"); provided that if such Scheduled Maturity Date is a Disrupted Equity Index Business Day, the Maturity Date shall be the earlier of (1) the first Equity Index Business Day immediately following the Scheduled Maturity Date that is not a Disrupted Equity Index Business Day and (2) the eighth Equity Index Business Day immediately following the Scheduled Maturity Date (irrespective of whether such eighth Equity Index Business Day is a Disrupted Equity Index Business Day) (any such Maturity Date determined pursuant to this clause (2), the "**Deemed Maturity Date**").

"**Monthly Strategy Rebalancing Day**" means the last Strategy Calculation Day of each calendar month or, if that day is a Disrupted Strategy Calculation Day, the immediately following Strategy Calculation Day that is not a Disrupted Strategy Calculation Day.

"**Potential Variance Swap Start Date**" means each Variance Component Calculation Day that is not a Disrupted Variance Component Calculation Day.

"**Prior Undisrupted Futures Component Calculation Day**" has the meaning given to such term in Part B, Section 4.3.

"**Rebalancing Adjustment Factor**" means, in respect of a Strategy, the rebalancing adjustment factor specified as such in the Applicable Module.

"**Scheduled Closing Time**" means:

(a) in respect of the Equity Index, the scheduled weekday closing time of the applicable Exchange or Related Exchange on an Equity Index Business Day, without regard to after hours or any other trading outside of the regular trading session hours; and

(b) in respect of a Futures Contract, the scheduled weekday closing time of the applicable Related Exchange on a Futures Component Calculation Day, without regard to after hours or any other trading outside of the regular trading session hours.

"**Scheduled Maturity Date**" has the meaning given to it in the definition of "Maturity Date".

"**Strategy Rebalancing Adjustment**" means the strategy rebalancing adjustment as determined in accordance with Part B, Section 3.5.

"**Strike Level**" means the strike level for an Active Synthetic Variance Swap as determined in accordance with Part B, Section 5.4.

"**Synthetic Variance Swap**" means, in respect of an Equity Index Business Day, a synthetic variance swap that references the Equity Index and either (x) was initiated on a Potential Variance Swap Start Date preceding such Equity Index Business Day or (y) will be or may be initiated on a Potential Variance Swap Start Date that is such Equity Index Business Day.

"**Target Vega**" means, in respect of a Strategy, the target vega specified as such in the Applicable Module.

"**Trading Disruption**" means

(a) in respect of the Equity Index, any suspension of or limitation imposed on trading by any Exchange or Related Exchange or otherwise and whether by reason of movements in price exceeding limits permitted by the relevant Exchange or Related Exchange or otherwise: (i) relating to securities that comprise 20 percent or more of the level of the Equity Index or (ii) in futures or options contracts relating to the Equity Index on the Related Exchange; and

(b) in respect of a Futures Contract, any suspension of or limitation imposed on trading by the Related Exchange or otherwise and whether by reason of movements in price exceeding limits permitted by the Related Exchange or otherwise relating to such Futures Contract or options contracts on such Futures Contract.

"**Variance Component Base Date**" means the date specified as such in the Applicable Module.

"**Variance Component Base Level**" means the level specified as such in the Applicable Module.

"**Variance Component Calculation Day**" means each day that is both (x) an Equity Index Business Day and (y) a Volatility Index Business Day.

"**Variance Component Level**" means the variance component level as determined in accordance with Part B, Section 5.8

"**Variance Level**" means the variance level for an Active Synthetic Variance Swap as determined in accordance with Part B, Section 5.7.

"**Vega Notional**" means the vega notional for an Active Synthetic Variance Swap as determined in accordance with Part B, Section 5.5.

"**Volatility Index Business Day**" means, in respect of the Volatility Index, any day on which the Volatility Index Sponsor is scheduled to publish the level of such Volatility Index.

"**Volatility Index Floor**" means the volatility index floor specified as such in the Applicable Module.

"**Volatility Index Level**" means, in respect of the Volatility Index and a Volatility Index Business Day, the official closing level of the Volatility Index, as published by the Volatility Index Sponsor for that Volatility Index Business Day.

3. Strategy Level

On the Strategy Base Date, the Strategy Level was the Strategy Base Level. After the Strategy Base Date, the methodology described below in this Section 3 will be used to calculate the Strategy Level for each Strategy Calculation Day that is not a Disrupted Strategy Calculation Day.

3.1 Calculation of Strategy Levels

The Strategy Calculation Agent will determine the Strategy Level in respect of any Strategy Calculation Day t that is not a Disrupted Strategy Calculation Day as follows:

$$StrategyLevel_t = StrategyLevel_{prior} \times \left(\frac{GrossStrategyLevel_t}{GrossStrategyLevel_{prior}} - AF \times \frac{Act(t, prior)}{360} - SRA_t \right)$$

Where:

$StrategyLevel_t$ means the Strategy Level determined by the Strategy Calculation Agent for Strategy Calculation Day t

$StrategyLevel_{prior}$ means the Strategy Level determined by the Strategy Calculation Agent for the Strategy Calculation Day that was not a Disrupted Strategy Calculation Day immediately preceding Strategy Calculation Day t

$GrossStrategyLevel_t$ means the Gross Strategy Level for Strategy Calculation Day t

$GrossStrategyLevel_{prior}$ means the Gross Strategy Level for the Strategy Calculation Day that was not a Disrupted Strategy Calculation Day immediately preceding Strategy Calculation Day t

AF means the Adjustment Factor

Act (t,prior) means the number of calendar days from, and including, the Strategy Calculation Day that was not a Disrupted Strategy Calculation Day immediately preceding Strategy Calculation Day t to, but excluding, Strategy Calculation Day t

SRA_t means the Strategy Rebalancing Adjustment for Strategy Calculation Day t

3.2 Calculation of Gross Strategy Level

The Strategy Calculation Agent will determine the Gross Strategy Level in respect of any Strategy Calculation Day t that is not a Disrupted Strategy Calculation Day as follows:

$$GrossStrategyLevel_t = GrossStrategyLevel_{prior_rebal} \times \left(1 + \mathrm{Re}turn_{t,prior_rebal}\right)$$

Where:

$GrossStrategyLevel_t$ means the Gross Strategy Level for Strategy Calculation Day t

$GrossStrategyLevel_{prior_rebal}$ means the Gross Strategy Level for the Monthly Strategy Rebalancing Day immediately preceding Strategy Calculation Day t

$$\mathrm{Re}turn_{t,prior_rebalancing} = \left(\frac{VarCompLevel_t}{VarCompLevel_{prior_rebal}} - 1 \right) + w_{prior_rebal} \times \left(\frac{FutCompLevel_t}{FutCompLevel_{prior_rebal}} - 1 \right)$$

Where:

$VarCompLevel_t$ means the Variance Component Level for Strategy Calculation Day t

$VarCompLevel_{prior_rebal}$ means the Variance Component Level for the Monthly Strategy Rebalancing Day immediately preceding Strategy Calculation Day t

w_{prior_rebal} means the Futures Component Weight for the Monthly Strategy Rebalancing Day immediately preceding Strategy Calculation Day t

$FutCompLevel_t$ means the Futures Component Level for Strategy Calculation Day t

$FutCompLevel_{prior_rebal}$ means the Futures Component Level for the Monthly Strategy Rebalancing Day immediately preceding Strategy Calculation Day t

3.3 Calculation of Futures Component Weight

The Strategy Calculation Agent will determine the Futures Component Weight in respect of any Strategy Calculation Day t that is not a Disrupted Strategy Calculation Day as follows:

a) If Strategy Calculation Day t is not a Monthly Strategy Rebalancing Day, then:

$$w_t = w_{prior}$$

b) If Strategy Calculation Day t is a Monthly Strategy Rebalancing Day, then:

$$w_t = \frac{2 \times \sqrt{2} \times TargetVega}{FutCompVega_t}$$

Where:

w_t means the Futures Component Weight for Strategy Calculation Day t

w_{prior} means the Futures Component Weight for the Strategy Calculation Day that was not a Disrupted Strategy Calculation Day immediately preceding Strategy Calculation Day t

TargetVega means the Target Vega

$FutCompVega_t$ means the Futures Component Vega for Strategy Calculation Day t

3.4 Calculation of Futures Component Vega

The Strategy Calculation Agent will determine the Futures Component Vega in respect of any Strategy Calculation Day t that is not a Disrupted Strategy Calculation Day as follows:

$$FutCompVega_t = \frac{1}{CW_t \times DCRP(2,t) + (1 - CW_t) \times DCRP(3,t)}$$

Where:

$FutCompVega_t$ means the Futures Component Vega for Strategy Calculation Day t

CW_t means the Contract Weight for Strategy Calculation Day t

DCRP (2,t) means the Daily Contract Reference Price of Futures Contract i=2 for Strategy Calculation Day t.

DCRP (3,t) means the Daily Contract Reference Price of Futures Contract i=3 for Strategy Calculation Day t.

3.5 Calculation of Strategy Rebalancing Adjustment

The Strategy Calculation Agent will determine the Strategy Rebalancing Adjustment in respect of any Strategy Calculation Day t that is not a Disrupted Strategy Calculation Day as follows:

a) If Strategy Calculation Day t is not a Monthly Strategy Rebalancing Day, then:

$$SRA_t = 0$$

b) If Strategy Calculation Day t is a Monthly Strategy Rebalancing Day, then:

$$SRA_t = \left| w_t - w_{prior} \right| \times Long\,\mathrm{Ret}tExp_t \times RAF$$

Where:

SRA_t means the Strategy Rebalancing Adjustment for Strategy Calculation Day t

w_t means the Futures Component Weight for Strategy Calculation Day t

w_{prior} means the Futures Component Weight for the Strategy Calculation Day that was not a Disrupted Strategy Calculation Day immediately preceding Strategy Calculation Day t

$LongRetExp_t$ means the Long Return Exposure for Strategy Calculation Day t

RAF means the Rebalancing Adjustment Factor

4. Futures Component

4.1 Introduction

The Futures Component models returns from a contingent synthetic long exposure to Futures Contracts that are rolled continuously.

The synthetic long exposure to the Futures Contracts measures the return from a rolling long position in the second- and third-month Futures Contracts and is designed to be activated and maintained when the VIX futures term structure is in "backwardation" (meaning that the price of a VIX futures contract with a later expiration is lower than the price of a VIX futures contract with an earlier expiration).

The synthetic long exposure is adjusted following three consecutive Futures Component Calculation Days that are not Disrupted Futures Component Calculation Days on which the level of the Volatility Index is (x) less than or (y) greater than or equal to, in either case, the rolling average price of the first- and second-month Futures Contracts, with the size of the adjustment in exposure (being a decrease in the case of (x) or an increase in the case of (y)) being 25% on any given day and being subject to an overall maximum long exposure of 100% and an overall minimum long exposure of 0%. If the level of the Volatility Index has been less than the rolling average of the first- and second-month Futures Contracts for three consecutive Futures Component Calculation Days that are not Disrupted Futures Component Calculation Days, then the long exposure will be decreased by 25% from the existing long exposure, with effect on the Futures Component Calculation Day that is not a Disrupted Futures Component Calculation Day immediately following such three days, subject to an overall minimum long exposure of 0%. If the level of the Volatility Index has been greater than or equal to the rolling average of the first- and second-month Futures Contracts for three consecutive Futures Component Calculation Days that are not Disrupted Futures Component Calculation Days, then the long exposure will be increased by 25% from the existing long exposure, with effect on the Futures Component Calculation Day that is not a Disrupted Futures Component Calculation Day immediately following such three days, subject to an overall maximum long exposure of 100%. If neither of the conditions described in the first sentence of this paragraph is met, the long position is rolled over with the same aggregate level of long exposure as the previous Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day.

4.2 Calculation of Futures Component Level

On the Futures Component Base Date, the Futures Component Level was the Futures Component Base Level. After the Futures Component Base Date, the Strategy Calculation Agent will determine the Futures Component Level in respect of each Futures Component Calculation Day t that is not a Disrupted Futures Component Calculation Day as follows:

$$FutCompLevel_t = FutCompLevel_{prior} \times (1 + \mathrm{Re}turn_t)$$

Where:

$FutCompLevel_t$ means the Futures Component Level for Futures Component Calculation Day t

$FutCompLevel_{prior}$ means the Futures Component Level for the Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day immediately preceding Futures Component Calculation Day t

$$\mathrm{Re}turn_t = Long\,\mathrm{Re}tExp_{prior} \times Long\,\mathrm{Re}turn_t - (Fut\,\mathrm{Re}bNotional_t \times RAF) \; - ALRR_Deduction_t$$

Where:

$LongRetExp_{prior}$ means the Long Return Exposure for the Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day immediately preceding Futures Component Calculation Day t

$LongReturn_t$ means the Long Return for Futures Component Calculation Day t

$FutRebNotional_t$ means the Futures Rebalancing Notional for Futures Component Calculation Day t

RAF means the Rebalancing Adjustment Factor

$ALRR_Deduction_t$ means the Additional Long Related Rebalancing Deduction for Futures Component Calculation Day t (applied when there is a change in the Long Return Exposure between Futures Component Calculation Day t and the Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day immediately preceding Futures Component Calculation Day t)

4.3 Calculation of the Long Return

Subject to Section 4.8, the Strategy Calculation Agent will determine the Long Return in respect of each Futures Component Calculation Day t that is not a Disrupted Futures Component Calculation Day as follows:

a) If Futures Component Calculation Day t is a Futures Monthly Rebalanced Portfolio Day, then:

$$Long\,\mathrm{Re}turn_t = \frac{DCRP(2,t)}{DCRP(3,prior)} - 1$$

b) If Futures Component Calculation Day t is not a Futures Monthly Rebalanced Portfolio Day, then:

$$Long\,\mathrm{Re}turn_t = \frac{CW_{prior} \times DCRP(2,t) + (1 - CW_{prior}) \times DCRP(3,t)}{CW_{prior} \times DCRP(2,prior) + (1 - CW_{prior}) \times DCRP(3,prior)} - 1$$

Where:

"**Prior Undisrupted Futures Component Calculation Day**" means a Futures Component Calculation Day (x) that immediately precedes a Futures Scheduled Final Settlement Date and (y) that is not a Disrupted Futures Component Calculation Day.

"**Futures Monthly Rebalanced Portfolio Day**" means the first Futures Component Calculation Day that is not a Disrupted Futures Component Calculation Day that immediately follows a Prior Undisrupted Futures Component Calculation Day.

$LongReturn_t$ means the Long Return for Futures Component Calculation Day t

CW_{prior} means the Contract Weight for the Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day immediately preceding Futures Component Calculation Day t

DCRP (2,t) means the Daily Contract Reference Price of Futures Contract i=2 for Futures Component Calculation Day t

DCRP (3,t) means the Daily Contract Reference Price of Futures Contract i=3 for Futures Component Calculation Day t

DCRP (2,prior) means the Daily Contract Reference Price of Futures Contract i=2 for the Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day immediately preceding Futures Component Calculation Day t

DCRP (3,prior) means the Daily Contract Reference Price of Futures Contract i=3 for the Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day immediately preceding Futures Component Calculation Day t

4.4 Calculation of Contract Weight

The Strategy Calculation Agent will determine the Contract Weight in respect of each Futures Component Calculation Day t as follows:

$$CW_t = \frac{dr}{dp}$$

Where:

CW_t means the Contract Weight for Futures Component Calculation Day t

dp is the total number of Futures Component Calculation Days in the period from, and including, one Futures Scheduled Final Settlement Date to, and including, the Futures Component Calculation Day immediately preceding the next following Futures Scheduled Final Settlement Date in which the Futures Component Calculation Day t occurs (irrespective of whether any such day(s) are or become a Disrupted Futures Component Calculation Day).

dr is the total number of Futures Component Calculation Days from, but excluding, the Futures Component Calculation Day t to, but excluding, the next following Futures Scheduled Final Settlement Date (irrespective of whether any such day(s) are or become a Disrupted Futures Component Calculation Day).

4.5 Calculation of the Long Return Exposure

The Strategy Calculation Agent will determine the Long Return Exposure in respect of each Futures Component Calculation Day t that is not a Disrupted Futures Component Calculation Day as follows:

a) In respect of the three (j=1,2,3) consecutive Futures Component Calculation Days that were not Disrupted Futures Component Calculation Days immediately preceding Futures Component Calculation Day t, if the Volatility Index Level in respect of each such Futures Component Calculation Day j is greater than or equal to an amount calculated as follows:

$$CW_j \times DCRP(1, j) + (1 - CW_j) \times DCRP(2, j)$$

Then:

$$Long\,\mathrm{Re}tExp_t = Min\left[Long\,\mathrm{Re}tExp_{prior} + 25\% \;\;,\;\; 100\%\right]$$

b) In respect of the three (j=1,2,3) consecutive Futures Component Calculation Days that were not Disrupted Futures Component Calculation Days immediately preceding Futures Component Calculation Day t, if the Volatility Index Level in respect of each such Futures Component Calculation Day j is less than an amount calculated as follows:

$$CW_j \times DCRP(1,j) + (1 - CW_j) \times DCRP(2,j)$$

Then:

$$Long\,\mathrm{Re}tExp_t = Max\left[Long\,\mathrm{Re}tExp_{prior} - 25\% \;\;,\;\; 0\%\right]$$

c) In respect of the three (j=1,2,3) consecutive Futures Component Calculation Days that were not Disrupted Futures Component Calculation Days immediately preceding Futures Component Calculation Day t, if neither the condition in a) nor the condition in b) has been satisfied, then:

$$Long\,\mathrm{Re}tExp_t = Long\,\mathrm{Re}tExp_{prior}$$

Where:

$LongRetExp_t$ means the Long Return Exposure for Futures Component Calculation Day t

$LongRetExp_{prior}$ means the Long Return Exposure for the Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day immediately preceding Futures Component Calculation Day t

CW_j means the Contract Weight for Futures Component Calculation Day j

DCRP (1,j) means the Daily Contract Reference Price of Futures Contract i=1 for Futures Component Calculation Day j

DCRP (2,j) means the Daily Contract Reference Price of Futures Contract i=2 for Futures Component Calculation Day j

4.6 Calculation of the Futures Rebalancing Notional

Subject to Section 4.8, the Strategy Calculation Agent will determine the Futures Rebalancing Notional in respect of each Futures Component Calculation Day t that is not a Disrupted Futures Component Calculation Day as follows:

a) If Futures Component Calculation Day t is not a Futures Monthly Rebalanced Portfolio Day, then:

$$Fut\,\mathrm{Re}bNotional_t = \left|F2_t \times Perf_t - F2_{prior}\right| + \left|F3_t \times Perf_t - F3_{prior}\right|$$

Where:

$$Perf_t = 1 + Long\,\mathrm{Re}tExp_{prior} \times Long\,\mathrm{Re}turn_t$$

$$F2_t = Long\,\mathrm{Re}tExp_t \times \frac{CW_t \times DCRP(2,t)}{CW_t \times DCRP(2,t) + (1 - CW_t) \times DCRP(3,t)}$$

$$F3_t = LongRetExp_t \times \frac{(1-CW_t)\times DCRP(3,t)}{CW_t \times DCRP(2,t) + (1-CW_t)\times DCRP(3,t)}$$

$$F2_{prior} = LongRetExp_{prior} \times \frac{DCRP(2,t)}{DCRP(2,prior)} \times \frac{CW_{prior} \times DCRP(2,prior)}{CW_{prior} \times DCRP(2,prior) + (1-CW_{prior})\times DCRP(3,prior)}$$

$$F3_{prior} = LongRetExp_{prior} \times \frac{DCRP(3,t)}{DCRP(3,prior)} \times \frac{(1-CW_{prior})\times DCRP(3,prior)}{CW_{prior} \times DCRP(2,prior) + (1-CW_{prior})\times DCRP(3,prior)}$$

b) If Futures Component Calculation Day t is a Futures Monthly Rebalanced Portfolio Day, then:

$$FutRebNotional_t = \left|F2_t \times Perf_t - F3_{prior}\right| + \left|F3_t \times Perf_t\right|$$

Where:

$$Perf_t = 1 + LongRetExp_{prior} \times LongReturn_t$$

$$F2_t = LongRetExp_t \times \frac{CW_t \times DCRP(2,t)}{CW_t \times DCRP(2,t) + (1-CW_t)\times DCRP(3,t)}$$

$$F3_t = LongRetExp_t \times \frac{(1-CW_t)\times DCRP(3,t)}{CW_t \times DCRP(2,t) + (1-CW_t)\times DCRP(3,t)}$$

$$F3_{prior} = LongRetExp_{prior} \times \frac{DCRP(2,t)}{DCRP(3,prior)} \times \frac{(1-CW_{prior})\times DCRP(3,prior)}{CW_{prior} \times DCRP(2,prior) + (1-CW_{prior})\times DCRP(3,prior)}$$

$FutRebNotional_t$ means the Futures Rebalancing Notional for Futures Component Calculation Day t

CW_t means the Contract Weight for Futures Component Calculation Day t

CW_{prior} means the Contract Weight for the Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day immediately preceding Futures Component Calculation Day t

$LongReturn_t$ means the Long Return for Futures Component Calculation Day t

$LongRetExp_t$ means the Long Return Exposure for Futures Component Calculation Day t

$LongRetExp_{prior}$ means the Long Return Exposure for the Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day immediately preceding Futures Component Calculation Day t

DCRP (2,t) means the Daily Contract Reference Price of Futures Contract i=2 for Futures Component Calculation Day t

DCRP (3,t) means the Daily Contract Reference Price of Futures Contract i=3 for Futures Component Calculation Day t

DCRP (2,prior) means the Daily Contract Reference Price of Futures Contract i=2 for the Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day immediately preceding Futures Component Calculation Day t

DCRP (3,prior) means the Daily Contract Reference Price of Futures Contract i=3 for the Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day immediately preceding Futures Component Calculation Day t

4.7 Calculation of Additional Long Related Rebalancing Deduction

The Strategy Calculation Agent will determine the Additional Long Related Rebalancing Deduction in respect of each Futures Component Calculation Day t that is not a Disrupted Futures Component Calculation Day as follows:

$$ALRR_Deduction_t = \left| Long\,RetExp_t - Long\,RetExp_{prior} \right| \times RAF$$

Where:

$ALRR_Deduction_t$ means the Additional Long Related Rebalancing Deduction for Futures Component Calculation Day t

$LongRetExp_t$ means the Long Return Exposure for Futures Component Calculation Day t

$LongRetExp_{prior}$ means the Long Return Exposure for the Futures Component Calculation Day that was not a Disrupted Futures Component Calculation Day immediately preceding Futures Component Calculation Day t

RAF means the Rebalancing Adjustment Factor

4.8 Provisions relating to disruption treatment surrounding a Futures Scheduled Final Settlement Date

If any Futures Component Calculation Day is a Disrupted Futures Component Calculation Day, then the relevant Futures Component Calculation Day shall be deemed to be the first following Futures Component Calculation Day that is not a Disrupted Futures Component Calculation Day (the "**First Following Undisrupted Futures Component Calculation Day**").

On the First Following Undisrupted Futures Component Calculation Day following one or more consecutive Disrupted Futures Component Calculation Days (the first such Disrupted Futures Component Calculation Day being the "**First Disrupted Futures Component Calculation Day**"), the Strategy Calculation Agent will determine the Futures Component Level in accordance with the methodology set out in Part B, Section 4.2.

If the First Following Undisrupted Futures Component Calculation Day occurs on or after a Futures Scheduled Final Settlement Date and the relevant First Disrupted Futures Component Calculation Day occurs before such Futures Scheduled Final Settlement Date, then for the purposes of calculating the Futures Component Level in respect of such First Following Undisrupted Futures Component Calculation Day, references to:

DCRP (i,t) shall be deemed to be a reference to DCRP(i-1,t) for all i > 1; and

DCRP(1,t) shall be deemed to be a reference to the Futures Final Settlement Value of the relevant Futures Contract scheduled to expire on that Futures Scheduled Final Settlement Date (as published by the Related Exchange).

If the First Following Undisrupted Futures Component Calculation Day occurs on or after a Futures Scheduled Final Settlement Date and the relevant First Disrupted Futures Component Calculation Day occurs before such Futures Scheduled Final Settlement Date, the Strategy Calculation Agent will make such adjustments to the methodology set forth in Part B, Section 4.6, as the Strategy Calculation Agent determines in good faith are appropriate in order to determine a Futures Rebalancing Notional that accounts for the aggregate notional percentage of Futures Contracts rebalanced in respect of such First Following Undisrupted Futures Component Calculation Day.

If the period from and including the First Disrupted Futures Component Calculation Day to, but excluding, the First Following Undisrupted Futures Rebalancing Day includes more than one Futures Scheduled Final Settlement Date, the Strategy Calculation Agent shall make such adjustments to these Strategy Rules, as it determines in good faith are appropriate, to account for such fact.

5. Variance Component

5.1 Introduction

The Variance Component models returns from various synthetic short positions in Active Synthetic Variance Swaps, each of which reference the Equity Index.

The Strategy Calculation Agent will determine the Variance Component Level by implementing the seven steps that are summarized immediately below and more fully described in the remainder of this Part B, The more detailed description of each step in this Part B, Section 5 will control to the extent that there is any conflict with the summary of such step immediately below in this Section 5.1.

Step 1: determining the Carry Signal
In respect of each Potential Variance Swap Start Date, the Strategy Calculation Agent shall determine the carry signal in accordance with Part B, Section 5.2 (the "**Carry Signal**"). The Carry Signal is equal to the difference between the average level of the Volatility Index and the realized volatility of the Equity Index.

The average level of the Volatility Index will be determined based on the 20 consecutive Volatility Index Business Days that were not Disrupted Volatility Index Business Days immediately preceding the relevant Potential Variance Swap Start Date.

The realized volatility of the Equity Index will be determined based on the 5 consecutive Equity Index Business Days that were not Disrupted Equity Index Business Days immediately preceding the relevant Potential Variance Swap Start Date.

Step 2: using the Carry Signal to determine if a short Synthetic Variance Swap should be initiated
The Carry Signal will determine if a short Synthetic Variance Swap will be initiated on the relevant Potential Variance Swap Start Date as follows:

- if the Carry Signal is greater than zero, then a short position in a Synthetic Variance Swap referencing the Equity Index will be initiated; and
- if the Carry Signal is less than or equal to zero, then no short position in a Synthetic Variance Swap referencing the Equity Index will be initiated

Step 3: determining the Strike Level for each initiated Synthetic Variance Swap
The next step is to determine the Strike Level for each Synthetic Variance Swap initiated on each Potential Variance Swap Start Date, which is described in more detail in Section 5.4 below.

Step 4: determining the Vega Notional for each initiated Synthetic Variance Swap
The next step is to determine the Vega Notional for each Synthetic Variance Swap initiated on each Potential Variance Swap Start Date, which is described in more detail in Section 5.5 below.

Step 5: determining the Active Synthetic Variance Swap Closing Levels
In addition to determining the remaining features of the Active Synthetic Variance Swap that may be initiated on the applicable Potential Variance Swap Start Date (e.g., the Variance Notional), the Strategy Calculation Agent will determine the prevailing synthetic level attributed to each Active Synthetic Variance Swap, which is described in more detail in Section 5.6 below.

Step 6: determining the Variance Level for each Active Synthetic Variance Swap
The next step is to determine the Variance Level for each Active Synthetic Variance Swap initiated on each Potential Variance Swap Start Date, which is described in more detail in Section 5.7 below.

Step 7: calculating the Variance Component Level
The final step is for the Strategy Calculation Agent to calculate the Variance Component Level for each Variance Component Calculation Day t that is not a Disrupted Variance Component Calculation Day. This step involves the aggregation of the change in the Active Synthetic Variance Swap Closing Levels for each

Active Synthetic Variance Swap, together with the change in the Active Synthetic Variance Swap Closing Levels for any previous Active Synthetic Variance Swap that matured on any day from, but excluding, the Variance Component Calculation Day that was not a Disrupted Variance Component Calculation Day immediately preceding Variance Component Calculation Day t to, but excluding, Variance Component Calculation Day t.

5.2 Calculation of the Carry Signal

The Strategy Calculation Agent will determine the Carry Signal in respect of each Potential Variance Swap Start Date SD as follows:

$$CarrySignal_{SD} = Average\,\mathrm{Im}\,pliedVol_{SD} - \mathrm{Re}\,alizedVol_{SD}$$

With:

$$Average\,\mathrm{Im}\,pliedVol_{SD} = \frac{1}{20} \times \sum_{i=VolIndexDay_{SD,start}}^{VolIndexDay_{SD,prior}} VolIndexLevel_i$$

$$\mathrm{Re}\,alizedVol_{SD} = 100 \times \sqrt{\frac{252}{5} \times \sum_{j=EqIndexDay_{SD,start}}^{EqIndexDay_{SD,prior}} \ln\left(\frac{EqIndexLevel_j}{EqIndexLevel_{j,prior}}\right)^2}$$

Where:

$CarrySignal_{SD}$ means the Carry Signal for Potential Variance Swap Start Date SD

$VolIndexDay_{SD,prior}$ means the Volatility Index Business Day that is not a Disrupted Volatility Index Business Day immediately preceding Potential Variance Swap Start Date SD

$VolIndexDay_{SD,start}$ means the first Volatility Index Business Day in the period comprising the 20 consecutive Volatility Index Business Days that were not Disrupted Volatility Index Business Days immediately preceding Potential Variance Swap Start Date SD

$VolIndexLevel_i$ means the Volatility Index Level for Volatility Index Business Day i

i means a Volatility Index Business Day that is not a Disrupted Volatility Index Business Day

$EqIndexDay_{SD,prior}$ means the Equity Index Business Day that is not a Disrupted Equity Index Business Day immediately preceding Potential Variance Swap Start Date SD

$EqIndexDay_{SD,start}$ means the first Equity Index Business Day in the period comprising the 5 consecutive Equity Index Business Days that were not Disrupted Equity Index Business Days immediately preceding Potential Variance Swap Start Date SD

$EqIndexLevel_j$ means the Equity Index Level for Equity Index Business Day j

$EqIndexLevel_{j,prior}$ means the Equity Index Level for the Equity Index Business Day that is not a Disrupted Equity Index Business Day immediately preceding Equity Index Business Day j

j means an Equity Index Business Day that is not a Disrupted Equity Index Business Day

5.3 Determining if a synthetic short position in a Synthetic Variance Swap should be initiated on a Potential Variance Swap Start Date

The Strategy Calculation Agent will determine if a synthetic short position in a Synthetic Variance Swap should be initiated in respect of each Potential Variance Swap Start Date SD as follows:

a) If the Carry Signal for Potential Variance Swap Start Date SD is greater than zero, then a synthetic short position in the Synthetic Variance Swap will be initiated on that day; and

b) If the Carry Signal for Potential Variance Swap Start Date SD is less than or equal to zero, then no synthetic short position in the Synthetic Variance Swap will be initiated on that day

5.4 Calculation of the Strike Level

The Strategy Calculation Agent will determine the Strike Level for the Active Synthetic Variance Swap, if any, to be initiated on Potential Variance Swap Start Date SD as follows:

$$StrikeLevel_{SD} = Max[0, (VolIndexLevel_{SD} - StrikeAdjustment_{SD})] \times 0.01$$

With:

$$StrikeAdjustment_{SD} = 0.1 + Max\left[1.0, Min[2.5, VolIndexLevel_{SD} \times 0.05]\right]$$

Where:

StrikeLevel$_{SD}$ means the Strike Level for the Active Synthetic Variance Swap initiated on Potential Variance Swap Start Date SD

VolIndexLevel$_{SD}$ means the Volatility Index Level for Potential Variance Swap Start Date SD

5.5 Calculation of the Vega Notional

The Strategy Calculation Agent will determine the Vega Notional for the Active Synthetic Variance Swap, if any, to be initiated on Potential Variance Swap Start Date SD as follows:

$$VegaNotional_{SD} = 0.025\% \times VarCompLevel_{prior} \times Min\left[1, \frac{VolIndexLevel_{prior}}{VolIndexFloor}\right]$$

Where:

VegaNotional$_{SD}$ means the Vega Notional for the Active Synthetic Variance Swap to be initiated on Potential Variance Swap Start Date SD

VarCompLevel$_{prior}$ means the Variance Component Level for the Variance Component Calculation Day that was not a Disrupted Variance Component Calculation Day immediately preceding Potential Variance Swap Start Date SD

VolIndexLevel$_{prior}$ means the Volatility Index Level for the Volatility Index Business Day that was not a Disrupted Volatility Index Business Day immediately preceding Potential Variance Swap Start Date SD

VolIndexFloor means the Volatility Index Floor

5.6 Determining the Active Synthetic Variance Swap Closing Levels

The Strategy Calculation Agent will determine the Active Synthetic Variance Swap Closing Level for each Active Synthetic Variance Swap initiated on Potential Variance Swap Start Date SD, in respect of any Equity Index Business Day t that is (x) a Variance Component Calculation Day that is not a Disrupted Variance Component Calculation Day or (y) the Maturity Date for the Active Synthetic Variance Swap as follows:

$$Clo\sin gLevel_{SD,t} = VarNotional_{SD} \times 100 \times \left((StrikeLevel_{SD})^2 - Min\left((Cap_{SD})^2 \times (StrikeLevel_{SD})^2, VarLevel_{SD,t}\right)\right)$$

With:

$$Cap_{SD} = \sqrt{1 + \frac{4}{StrikeLevel_{SD}}}$$

$$VarNotional_{SD} = \frac{VegaNotional_{SD}}{2 \times StrikeLevel_{SD}}$$

Where:

$ClosingLevel_{SD,t}$ means the Active Synthetic Variance Swap Closing Level in respect of Equity Index Business Day t for the Active Synthetic Variance Swap initiated on Potential Variance Swap Start Date SD

$VegaNotional_{SD}$ means the Vega Notional for the Active Synthetic Variance Swap initiated on Potential Variance Swap Start Date SD

$StrikeLevel_{SD}$ means the Strike Level for the Active Synthetic Variance Swap initiated on Potential Variance Swap Start Date SD

$VarLevel_{SD,t}$ means the Variance Level in respect of Equity Index Business Day t for the Active Synthetic Variance Swap initiated on Potential Variance Swap Start Date SD

5.7 Determining the Variance Level of the Active Synthetic Variance Swaps

The Strategy Calculation Agent will determine the Variance Level for each Active Synthetic Variance Swap initiated on Potential Variance Swap Start Date SD, in respect of any Equity Index Business Day t that is (x) a Variance Component Calculation Day that is not a Disrupted Variance Component Calculation Day or (y) the Maturity Date for the Active Synthetic Variance Swap as follows:

a) If Equity Index Business Day t is Potential Variance Swap Start Date SD in respect of the Active Synthetic Variance Swap, then:

$$VarLevel_{SD,t} = \left(VolIndexLevel_t \times 0.01\right)^2$$

b) If Equity Index Business Day t occurs after the Potential Variance Swap Start Date SD but before the Maturity Date in respect of the Active Synthetic Variance Swap, then:

$$VarLevel_{SD,t} = \frac{Period_{SD,t}}{Period_{SD,MatDate}} \times VarLevel\,\mathrm{Re}\,alized_{SD,t} + \frac{Period_{t,MatDate}}{Period_{SD,MatDate}} \times VarLevel\,\mathrm{Im}\,plied_{SD,t}$$

With:

$$VarLevel\,\mathrm{Re}\,alized_{SD,t} = \frac{252}{Period_{SD,t}} \times \sum_{i=EqIndexDay_{SD,\,following}}^{t} \left(\ln\left(\frac{EqIndexLevel_i}{EqIndexLevel_{i,prior}} \right) \right)^2$$

$$VarLevel\,\mathrm{Im}\,plied_{SD,t} = \left(VolIndexLevel_t \times 0.01\right)^2$$

c) If Equity Index Business Day t is the Maturity Date in respect of the Active Synthetic Variance Swap then:

$$VarLevel_{SD,t} = \frac{252}{Period_{SD,MatDate}} \times \sum_{i=EqIndexDay_{SD,\,following}}^{t} \left(\ln\left(\frac{EqIndexLevel_i}{EqIndexLevel_{i,prior}} \right) \right)^2$$

Where:

$VarLevel_{SD,t}$ means the Variance Level in respect of Equity Index Business Day t for the Active Synthetic Variance Swap initiated on Potential Variance Swap Start Date SD

$VolIndexLevel_t$ means, in respect of Equity Index Business Day t, (x) if that Equity Index Business Day t is a Volatility Index Business Day, the Volatility Index Level for Equity Index Business Day t or (y) if that Equity Index Business Day t is not a Volatility Index Business Day, the Volatility Index Level for the Volatility Index Business Day that was not a Disrupted Volatility Index Business Day immediately preceding that Equity Index Business Day t

$EqIndexDay_{SD,following}$ means the Equity Index Business Day immediately following Potential Variance Swap Start Date SD, irrespective of whether such day is a Disrupted Equity Index Business Day

$EqIndexLevel_i$ means:

(i) In respect of an Equity Index Business Day i that is not a Deemed Maturity Date, (x) if that Equity Index Business Day i is not a Disrupted Equity Index Business Day, the Equity Index Level for that Equity Index Business Day i or (y) if that Equity Index Business Day i is a Disrupted Equity Index Business Day, the Equity Index Level for the Equity Index Business Day that is not a Disrupted Equity Index Business Day immediately preceding that Equity Index Business Day i

(ii) In respect of an Equity Index Business Day i that is a Deemed Maturity Date, the level of the Equity Index as of the Scheduled Closing Time on the Deemed Maturity Date, as determined by the Strategy Calculation Agent in accordance with the formula for and method of calculating the Equity Index Level in effect immediately preceding the occurrence of the first Disrupted Equity Index Business Day resulting in such Deemed Maturity Date, using (x) if an event giving rise to a Disrupted Equity Index Business Day has not occurred in respect of the relevant security on the Deemed Maturity Date, the Exchange traded or quoted price as of the Scheduled Closing Time on the Deemed Maturity Date for the relevant security in the Equity Index and (y) if an event giving rise to a Disrupted Equity Index Business Day has occurred in respect of the relevant security on the Deemed Maturity Date, the Strategy Calculation Agent's good faith estimate of the per security value for the relevant security as of the Scheduled Closing Time on the Deemed Maturity Date.

$EqIndexLevel_{i,prior}$ means, in respect of Equity Index Business Day i, the Equity Index Level for the Equity Index Business Day that was not a Disrupted Equity Index Business Day immediately preceding that Equity Index Business Day i

i means an Equity Index Business Day irrespective of whether such day is a Disrupted Equity Index Business Day

$\text{Period}_{\text{SD,MatDate}}$ means the number of days that, as of the Potential Variance Swap Start Date SD, are scheduled to be Equity Index Business Days (irrespective of whether any such day is or becomes a Disrupted Equity Index Business Day) from, but excluding, the Potential Variance Swap Start Date SD to, and including, the Scheduled Maturity Date for the Active Synthetic Variance Swap.

$\text{Period}_{\text{t,MatDate}}$ means the number of days that, as of the Potential Variance Swap Start Date SD, are scheduled to be Equity Index Business Days (irrespective of whether any such day is or becomes a Disrupted Equity Index Business Day) from but excluding Equity Index Business Day t to and including the Scheduled Maturity Date for the Active Synthetic Variance Swap.

$\text{Period}_{\text{SD,t}}$ means the number of days that, as of the Potential Variance Swap Start Date SD, are scheduled to be Equity Index Business Days (irrespective of whether any such day is or becomes a Disrupted Equity Index Business Day) from, but excluding, the Potential Variance Swap Start Date SD to, and including, Equity Index Business Day t.

5.8 Calculation of the Variance Component Level

On the Variance Component Base Date, the Variance Component Level was the Variance Component Base Level. After the Variance Component Base Date, the Strategy Calculation Agent will determine the Variance Component Level in respect of each Variance Component Calculation Day t that is not a Disrupted Variance Component Calculation Day as follows:

$$VarCompLevel_t = VarCompLevel_{prior} + NewVarSwapLevel_t + ActiveVarSwapMtM_t + AdditionalVS(VarCompCalcDay_{prior}, t)$$

With:

$$ActiveVarSwapMtM_t = \sum_{SD=EarliestPotVarSwapStartDate}^{VarCompCalcDay_{prior}} \left(Closing Level_{SD,t} - Closing Level_{SD,prior} \right)$$

Where:

$\text{VarCompLevel}_{\text{t}}$ means the Variance Component Level for Variance Component Calculation Day t

$\text{VarCompLevel}_{\text{prior}}$ means the Variance Component Level for the Variance Component Calculation Day that was not a Disrupted Variance Component Calculation Day immediately preceding Variance Component Calculation Day t

$\text{NewVarSwapLevel}_{\text{t}}$ means (x) if there is an Active Synthetic Variance Swap in respect of Variance Component Calculation Day t with a Potential Variance Swap Start Date that is Variance Component Calculation Day t, the Active Synthetic Variance Swap Closing Level in respect of Variance Component Calculation Day t for the Active Synthetic Variance Swap initiated on a Potential Variance Swap Start Date that is Variance Component Calculation Day t or (y) if there is no Active Synthetic Variance Swap in respect of Variance Component Calculation Day t with a Potential Variance Swap Start Date that is Variance Component Calculation Day t, zero

$\text{VarCompCalcDay}_{\text{prior}}$ means the Variance Component Calculation Day that is not a Disrupted Variance Component Calculation Day immediately preceding Variance Component Calculation Day t

EarliestPotVarSwapStartDate means (x) if there are Active Synthetic Variance Swaps in respect of Variance Component Calculation Day t, the earliest occurring Potential Variance Swap Start Date for the set of Active Synthetic Variance Swaps in respect of Variance Component Calculation Day t or (y) if there are no Active Synthetic Variance Swaps in respect of Variance Component Calculation Day t, Variance Component Calculation Day t

SD means a Potential Variance Swap Start Date

$ClosingLevel_{SD,t}$ means (x) if there are Active Synthetic Variance Swaps in respect of Variance Component Calculation Day t with a Potential Variance Swap Start Date SD prior to Variance Component Calculation Day t, the Active Synthetic Variance Swap Closing Level in respect of Variance Component Calculation Day t for the Active Synthetic Variance Swap initiated on a Potential Variance Swap Start Date SD prior to Variance Component Calculation Day t or (y) if there are no Active Synthetic Variance Swaps in respect of Variance Component Calculation Day t with a Potential Variance Swap Start Date SD prior to Variance Component Calculation Day t, zero

$ClosingLevel_{SD,prior}$ means (x) if there are Active Synthetic Variance Swaps in respect of Variance Component Calculation Day t with a Potential Variance Swap Start Date SD prior to Variance Component Calculation Day t, the Active Synthetic Variance Swap Closing Level in respect of the Variance Component Calculation Day that is not a Disrupted Variance Component Calculation Day immediately preceding Variance Component Calculation Day t for the Active Synthetic Variance Swap initiated on a Potential Variance Swap Start Date SD prior to Variance Component Calculation Day t or (y) if there are no Active Synthetic Variance Swaps in respect of Variance Component Calculation Day t with a Potential Variance Swap Start Date SD prior to Variance Component Calculation Day t, zero

$AdditionalVS(VarCompCalcDay_{prior},t)$ means in respect of Variance Component Calculation Day t and any of the Previous Active Synthetic Variance Swaps (in respect of Variance Component Calculation Day t) whose Maturity Date occurred from, but excluding, the Variance Component Calculation Day that was not a Disrupted Variance Component Calculation Day immediately preceding Variance Component Calculation Day t to, but excluding, Variance Component Calculation Day t, an amount equal to (i) if there is no such Previous Active Synthetic Variance Swap, zero or (ii) if there is one or more such Previous Active Synthetic Variance Swaps (x) the sum of the Active Synthetic Variance Swap Closing Level of each such Previous Active Synthetic Variance Swap on the relevant Maturity Date for the relevant Active Synthetic Variance Swap minus (y) the sum of the Active Synthetic Variance Swap Closing Level of each such Previous Active Synthetic Variance Swap on the Variance Component Calculation Day that is not a Disrupted Variance Component Calculation Day immediately preceding Variance Component Calculation Day t

Previous Active Synthetic Variance Swaps means, in respect of Variance Component Calculation Day t, the set of Active Synthetic Variance Swaps in respect of the Variance Component Calculation Day that was not a Disrupted Variance Component Calculation Day immediately preceding Variance Component Calculation Day t

Module B1.0: J.P. Morgan Volemont Strategy – U.S. Equity (Series 1) (USD)

Name of Strategy	J.P. Morgan Volemont Strategy – U.S. Equity (Series 1) (USD)	
Bloomberg ticker	JPVOLUSA Index	
Currency of the Strategy	USD	
Strategy Base Date	December, 18 2007	
Strategy Base Level	100.00	
Strategy Live Date	April 30, 2013	
Futures Component Base Date	December, 18 2007	
Futures Component Base Level	100.00	
Variance Component Base Date	December, 18 2007	
Variance Component Base Level	100.00	
Volatility Index Floor	15.00	
Target Vega	0.5%	
Adjustment Factor	0.75%	
Rebalancing Adjustment Factor ("RAF") utilized for a Futures Component Calculation Day t or a Strategy Calculation Day t	Volatility Index Level on the Volatility Index Business Day that is not a Disrupted Volatility Index Business Day immediately preceding Futures Component Calculation Day t or Strategy Calculation Day t (as the case may be)	Rebalancing Adjustment Factor
	=< 35	0.20%
	=< 50 and > 35	0.30%
	=< 70 and > 50	0.40%
	> 70	0.50%

Table A: Equity Index

Equity Index	Exchange	Related Exchange	Equity Index Sponsor	Bloomberg Ticker
S&P 500® Index	New York Stock Exchange and the NASDAQ Global Select Market	The Chicago Mercantile Exchange (also known as CME)	Standard & Poor's Financial Services LLC, a subsidiary of The McGraw-Hill Companies, Inc.	SPX Index

Table B: Volatility Index

Volatility Index	Volatility Index Sponsor	Related Exchange	Bloomberg Ticker
The CBOE Volatility Index®	The Chicago Board Options Exchange, Incorporated	The Chicago Board Options Exchange® (also known as CBOE®)	VIX Index

Table C: Futures Contracts

Futures Contracts	Related Exchange
As defined in Part A, Section 9	The Chicago Board Options Exchange® (also known as CBOE®)

Strategy Disclaimers

S&P 500® Index

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The CBOE Volatility Index (the VIX Index)

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