Underlying supplement no. 21-I
To prospectus dated November 14, 2011,
prospectus supplement dated November 14, 2011 and
product supplement no. 37-I dated January 31, 2014

Registration Statement No. 333-177923
Dated January 31, 2014
Rule 424(b)(2)

JPMorgan Chase & Co.

Range Accrual Notes Linked to One or More Equity Indices

General

JPMorgan Chase & Co. may, from time to time, offer and sell range accrual notes linked to one or more equity indices (each, an "Equity Index" and collectively, the "Equity Indices"). This underlying supplement no. 21-I describes potential Equity Indices to which the notes may be linked, the relationship, if any, between JPMorgan Chase & Co. and the sponsor or publisher of the Equity Indices and other relevant information. This underlying supplement no. 21-I supplements the terms described in the accompanying product supplement, prospectus supplement and 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 description of any relevant Equity Index specified below. We refer to such term sheets and pricing supplements generally as terms supplements. If the terms described in the relevant terms supplement are inconsistent with those described in this underlying supplement or in any other relevant underlying supplement, or in the accompanying product supplement, prospectus supplement or prospectus, the terms described in the relevant terms supplement will control. In addition, if this underlying supplement no. 21-I and the accompanying product supplement or another relevant underlying supplement contain information relating to the same Equity Index to which the notes are linked, the information contained in the document with the most recent date will control.

Supplemental Key Terms

Components:	For the purposes of the accompanying product supplement, each Equity Index described in this underlying supplement is a Component.
Component Provisions:	For the purposes of the accompanying product supplement, the Equity Index Provision is a Component Provision.
Equity Index Provision:	Unless otherwise specified in the relevant terms supplement, with respect to any Equity Index, the Equity Index Provision will be deemed satisfied on each calendar day during an Interest Period (other than the Initial Interest Period(s), if applicable, or any Substitute Interest Period, if applicable) on which, as specified in the relevant terms supplement, the Equity Index Level of that Equity Index is equal to or greater than the low end of a range and equal to or less than the high end of such range (which we refer to as the "Equity Index Range") *or* equal to, less than or greater than a specified level of that Equity Index (which we refer to as the "Equity Index Strike"), which may be equal to 0 (as specified in the relevant terms supplement), in each case, on the applicable Equity Index Determination Date. Notwithstanding the foregoing, the Equity Index Provision will be deemed *not* satisfied on a calendar day if a market disruption event occurred or was continuing on the originally scheduled Equity Index Determination Date for that calendar day and on each of the four trading days immediately preceding that originally scheduled Equity Index Determination Date.
Equity Index Range (if applicable):	As specified in the relevant terms supplement
Equity Index Strike (if applicable):	As specified in the relevant terms supplement
Equity Index Level:	Unless otherwise specified in the relevant terms supplement, with respect to each Equity Index or any relevant successor index (as defined in "Supplemental General Terms of Notes — Discontinuation of an Equity Index; Alteration of Method of Calculation"), the "Equity Index Level" on any relevant day will equal the official closing level of that Equity Index or that successor index, as applicable, published with respect to that day. In certain circumstances, the "Equity Index Level" for an Equity Index will be based on the alternative calculation of that Equity Index described under "Supplemental General Terms of Notes — Discontinuation of an Equity Index; Alteration of Method of Calculation."
Equity Index Determination Date:	Unless otherwise provided in the relevant terms supplement, for each calendar day in an Interest Period to which the applicable Equity Index Provision applies, the second trading day prior to that calendar day; *provided*, *however*, that if a market disruption event occurs or is continuing on that trading day, then the trading day immediately preceding that trading day on which no market disruption event occurs or is continuing. Notwithstanding the foregoing, if the relevant terms supplement specifies that an Exclusion Period applies, for each calendar day in the Exclusion Period, the Equity Index Determination Date will be the trading day immediately preceding the first day of the Exclusion Period, unless otherwise specified in the relevant terms supplement.

Investing in the range accrual notes involves a number of risks. See "Risk Factors" in the accompanying product supplement and "Risk Factors" beginning on page US-3 of this underlying supplement no. 21-I.

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 this underlying supplement no. 21-I, the accompanying product supplement, prospectus supplement and prospectus, any other relevant underlying supplement or the relevant terms supplement. Any representation to the contrary is a criminal offense.

The notes are not bank deposits and are not insured by the Federal Deposit Insurance Corporation or any other governmental agency, nor are they obligations of, or guaranteed by, a bank.

J.P.Morgan

January 31, 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, any related underlying supplement, this underlying supplement no. 21-I and the accompanying product supplement, prospectus supplement and 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. This underlying supplement no. 21-I, together with the relevant terms supplement, any related underlying supplement and the accompanying prospectus and prospectus supplement, contains the terms of the notes and supersedes 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 the relevant terms supplement, any related underlying supplement, this underlying supplement no. 21-I and the accompanying product supplement, prospectus supplement and prospectus may only be accurate as of the dates of each of these documents, respectively.

The notes described in the relevant terms supplement, the accompanying product supplement, any other related underlying supplement and this underlying supplement no. 21-I are not appropriate for all investors, and involve important legal and tax consequences and investment risks, which 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. 21-I, any other related underlying supplement and the accompanying product supplement, prospectus supplement and prospectus do not constitute an offer to sell or a solicitation of an offer to buy the notes in any circumstances in which such offer or solicitation is unlawful.

In this underlying supplement no. 21-I, any related underlying supplement, the relevant terms supplement and the accompanying product supplement, prospectus supplement and prospectus, "we," "us" and "our" refer to JPMorgan Chase & Co., unless the context requires otherwise.

SUPPLEMENTAL DESCRIPTION OF NOTES

*The following description of the terms of the notes supplements the description of the general terms of the debt securities set forth under the headings "Description of Notes" in the accompanying product supplement, prospectus supplement and "Description of Debt Securities" in the accompanying prospectus. A separate terms supplement will describe the terms that apply to specific issuances of the notes, including any changes to the terms specified below. Capitalized terms used but not defined in this underlying supplement no. 21-I have the meanings assigned in the accompanying product supplement, prospectus supplement, prospectus and the relevant terms supplement. The term "**note**" refers to each $1,000 principal amount of our Range Accrual Notes.*

The Accrual Provision

For the purposes of the accompanying product supplement, each Equity Index described in this underlying supplement is a Component.

For the purposes of the accompanying product supplement, the Equity Index Provision is a Component Provision.

Unless otherwise specified in the relevant terms supplement, with respect to any Equity Index, the Equity Index Provision will be deemed satisfied on each calendar day during an Interest Period (other than the Initial Interest Period(s), if applicable, or any Substitute Interest Period, if applicable) on which, as specified in the relevant terms supplement, the Equity Index Level of that Equity Index is equal to or greater than the low end of a range and equal to or less than the high end of such range (which we refer to as the "Equity Index Range") or equal to, less than or greater than a specified level of that Equity Index (which we refer to as the "Equity Index Strike"), which may be equal to 0 (as specified in the relevant terms supplement), in each case, on the applicable Equity Index Determination Date. Notwithstanding the foregoing, the Equity Index Provision will be deemed *not* satisfied on a calendar day if a market disruption event occurred or was continuing on the originally scheduled Equity Index Determination Date for that calendar day and on each of the four trading days immediately preceding that originally scheduled Equity Index Determination Date.

Unless otherwise specified in the relevant terms supplement, with respect to each Equity Index or any relevant successor index (as defined in "Supplemental General Terms of Notes — Discontinuation of an Equity Index; Alteration of Method of Calculation"), the "Equity Index Level" on any relevant day will equal the official closing level of that Equity Index or that successor index, as applicable, published with respect to that day. In certain circumstances, the "Equity Index Level" for an Equity Index will be based on the alternative calculation of that Equity Index described under "Supplemental General Terms of Notes — Discontinuation of an Equity Index; Alteration of Method of Calculation."

The "Equity Index Range," if applicable, will be as specified in the relevant terms supplement

The "Equity Index Strike," if applicable, will be as specified in the relevant terms supplement

Unless otherwise provided in the relevant terms supplement, the "Equity Index Determination Date" will be, for each calendar day in an Interest Period to which the applicable Equity Index Provision applies, the second trading day prior to that calendar day; *provided*, *however*, that if a market disruption event occurs or is continuing on that trading day, then the trading day immediately preceding that trading day on which no market disruption event occurs or is continuing. Notwithstanding the foregoing, if the relevant terms supplement specifies that an Exclusion Period applies, for each calendar day in the Exclusion Period, the Equity Index Determination Date will be the trading day immediately preceding the first day of the Exclusion Period, unless otherwise specified in the relevant terms supplement.

Unless otherwise specified in the relevant terms supplement, a “trading day,” with respect to an Equity Index or any relevant successor index, means a day, as determined by the calculation agent, on which trading is generally conducted on (i) the relevant exchanges (as defined below) for securities underlying that Equity Index or successor index, and (ii) the exchanges on which futures or options contracts related to that Equity Index or successor index, as applicable, are traded.

Unless otherwise specified in the relevant terms supplement, the “relevant exchange,” with respect to an Equity Index or any relevant successor index, means the primary exchange or market of trading for any security (or any combination thereof) then included in that Equity Index or successor index, as applicable.

RISK FACTORS

Your investment in the notes will involve certain risks. Investing in the notes is not equivalent to investing in any of the Indices described herein or any of their component securities. ***You should consider carefully the risks discussed under "Risk Factors" in the accompanying product supplement and in any other related underlying supplement, together with the following discussion of additional risks, before you decide that an investment in the notes is suitable for you.***

We or our affiliates may have economic interests that are adverse to those of the holders of the notes as a result of our business activities.

We or our affiliates may currently or from time to time engage in business with companies the equity securities of which are included in an Equity Index (the "underlying companies"), including extending loans to, making equity investments in or providing advisory services to the underlying companies, including merger and acquisition advisory services. In the course of this business, we or our affiliates may acquire nonpublic information about the underlying companies, and we will not disclose any such information to you. In addition, we or one or more of our affiliates may publish research reports or otherwise express views about the underlying companies. Any prospective purchaser of notes should undertake an independent investigation of each of the underlying companies as in its judgment is appropriate to make an informed decision with respect to an investment in the notes. We do not make any representation or warranty to any purchaser of notes with respect to any matters whatsoever relating to our business with the underlying companies.

Market disruptions may adversely affect your return.

The calculation agent may, in its sole discretion, determine that the markets have been affected in a manner that prevents it from determining any relevant Equity Index Level on any Equity Index Determination Date. These events may include disruptions or suspensions of trading in the markets as a whole. If the calculation agent, in its sole discretion, determines that any of these events has occurred on any Equity Index Determination Date, the calculation agent will use the Equity Index Level on the immediately preceding Equity Index Determination Date to make any relevant determination and, as a result, your payments on the notes, if any, may be adversely affected. See "Supplemental General Terms of Notes — Market Disruption Events."

We are currently one of the companies that make up the S&P 500® Index, but, to our knowledge, unless otherwise specified in the relevant terms supplement, we are not currently affiliated with any other company whose equity securities are included in an Equity Index.

We will have no ability to control the actions of the other issuers whose equity securities are included in the S&P 500® Index or issuers whose equity securities are included in any other Equity Index, including actions that could affect the value of the equity securities underlying an Equity Index or your notes. None of the money you pay us will go to the sponsor of any Equity Index (each, an "Index Sponsor") or any of the issuers of the equity securities included in any Equity Index, and none of those issuers will be involved in the offering of the notes in any way. Neither those issuers nor we will have any obligation to consider your interests as a holder of the notes in taking any corporate actions that might affect the value of your notes. See the relevant terms supplement for additional information about whether we are one of the companies included in an Equity Index.

In the event we become affiliated with any issuers whose equity securities are included in an Equity Index, we will have no obligation to consider your interests as a holder of the notes in taking any action with respect to such issuer that might affect the value of your notes.

You will have no shareholder rights in issuers of equity securities that are included in an Equity Index.

As a holder of the notes, you will not have voting rights or rights to receive dividends or other distributions or other rights that holders of the equity securities that are included in an Equity Index would have.

For notes linked in whole or in part to the Russell 2000® Index, an investment in the notes will be subject to risks associated with small capitalization stocks.

The stocks that constitute the Russell 2000® Index are issued by companies with relatively small market capitalization. The stock prices of smaller companies may be more volatile than stock prices of large capitalization companies. Small capitalization companies may be less able to withstand adverse economic, market, trade and competitive conditions relative to larger companies. These companies tend to be less well-established than large market capitalization companies. Small capitalization companies are less likely to pay dividends on their stocks, and the presence of a dividend payment could be a factor that limits downward stock price pressure under adverse market conditions.

For notes linked in whole or in part to a foreign Equity Index, if the prices of its component non-U.S. securities are not converted into U.S. dollars for purposes of calculating the value of that foreign Equity Index, the Equity Index Level and therefore any amount you may receive on the notes will not be adjusted for changes in exchange rates that might affect that foreign Equity Index.

Because the prices of the non-U.S. securities underlying the applicable foreign Equity Index are not converted into U.S. dollars for purposes of calculating the value of that foreign Equity Index and although the non-U.S. securities underlying that foreign Equity Index are traded in currencies other than U.S. dollars, and the notes, which are linked in part to that foreign Equity Index, are denominated in U.S. dollars, any amount payable on the notes, if any, will not be adjusted for changes in the exchange rate between the U.S. dollar and each of the currencies in which the non-U.S. securities underlying that foreign Equity Index are denominated. Changes in exchange rates, however, may reflect changes in various non-U.S. economies that in turn may affect the payment on the notes. The amount we pay in respect of the notes, if any, will be determined solely in accordance with the procedures described in the accompanying product supplement. A "foreign Equity Index" is an Equity Index that is composed exclusively of securities issued by non-U.S. companies.

For notes linked in whole or in part to a foreign Equity Index, if the prices of its component non-U.S. securities are converted into U.S. dollars for purposes of calculating the value of that foreign Equity Index, the notes will be subject to currency exchange risk.

Because the prices of the non-U.S. securities underlying the applicable foreign Equity Index are converted into U.S. dollars for the purposes of calculating the value of that foreign Equity Index, the holders of the notes will be exposed to currency exchange rate risk with respect to each of the currencies in which the non-U.S. securities underlying that foreign Equity Index trade. An investor's net exposure will depend on the extent to which such currencies strengthen or weaken against the U.S. dollar and the relative weight of the non-U.S. securities underlying that foreign Equity Index denominated in each applicable currency. If, taking into account the weighting, the U.S. dollar strengthens against those currencies, the value of that foreign Equity Index will be adversely affected and any payment on the notes may be reduced.

Of particular importance to potential currency exchange risk are:

- existing and expected rates of inflation;
- existing and expected interest rate levels;
- the balance of payments;
- political, civil or military unrest; and
- the extent of governmental surpluses or deficits in the component countries and the United States.

All of these factors are, in turn, sensitive to the monetary, fiscal and trade policies pursued by the governments of various component countries, the United States and other countries important to international trade and finance.

For notes linked to a foreign Equity Index, if the prices of its component non-U.S. securities are converted into U.S. dollars for purposes of calculating the value of that foreign Equity Index, changes in the volatility of exchange rates and the correlation between those rates and the values of that foreign Equity Index are likely to affect the market value of the notes.

The exchange rate between the U.S. dollar and each of the currencies in which the non-U.S. securities underlying the applicable foreign Equity Index are denominated refers to a foreign exchange spot rate that measures the relative values of two currencies — the particular currency in which an equity security composing that foreign Equity Index is denominated and the U.S. dollar. This exchange rate reflects the amount of the particular currency in which an equity security composing a foreign Equity Index is denominated that can be purchased for one U.S. dollar and thus increases when the U.S. dollar appreciates relative to the particular currency in which that equity security is denominated. The volatility of the exchange rate between the U.S. dollar and each of the currencies in which the non-U.S. securities underlying a foreign Equity Index are denominated refers to the size and frequency of changes in that exchange rate.

Because the applicable foreign Equity Index is calculated, in part, by converting the closing prices of the non-U.S. securities underlying that foreign Equity Index into U.S. dollars, the volatility of the exchange rate between the U.S. dollar and each of the currencies in which those non-U.S. securities are denominated could affect the market value of the notes.

The correlation of the exchange rate between the U.S. dollar and each of the currencies in which the non-U.S. securities underlying a foreign Equity Index are denominated and the value of that foreign Equity Index refers to the relationship between the percentage changes in that exchange rate and the percentage changes in the value of that foreign Equity Index. The direction of the correlation (whether positive or negative) and the extent of the correlation between the percentage changes in the exchange rate between the U.S. dollar and each of the currencies in which the non-U.S. securities underlying a foreign Equity Index are denominated and the percentage changes in the value of that foreign Equity Index could affect the value of the notes.

For notes linked to a foreign Equity Index, an investment in the notes is subject to risks associated with non-U.S. securities markets.

Unless otherwise specified in the relevant terms supplement, the securities that compose a foreign Equity Index have been issued by non-U.S. companies. Investments in securities linked to the value of securities of non-U.S. issuers involve risks associated with the securities markets in those countries, including risks of volatility in those markets, governmental intervention in those markets and cross-shareholdings in companies in certain countries. Also, there is generally less publicly available information about companies in some of these jurisdictions than about U.S. companies that are subject to the reporting requirements of the SEC, and generally non-U.S. companies are subject to accounting, auditing and financial reporting standards and requirements and securities trading rules different from those applicable to U.S. reporting companies.

The prices of securities in non-U.S. markets may be affected by political, economic, financial and social factors in those markets, including changes in a country's government, economic and fiscal policies, currency exchange laws or other laws or restrictions. Moreover, the economies of these countries may differ favorably or unfavorably from the economy of the United States in such respects as growth of gross national product, rate of inflation, capital reinvestment, resources and self-sufficiency. These countries may be subjected to different and, in some cases, more adverse economic environments.

The economies of emerging market countries in particular face several concerns, including relatively unstable governments that may present the risks of nationalization of businesses, restrictions on foreign ownership and prohibitions on the repatriation of assets, and which may have less protection of property rights than more developed countries. These economies may also be based on only a few industries, be highly vulnerable to changes in local and global trade conditions and may suffer from extreme and volatile debt burdens or inflation rates. In addition, local securities markets may trade a small number of securities and may be unable to respond effectively to increases in trading volume, potentially making prompt liquidation of holdings difficult or impossible at times. The risks of the economies of emerging market countries are relevant for notes linked to a foreign Equity Index composed of securities traded in one or more emerging market countries.

Some or all of these factors may influence the Equity Index Level for a foreign Equity Index. The impact of any of the factors set forth above may enhance or offset some or all of any change resulting from another factor or factors. You cannot predict the future performance of an Equity Index based on its historical performance. The level of an Equity Index may decrease, which may adversely affect any payment on the notes.

The Index Sponsor of an Equity Index may adjust that Equity Index in a way that affects its level, and the Index Sponsor has no obligation to consider your interests.

The Index Sponsor of an Equity Index is responsible for maintaining that Equity Index. The Index Sponsor can add, delete or substitute the securities included in the applicable Equity Index or make other methodological changes that could change the level of that Equity Index. You should realize that the changing of securities included in an Equity Index may affect that Equity Index, as a newly added security may perform significantly better or worse than the security or securities it replaces. Additionally, the Index Sponsor may alter, discontinue or suspend calculation or dissemination of the applicable Equity Index. Any of these actions could adversely affect the value of the notes. The Index Sponsor of an Equity Index has no obligation to consider your interests in calculating or revising that Equity Index. See the relevant index description section in this underlying supplement or the relevant terms supplement for additional information.

The relevant terms supplement may provide additional risk factors relating to any Equity Index to which the notes are linked.

SUPPLEMENTAL GENERAL TERMS OF NOTES

Calculation Agent

The calculation agent will determine, among other things, the applicable Equity Index Level, Equity Index Range (if applicable), and Equity Index Strike (if applicable). In addition, the calculation agent will determine, among other things:

- whether a market disruption event has occurred; and
- whether an Equity Index has been discontinued, whether the method of calculating an Equity Index has changed in a material respect or whether an Equity Index has been otherwise modified so that it does not, in the opinion of the calculation agent, fairly represent the level of that Equity Index had those changes or modifications not been made and, if applicable, which index to select as a successor index;

All determinations made by the calculation agent will be at the sole discretion of the calculation agent and will, in the absence of manifest error, be conclusive for all purposes and binding on you and on us.

All calculations with respect to any Equity Index Level, Equity Index Range (if applicable), and Equity Index Strike will be rounded to the nearest one hundred-thousandth, with five one-millionths rounded upward (*e.g.*, 0.876545 would be rounded to 0.87655).

Market Disruption Events

With respect to an Equity Index (or any relevant successor index), a "**market 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 that Equity Index (or that successor index) on the relevant exchanges (as defined below) for those securities for more than two hours of trading during, or during the one-hour period preceding the close of, the principal trading session on that 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 that Equity Index (or that successor index) during the one-hour period 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 that Equity Index (or that successor 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 calculation agent in its sole discretion; and

- a determination by the 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.

For purposes of determining whether a market disruption event with respect to an Equity Index (or any relevant successor index) exists at any time, if trading in a security included in that Equity Index (or that successor index) is materially suspended or materially limited at that time, then the relevant percentage contribution of that security to the level of that Equity Index (or that successor index) will be based on a comparison of:

- the portion of the level of that Equity Index (or that successor index) attributable to that security relative to
- the overall level of that Equity Index (or that successor index),

in each case immediately before that suspension or limitation.

For purposes of determining whether a market disruption event with respect to an Equity Index (or any relevant successor index) 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 that Equity Index (or that successor 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 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 that Equity Index (or that successor 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 that Equity Index (or that successor 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 that Equity Index (or that successor index) are traded will not include any time when that exchange or market is itself closed for trading under ordinary circumstances.

Discontinuation of an Equity Index; Alteration of Method of Calculation

Unless otherwise specified in the relevant terms supplement, if the sponsor of an Equity Index (an "**Index Sponsor**") discontinues publication of that Equity Index and that Index Sponsor or another entity publishes a successor or substitute index that the calculation agent determines, in its sole discretion, to be comparable to the discontinued Equity Index (such index being referred to herein as a "**successor index**"), then the Equity Index Level of that Equity Index on any Equity Index Determination Date or any other relevant date on which the Equity Index Level of that Equity Index is to be determined will be determined by reference to the level of that successor index published with respect to that day.

Upon any selection by the calculation agent of a successor index, the calculation agent will cause written notice thereof to be promptly furnished to the trustee, to us and to the holders of the notes.

Unless otherwise specified in the relevant terms supplement, if the Index Sponsor for an Equity Index discontinues publication of that Equity Index prior to, and that discontinuation is continuing on, an Equity Index Determination Date or any other relevant date on which the Equity Index Level of that Equity Index is to be determined, and the calculation agent determines, in its sole discretion, that no successor index for that Equity Index is available at such time, or the calculation agent has previously selected a successor index for that Equity Index and publication of that successor index is discontinued prior to, and that discontinuation is continuing on, that Equity Index Determination Date or other relevant date, then the calculation agent will determine the Equity Index Level of that Equity Index for that Equity Index Determination Date or that other relevant date on that date. Unless otherwise specified in the relevant terms supplement, the Equity Index Level of that Equity Index will be computed by the calculation agent in accordance with the formula for and method of calculating that Equity Index or successor index, as applicable, last in effect prior to that discontinuation, using the closing price (or, if trading in the relevant securities has been materially suspended or materially limited, the calculation agent's good faith estimate of the closing price that would have prevailed but for that suspension or limitation) at the close of the principal trading session on that date of each security most recently composing that Equity Index or successor index, as applicable. Notwithstanding these alternative arrangements, discontinuation of the publication of an Equity Index or its successor index, as applicable, may adversely affect the value of the notes.

If at any time the method of calculating an Equity Index or a successor index, or the level thereof, is changed in a material respect, or if an Equity Index or a successor index is in any other way modified so that it does not, in the opinion of the calculation agent, fairly represent the level of that Equity Index or successor index, as applicable, had those changes or modifications not been made, then the calculation agent will, at the close of business in New York City on each date on which the Equity Index Level of that Equity Index or successor index, as applicable, is to be determined, make such calculations and adjustments as, in the good faith judgment of the calculation agent, may be necessary in order to arrive at a level of an index comparable to that Equity Index or successor index, as the case may be, as if those changes or modifications had not been made, and the calculation agent will calculate the Equity Index Level of that Equity Index or successor index, as applicable, with reference to that Equity Index or successor index, as adjusted. Accordingly, if the method of calculating an Equity Index or a successor index is modified so that the level of that Equity Index or successor index is a fraction of what it would have been if there had been no such modification (*e.g.*, due to a split in that Equity Index or successor index), then the calculation agent will adjust its calculation of that Equity Index or successor index, as applicable, in order to arrive at a level of that Equity Index or successor index, as applicable, as if there had been no modification (*e.g.*, as if the split had not occurred).

EQUITY INDEX DESCRIPTIONS

If the notes are linked to any Equity Index not described in this underlying supplement, that Equity Index will be described in a separate underlying supplement or the applicable terms supplement. In addition, the applicable terms supplement may include changes to the description of any of the Equity Indices described below.

The EURO STOXX 50® Index

We have derived all information contained in this underlying supplement regarding the EURO STOXX 50® Index, including, without limitation, its make-up, method of calculation and changes in its components, from publicly available information. Such information reflects the policies of, and is subject to change by, STOXX Limited. We make no representation or warranty as to the accuracy or completeness of such information. The EURO STOXX 50® Index is calculated, maintained and published by STOXX Limited. STOXX Limited has no obligation to continue to publish, and may discontinue publication of, the EURO STOXX 50® Index.

The EURO STOXX 50® Index is reported by Bloomberg L.P. under the ticker symbol "SX5E."

The EURO STOXX 50® Index was created by STOXX Limited, a joint venture between Deutsche Börse AG and SIX Group AG. Publication of the EURO STOXX 50® Index began on February 26, 1998, based on an initial EURO STOXX 50® Index value of 1,000 at December 31, 1991. The EURO STOXX 50® Index is published in The Wall Street Journal and disseminated on the STOXX Limited website: http://www.stoxx.com, which sets forth, among other things, the country and industrial sector weightings of the securities included in the EURO STOXX 50® Index and updates these weightings at the end of each quarter. Information contained in the STOXX Limited website is not incorporated by reference in, and should not be considered a part of, this underlying supplement or the relevant terms supplement.

On March 1, 2010, STOXX Limited announced the removal of the "Dow Jones" prefix from all of its indices, including the EURO STOXX 50® Index.

EURO STOXX 50® Index Composition and Maintenance

The EURO STOXX 50® Index is composed of 50 component stocks of market sector leaders from within the 19 EURO STOXX® Supersector indices, which represent the Eurozone portion of the STOXX Europe 600® Supersector indices. The STOXX Europe 600® Supersector indices contain the 600 largest stocks traded on the major exchanges of 18 European countries.

The composition of the EURO STOXX 50® Index is reviewed annually, based on the closing stock data on the last trading day in August. The component stocks are announced the first trading day in September. Changes to the component stocks are implemented on the third Friday in September and are effective the following trading day. The composition of the EURO STOXX 50® Index is also reviewed monthly to ensure that component stocks still remain eligible for inclusion. Any resulting changes from the monthly review are implemented on the close of the fifth trading day following the monthly review and are effective the next trading day. Changes in the composition of the EURO STOXX 50® Index are made to ensure that the EURO STOXX 50® Index includes the 50 market sector leaders from within the EURO STOXX® Index. A current list of the issuers that comprise the EURO STOXX 50® Index is available on the STOXX Limited website: http://www.stoxx.com. Information contained in the STOXX Limited website is not incorporated by reference in, and should not be considered a part of, this underlying supplement or the relevant terms supplement.

The free float factors for each component stock used to calculate the EURO STOXX 50® Index, as described below, are reviewed, calculated and implemented on a quarterly basis and are fixed until the next quarterly review.

The EURO STOXX 50® Index is also reviewed on an ongoing basis. Corporate actions (including initial public offerings, mergers and takeovers, spin-offs, delistings and bankruptcy) that affect the EURO STOXX 50® Index composition are immediately reviewed. Any changes are announced, implemented and effective in line with the type of corporate action and the magnitude of the effect.

EURO STOXX 50® Index Calculation

The EURO STOXX 50® Index is calculated with the "Laspeyres formula," which measures the aggregate price changes in the component stocks against a fixed base quantity weight. The formula for calculating the EURO STOXX 50® Index value can be expressed as follows:

$$\text{Index} = \frac{\text{free float market capitalization of the EURO STOXX 50® Index}}{\text{adjusted base date market capitalization of the EURO STOXX 50® Index}} \times 1{,}000$$

The "free float market capitalization of the EURO STOXX 50® Index" is equal to the sum of the products of the closing price, market capitalization and free float factor for each component stock as of the time the EURO STOXX 50® Index is being calculated.

The EURO STOXX 50® Index is also subject to a divisor, which is adjusted to maintain the continuity of EURO STOXX 50® Index values despite changes due to corporate actions. The following is a summary of the adjustments to any component stock made for corporate actions and the effect of such adjustment on the divisor, where shareholders of the component stock will receive "B" number of shares for every "A" share held (where applicable).

(1) *Split and reverse split:* Adjusted price = closing price * A/B New number of shares = old number of shares * B/A Divisor: no change	
(2) *Rights offering:* If the subscription price is not available or if the subscription price is equal to or greater than the closing price on the day before the effective date, then no adjustment is made Adjusted price = (closing price * A + subscription price * B) / (A + B) New number of shares = old number of shares *(A + B)/ A Divisor: increases	
(3) *Stock dividend:* Adjusted price = closing price * A / (A + B) New number of shares = old number of shares * (A + B) / A Divisor: decreases	(4) *Stock dividend of another company:* Adjusted price = (closing price * A - price of other company * B) / A Divisor: decreases
(5) *Return of capital and share*	(6) *Repurchase of shares / self tender:*

<table>
<tr><td>consideration:
Adjusted price = (closing price – capital return announced by company * (1- withholding tax)) * A / B
New number of shares = old number of shares * B / A
Divisor: decreases</td><td>Adjusted price = ((price before tender * old number of shares) - (tender price * number of tendered shares)) / (old number of shares - number of tendered shares)
New number of shares = old number of shares - number of tendered shares
Divisor: decreases</td></tr>
<tr><td colspan="2">(7) Spin-off:
Adjusted price = (closing price * A - price of spun-off shares * B) / A
Divisor: decreases</td></tr>
<tr><td colspan="2">(8) Combination stock distribution (dividend or split) and rights offering:
For this corporate action, the following additional assumptions apply:
Shareholders receive B new shares from the distribution and C new shares from the rights offering for every A share held.
If A is not equal to one share, all the following “new number of shares” formulae need to be divided by A:</td></tr>
<tr><td>- If rights are applicable after stock distribution (one action applicable to other):
Adjusted price = (closing price * A + subscription price * C * (1 + B / A)) / ((A + B) * (1 + C / A))
New number of shares = old number of shares * ((A + B) * (1 + C / A)) / A
Divisor: increases</td><td>- If stock distribution is applicable after rights (one action applicable to other):
Adjusted price = (closing price * A + subscription price * C) /((A + C) * (1 + B / A))
New number of shares = old number of shares * ((A + C) * (1 + B / A))
Divisor: increases</td></tr>
<tr><td colspan="2">- Stock distribution and rights (neither action is applicable to the other):
Adjusted price = (closing price * A + subscription price * C) / (A + B + C)
New number of shares = old number of shares * (A + B + C) / A
Divisor: increases</td></tr>
</table>

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We have entered into an agreement with STOXX Limited (“STOXX”) providing us and certain of our affiliates or subsidiaries identified in that agreement with a non-exclusive license and, for a fee, with the right to use the EURO STOXX 50® Index, which is owned and published by STOXX Limited, in connection with certain securities, including the notes.

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- recommend that any person invest in the notes or any other securities;
- have any responsibility or liability for or make any decisions about the timing, amount or pricing of the notes;
- have any responsibility or liability for the administration, management or marketing of the notes; or
- consider the needs of the notes or the holders of the notes in determining, composing or calculating the EURO STOXX 50® Index or have any obligation to do so.

STOXX and its Licensors will not have any liability in connection with the notes. Specifically,

- **STOXX and its Licensors do not make any warranty, express or implied and disclaim any and all warranty about:**
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  - **The accuracy or completeness of the EURO STOXX 50® Index and its data; or**
  - **The merchantability and the fitness for a particular purpose or use of the EURO STOXX 50® Index and its data;**
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The licensing agreement between JPMorgan Chase & Co. and STOXX is solely for their benefit and not for the benefit of the holders of the notes or any other third parties.

The Nikkei 225 Index

The J.P. Morgan Alternative Index Japan Equity Momentum Strategy and the J.P. Morgan Alternative Index Mean Reversion Japan Strategy are linked to a synthetic exposure to the performance of the J.P. Morgan Japanese Equity Futures (G) Tracker, which is directly linked to the Nikkei 225 Index. We have derived all information contained in this underlying supplement regarding the Nikkei 225 Index, including, without limitation, its make-up, method of calculation and changes in its components, from publicly available information. Such information reflects the policies of, and is subject to change by Nikkei Inc. We make no representation or warranty as to the accuracy or completeness of such information. The Nikkei 225 Index was developed by Nikkei Inc. and is calculated, maintained and published by Nikkei Inc. Nikkei Inc. has no obligation to continue to publish, and may discontinue the publication of, the Nikkei 225 Index.

The Nikkei 225 Index is reported by Bloomberg L.P. under the ticker symbol "NKY."

The Nikkei 225 Index is a stock index that measures the composite price performance of selected Japanese stocks. The Nikkei 225 Index, as of the date of this underlying supplement, is based on 225 underlying stocks (the "Nikkei Underlying Stocks") trading on the Tokyo Stock Exchange ("TSE") representing a broad cross-section of Japanese industries.

All 225 Nikkei Underlying Stocks are stocks listed in the First Section of the TSE. Stocks listed in the First Section of the TSE are among the most actively traded stocks on the TSE. Nikkei Inc. rules require that the 75 most liquid issues (one-third of the component count of the Nikkei 225 Index) be included in the Nikkei 225 Index. Nikkei Inc. first calculated and published the Nikkei 225 Index in 1970.

The 225 companies included in the Nikkei 225 Index are divided into six sector categories: Technology, Financials, Consumer Goods, Materials, Capital Goods/Others and Transportation and Utilities. These six sector categories are further divided into 36 industrial classifications as follows:

- Technology — Pharmaceuticals, Electrical Machinery, Automobiles, Precision Machinery, Telecommunications;
- Financials — Banks, Miscellaneous Finance, Securities, Insurance;
- Consumer Goods — Marine Products, Food, Retail, Services;
- Materials — Mining, Textiles, Paper and Pulp, Chemicals, Oil, Rubber, Ceramics, Steel, Nonferrous Metals, Trading House;
- Capital Goods/Others — Construction, Machinery, Shipbuilding, Transportation Equipment, Miscellaneous Manufacturing, Real Estate; and
- Transportation and Utilities — Railroads and Buses, Trucking, Shipping, Airlines, Warehousing, Electric Power, Gas.

Standards for Listing and Maintenance

A Nikkei Underlying Stock may be deleted or added by Nikkei Inc. Any stock becoming ineligible for listing in the First Section of the TSE due to any of the following reasons will be deleted from the Nikkei Underlying Stocks: (i) bankruptcy of the issuer, (ii) merger of the issuer with, or acquisition of the issuer by, another company, (iii) delisting of such stock, (iv) transfer of such stock to the "Seiri-Post" because of excess debt of the issuer or because of any other reason or (v) transfer of such stock to the Second Section. In addition, a component stock transferred to the "Kanri-Post" (Posts for stocks under supervision) is in principle a candidate for deletion. Nikkei Underlying Stocks with relatively low liquidity, based on trading value and rate of price fluctuation over the past five years, may be deleted by Nikkei Inc. Upon deletion of a stock from the Nikkei

Underlying Stocks, Nikkei Inc. will select a replacement for such deleted Nikkei Underlying Stock in accordance with certain criteria. In an exceptional case, a newly listed stock in the First Section of the TSE that is recognized by Nikkei Inc. to be representative of a market may be added to the Nikkei Underlying Stocks. In such a case, an existing Nikkei Underlying Stock with low trading volume and deemed not to be representative of a market will be deleted by Nikkei Inc.

A list of the issuers of the Nikkei Underlying Stocks constituting the Nikkei 225 Index is available from the Nikkei Economic Electronic Databank System and from the Stock Market Indices Data Book published by Nikkei Inc. Nikkei Inc. may delete, add or substitute any stock underlying the Nikkei 225 Index.

Calculation of the Nikkei 225 Index

The Nikkei 225 Index is a modified, price-weighted index (*i.e.*, a Nikkei Underlying Stock's weight in the index is based on its price per share rather than the total market capitalization of the issuer) which is calculated by (i) multiplying the per share price of each Nikkei Underlying Stock by the corresponding weighting factor for such Nikkei Underlying Stock (a "Weight Factor"), (ii) calculating the sum of all these products and (iii) dividing such sum by a divisor (the "Divisor"). The Divisor was initially set at 225 for the date of May 16, 1949 using historical numbers from May 16, 1949, the date on which the TSE was reopened. The Divisor was 24.966 as of September 28, 2011, and is subject to periodic adjustments as set forth below. Each Weight Factor is computed by dividing ¥50 by the par value of the relevant Nikkei Underlying Stock, so that the share price of each Nikkei Underlying Stock when multiplied by its Weight Factor corresponds to a share price based on a uniform par value of ¥50. The stock prices used in the calculation of the Nikkei 225 Index are those reported by a primary market for the Nikkei Underlying Stocks (currently the TSE). The level of the Nikkei 225 Index is calculated once per minute during TSE trading hours.

In order to maintain continuity in the Nikkei 225 Index in the event of certain changes due to non-market factors affecting the Nikkei Underlying Stocks, such as the addition or deletion of stocks, substitution of stocks, stock splits or distributions of assets to stockholders, the Divisor used in calculating the Nikkei 225 Index is adjusted in a manner designed to prevent any instantaneous change or discontinuity in the level of the Nikkei 225 Index. Thereafter, the Divisor remains at the new value until a further adjustment is necessary as the result of another change. As a result of such change affecting any Nikkei Underlying Stock, the Divisor is adjusted in such a way that the sum of all share prices immediately after such change multiplied by the applicable Weight Factor and divided by the new Divisor (*i.e.*, the level of the Nikkei 225 Index immediately after such change) will equal the level of the Nikkei 225 Index immediately prior to the change.

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We expect to enter into an agreement with Nikkei Inc. that would provide us and certain of our affiliates or subsidiaries identified in that agreement with a non-exclusive license and, for a fee, with the right to use the Nikkei 225 Index, which is owned and published by Nikkei Inc., in connection with certain securities, including the notes.

Our license agreement with Nikkei Inc. will provide that Nikkei Inc. will assume no obligation or responsibility for use of the Nikkei 225 Index by us or our affiliates.

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In addition, the Nikkei 225 Index Sponsor gives no assurance regarding any modification or change in any methodology used in calculating the Nikkei 225 Index and is under no obligation to continue the calculation, publication and dissemination of the Nikkei 225 Index.

The Tokyo Stock Exchange

The TSE is one of the world's largest securities exchanges in terms of market capitalization. Trading hours are currently from 9:00 a.m. to 11:00 a.m. and from 12:30 p.m. to 3:00 p.m., Tokyo time, Monday through Friday.

Due to the time zone difference, on any normal trading day the TSE will close prior to the opening of business in New York City on the same calendar day. Therefore, the closing level of the Nikkei 225 Index on a trading day will generally be available in the United States by the opening of business on the same calendar day.

The TSE has adopted certain measures, including daily price floors and ceilings on individual stocks, intended to prevent any extreme short-term price fluctuations resulting from order imbalances. In general, any stock listed on the TSE cannot be traded at a price lower than the applicable price floor or higher than the applicable price ceiling. These price floors and ceilings are expressed in absolute Japanese yen, rather than percentage limits based on the closing price of the stock on the previous trading day. In addition, when there is a major order imbalance in a listed stock, the TSE posts a "special bid quote" or a "special asked quote" for that stock at a specified higher or lower price level than the stock's last sale price in order to solicit counter-orders and balance supply and demand for the stock. Prospective investors should also be aware that the TSE may suspend the trading of individual stocks in certain limited and extraordinary circumstances, including, for example, unusual trading activity in that stock. As a result, changes in the Nikkei 225 Index may be limited by price limitations or special quotes, or by suspension of trading, on individual stocks that make up the Nikkei 225 Index, and these limitations, in turn, may adversely affect the value of the notes.

The Russell 2000® Index

We have derived all information contained in this private placement memorandum regarding the Russell 2000® 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, Russell Investments ("**Russell**"). The Russell 2000® Index was developed by Russell Investment Group (formerly, Frank Russell Company) and is calculated, maintained and published by Russell, a subsidiary of Russell Investment Group. Russell has no obligation to publish, and may discontinue the publication of, the Russell 2000® Index.

The Russell 2000® Index is reported by Bloomberg L.P. under the ticker symbol "RTY."

The Russell 2000® Index measures the capitalization-weighted price performance of the small-cap stocks included in the Russell 2000® Index (the "**Component Stocks**") and is designed to track the performance of the small capitalization segment of the U.S. equity market. All stocks included in the Russell 2000® Index are traded on a major U.S. exchange. The companies included in the Russell 2000® Index are the middle 2,000 of the companies that form the Russell 3000E™ Index, which is composed of the 4,000 largest U.S. companies as determined by total market capitalization and represents approximately 99% of the U.S. equity market. The Russell 3000E™ Index is not the same as the Russell 3000® Index, which is a subset of the Russell 3000E™ Index.

Selection of Stocks Underlying the Russell 2000® Index. The Russell 2000® Index is a sub-index of the Russell 3000E™ Index. To be eligible for inclusion in the Russell 3000E™ Index, and, consequently, the Russell 2000® Index, a company's stock must be listed on the last trading day in May of a given year, and Russell must have access to documentation on that date verifying the company's eligibility for inclusion. Eligible initial public offerings are added to Russell U.S. indices at the end of each calendar quarter, based on total market capitalization rankings within the market-adjusted capitalization breaks established during the most recent reconstitution. To be added to any Russell U.S. index during a quarter outside of reconstitution, initial public offerings must meet all Russell U.S. index eligibility requirements as well as the following criteria: on the last trading day of the month prior to quarter-end, (i) the company's stock must price and trade and (ii) the company must rank larger in total market capitalization than the market-adjusted smallest company in the Russell 3000E™ Index as of the most recent reconstitution.

U.S. companies are eligible for inclusion in the Russell 3000E™ Index and, consequently, the Russell 2000® Index. Russell uses the following method for determining whether a company is a U.S. company. If a company incorporates in, has a stated headquarters location in, and also trades in the same country (ADRs and ADSs are not eligible), the company is assigned to its country of incorporation. If any of the three do not match, Russell then defines 3 Home Country Indicators ("**HCIs**"). The HCIs are as follows:

- country of incorporation;
- country of headquarters; and
- country of the most liquid exchange as defined by 2-year average daily dollar trading volume ("**ADDTV**") from all exchanges within a country.

After the HCIs are defined, the next step in the country assignment involves an analysis of assets by location. Russell cross-compares the primary location of the company's assets with the three HCIs. If the primary location of assets matches ANY of the HCIs, then the company is assigned to its primary asset location.

If there is not enough information to determine a company's primary country of assets, Russell uses the primary location of the company's revenue for the same cross-comparison and assigns the company to the appropriate country in a similar fashion. In 2011, Russell began using an average of two years of assets or revenues data for analysis to reduce potential turnover.

If conclusive country details cannot be derived from assets or revenue, Russell assigns the company to the country where its headquarters are located unless the country is a Benefit Driven Incorporation ("BDI") country. If the country in which its headquarters are located is a BDI country, the company is assigned to the country of its most liquid stock exchange. The BDI countries are Anguilla, Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bonaire, British Virgin Islands, Cayman Islands, Channel Islands, Cook Islands, Curacao, Faroe Islands, Gibraltar, Isle of Man, Liberia, Marshall Islands, Panama, Saba, Sint Eustatius, Sint Maarten and Turks and Caicos Islands.

The following securities are specifically excluded from the Russell U.S. indices: (i) stocks that are not traded on a major U.S. exchange (Bulletin Board, Pink Sheet and over-the-counter (OTC) securities are not eligible); (ii) preferred stock, convertible preferred stock, redeemable shares, participating preferred stock, warrants, rights and trust receipts; and (iii) royalty trusts, limited liability companies, closed-end investment companies (business development companies, or "**BDCs**," are eligible), blank check companies, special purpose acquisition companies ("**SPACs**") and limited partnerships.

The primary criterion used to determine the initial list of securities eligible for the Russell 3000E™ Index and, consequently, the Russell 2000® Index is total market capitalization, which is defined as the total number of outstanding shares times the closing price of the shares as of the last trading day in May for those securities being considered at annual reconstitution. Initial public offering eligibility is determined each quarter. Common stock, non-restricted exchangeable shares and partnership units/membership interests (in certain cases) are used to calculate a company's total market capitalization. Exchangeable shares are shares that may be exchanged at any time, at the holder's option, on a one-for-one basis for common stock. Partnership units/membership interests represent an economic interest in a limited partnership or limited liability company. Russell includes partnership units/membership interests as part of total market capitalization when the company in question is a holding company whose sole asset is its partnership units/membership interests in an underlying entity. In these cases, total market capitalization will be calculated based on 100% of the value of all partnership units/membership interests. Any other form of shares—such as preferred or convertible preferred stock, redeemable shares, participating preferred stock, warrants and rights or trust receipts—is excluded from the calculation. If multiple share classes of common stock exist, they are combined. In cases where the common stock share classes act independently of each other (*e.g.*, tracking stocks), each class is considered for inclusion separately.

During annual reconstitution, a stock's closing price on its primary exchange on the last trading day in May is used to determine total market capitalization. If a stock does not trade on its primary exchange, the lowest price from another major U.S. exchange is used. In cases where multiple share classes have been combined, the price of the primary trading vehicle (usually the most liquid) is used in the total market capitalization calculations. Primary trading vehicles are determined by the last two years' average trading volume, as of the last trading day in May. For new members, the common share class with the highest trading volume will be considered the primary trading vehicle, and its associated price and trading symbol will be included in the Russell U.S. indices.

Companies with only a total market capitalization of less than $30 million are not eligible for inclusion in the Russell 3000E™ Index or, consequently, the Russell 2000® Index.

In addition, companies with only 5% or less of their shares available in the marketplace are not eligible for inclusion in the Russell 3000E™ Index or, consequently, the Russell 2000® Index. Also, stocks must have a closing price at or above $1.00 on their primary exchange on the last trading day in May to be eligible for inclusion in the Russell 2000® Index at annual reconstitution. In order to reduce unnecessary turnover, if an existing Russell 2000® Component Stock's closing price is less than $1.00 on its primary exchange on the last trading day in May, it will be considered eligible if the average of the daily closing prices from its primary exchange during the month of May is equal to or greater than $1.00. Furthermore, if a stock, new or existing, does not have a close price at or above $1.00 on its primary exchange on the last trading day in May, but does have a close price at or above $1.00 on another major U.S. exchange on that day, the stock will be eligible for inclusion. Quarterly initial public offering additions must have a close price at or above $1.00 on the last day of their eligibility period in order to qualify for index inclusion.

Companies that produce unrelated business taxable income (UBTI) are restricted from ownership for tax-exempt investors. In recognition of this, Russell screens all REITs and PTPs, removing any security from eligibility that generates or has historically generated UBTI and has not taken steps to block UBTI to equity holders. The research process is conducted as part of Russell's annual rebalance effort. Additional screening will not be assessed or changed outside of the reconstitution period. Information used to confirm UBTI impact includes the following publicly available sources: 10-K, SEC Form S-3, K-1, company annual report, dividend notices and the company website.

The Russell 2000® Index is reconstituted annually to reflect changes in the marketplace. The list of companies is ranked based on total market capitalization as of the last trading day in May, with the actual reconstitution occurring on the last Friday in June each year, except that if the last Friday in June of any year is the 28th, 29th or 30th, reconstitution will occur on the preceding Friday. Changes in the Component Stocks are pre-announced and subject to change if any corporate activity occurs or if any new information is received prior to release.

Capitalization Adjustments. As a capitalization-weighted index, the Russell 2000® Index reflects changes in the capitalization, or market value, of the Component Stocks relative to the capitalization on a base date. The current Russell 2000® Index value is calculated by adding the market values of the Component Stocks, which are derived by multiplying the price of each stock by the number of available shares, to arrive at the available market capitalization of the 2,000 stocks. The available market capitalization is then divided by a divisor, which represents the "adjusted" capitalization of the Russell 2000® Index on the base date of December 31, 1986. To calculate the Russell 2000® Index, last sale prices will be used for exchange-traded and NASDAQ stocks. If a Component Stock is not open for trading, the most recently traded price for that security will be used in calculating the Russell 2000® Index. In order to provide continuity for the Russell 2000® Index's value, the divisor is adjusted periodically to reflect events including changes in the number of common shares outstanding for Component Stocks, company additions or deletions, corporate restructurings and other capitalization changes.

Available shares are assumed to be shares available to the public for purchase. Exclusion of capitalization held by other listed companies and large holdings of private investors (10% or more) is based on information recorded in SEC corporate filings, including DEF 14, 424B and 10K filings (but not 13F filings), or other reliable sources in the event of missing or questionable data.

The following types of shares are removed from total market capitalization to arrive at available market capitalization:

- Corporate cross-owned shares — shares of a company in the Russell 2000® Index held by another member of a Russell index (including Russell Global Indexes). Any percentage held in this class will be adjusted;

- Large corporate and private holdings — shares held by a listed corporation not in the Russell 2000® Index, by an individual or by a group of individuals acting together if the holding constitutes 10% or more of shares outstanding. However, not to be included in this class are institutional holdings, which are shares held by investment companies, partnerships, insurance companies, mutual funds, banks or venture capital firms, unless these firms have a direct relationship to the company in the Russell 2000® Index, in which case the holdings are considered strategic holdings and are excluded;

- ESOP or LESOP shares — shares held by an Employee Stock Ownership Plan ("**ESOP**") or a Leveraged Employee Stock Ownership Plan ("**LESOP**") that comprise 10% or more of shares outstanding;

- Unlisted share classes — classes of common stock that are not traded on a U.S. securities exchange;

- Initial public offering lock-ups — shares locked up during an initial public offering are not available to the public and will be excluded from the market value at the time the initial public offering enters the Russell 2000® Index; and

- Government Holdings:

  - Direct government holders — those holdings listed as "government of" are considered unavailable and will be removed entirely from available shares;

  - Indirect government holders — shares held by government investment boards and/or investment arms will be treated similarly to large private holdings and removed if the holding is greater than 10% of shares outstanding; and

  - Government pensions — any holding by a government pension plan is considered an institutional holding and will not be removed from available shares.

Corporate Actions Affecting the Russell 2000® Index. The Russell 2000® Index is adjusted in response to certain corporate actions when the actions are final. Russell determines whether a corporate action is final based on sources of public information including company press releases, SEC filings, exchange notifications and Bloomberg or other sources that Russell deems reliable. If Russell determines that an action was not final after communication was given to clients, the changes to the Russell 2000® Index will still occur. Prior to the completion of a corporate action, Russell estimates the effective date. Russell then adjusts the anticipated effective date based on public information until the date is considered final. Depending on the time on a given day that an action is determined to be final, Russell either (1) applies the action after the close of the current market day (t); or (2) applies the action after the close of the following day (t+1). Russell applies the following methodology guidelines when adjusting the Russell 2000® Index in response to corporate actions:

- "No Replacement" Rule — Securities that leave the Russell 2000® Index, between reconstitution dates, for any reason (*e.g.*, mergers, acquisitions or other similar corporate activity) are not replaced. Thus, the number of securities in the Russell 2000® Index over a year will fluctuate according to corporate activity.

- Mergers and Acquisitions — Mergers and acquisitions result in changes to the membership and weighting of members within the Russell 2000® Index. In the event a merger or acquisition occurs between a member of the Russell 2000® Index and another member of a Russell index, the acquired company is deleted and its market capitalization moves to the acquiring company's stock according to the terms of the merger; hence, if the merger or acquisition occurs between members of the Russell 2000® Index, it has no effect on the Russell 2000® Index's total capitalization. Cross-ownership of the surviving entity is determined by a weighted average (by market value as of t-1) of the cross-ownership of the two previous companies. If Russell is able to determine that the action is final prior to 1:00 p.m. Eastern Standard Time on a given day, the action will be applied after the close of the current day (t). If Russell is able to determine that the action is final after 1:00 p.m. Eastern Standard Time on a given day, the action will be applied after the close of the following day (t+1). If the acquiring company is a member of the Russell 2000® Index but the acquired company is not a member of any Russell index, the acquiring company's shares are adjusted at month-end. If the acquired company is a member of the Russell 2000® Index but the acquiring company is not a member of any Russell index, there are two possibilities:

- Reverse Merger — If the acquiring company is a private, non-publicly traded company or OTC company, Russell will review the action to determine if it is considered a reverse merger, defined as a transaction that results in a publicly traded company that meets all requirements for inclusion in a Russell index. If it is determined that an action is a reverse merger, the newly formed entity will be placed in the appropriate market capitalization index after the close of the day following the completion of the merger (t+1), using the market-adjusted breakpoints from the most recent reconstitution. The acquired company will be removed from the current index simultaneously. Cross-ownership will be determined on the basis of the most recent SEC filings.

- Standard Action — The acquired company is deleted after the action is final. If Russell is able to determine that the action is final prior to 1:00 p.m. Eastern Standard Time on a given day, the action will be applied after the close of the current day (t). If Russell is able to determine that the action is final after 1:00 p.m. Eastern Standard Time on a given day, the action will be applied after the close of the following day (t+1).

- Reincorporations — Members of the Russell 2000® Index that reincorporate to another country are analyzed for country assignment during annual reconstitution, as long as they continue to trade in the United States. Members of the Russell 2000® Index that reincorporate to another country and no longer trade in the United States are immediately deleted from the Russell 2000® Index. Companies that reincorporate to the United States are assessed for membership during annual reconstitution.

- Reclassifications of Shares (Primary Vehicles) — Primary vehicles will not be assessed or changed outside of a reconstitution period unless the existing class ceases to exist. In the event of extenuating circumstances signaling a necessary primary vehicle change, proper notification will be made.

- Rights Offerings — A right offered to shareholders is reflected in the Russell 2000® Index only if the value of the right is at a premium to the market price. If the subscription price is at a premium to the market price, the right is reflected in the Russell 2000® Index at the market open on the ex-date (for both transferable and non-transferable rights). The price is adjusted to account for the value of the right, and shares are increased according to the terms of the offering. If the rate is not available by the market close on the ex-date, the changes will be applied at the end of the subscription period. If the rate becomes available on the ex-date, the changes will be delayed one day. Late notifications also will delay the price and share adjustments by one day. Russell will not apply rights issued in anticipation of a takeover event or entitlements that give shareholders the right to purchase ineligible securities such as convertible debt.

- Changes to Shares Outstanding — Changes to shares outstanding due to buybacks (including Dutch auctions), secondary offerings, merger activity with a non-Russell index member and other potential changes are updated at the end of the month (with the exception of June) in which the change is reflected in vendor-supplied updates and verified by Russell using an SEC filing. For a change in shares to occur, the cumulative change to available shares must be greater than 5%. These share changes are communicated to premier clients three trading days prior to month-end and include shares provided by the vendor and verified by Russell four days prior to month-end. The float factor determined at reconstitution is applied to the new shares issued or bought back. If any new shares issued are unavailable according to the filing, that portion will not be added to the Russell 2000® Index.

- Spin-offs and Initial Public Offerings — The only additions between reconstitution dates are as a result of spin-offs and initial public offerings. Spin-off companies are added to the parent company's index and capitalization tier of membership if the spin-off company is sufficiently large. To be eligible, the spun-off company must rank larger in total market capitalization than the market-adjusted smallest company in the Russell 3000E™ Index as of the most recent reconstitution. If the spun-off company is not large enough to be added to the Russell 2000® Index and is not trading on a "when-issued" basis, the Russell 2000® Index will recognize the performance of the spin-off during its first day of trading through a synthetic price/performance of the parent company. This will allow holders one trading day to liquidate positions and replicate the Russell 2000® Index. If the spun-off company is not large enough to be added to the Russell 2000® Index but is trading on a when-issued basis, the Russell 2000® Index will remove the spun-off company's value by using the when-issued price. If a U.S. spin-off occurs from a Russell Global ex-U.S. Index member, the spun-off company will be placed in the parent's index and capitalization tier of the Russell Global Index. If the price of a spin-off is not available, a price will be established by first using an exchange-provided estimate or a Russell-calculated estimate if the exchange does not provide one. At the close of the first day of trading, a synthetic price/performance will be calculated to account for the actual opening price of the spin-off. This price/performance is calculated to capture the accurate performance of both the spin-off and parent for the day. Real-time calculations will reflect only the estimated performance of the two companies as actual performance is not captured until end of day.

- Tender Offers — A company acquired as a result of a tender offer is removed if (1) the initial tender offer has expired, (2) shareholders have validly tendered, not withdrawn, and the share have been accepted for payment, (3) all regulatory requirements have been fulfilled and (4) the acquirer will seek to complete the acquisition via a short-form merger or by compulsorily acquiring any remaining shares outstanding. In the case where a tender offer completes and does not result in the full acquisition of the target company, Russell will make a share adjustment to the target company's shares, on a date pre-announced by Russell, in cases where the available shares have decreased by 30% or more.

- Delisted Stocks — When Component Stocks are deleted as a result of exchange delisting or reconstitution, the price used will be the closing primary exchange price on the day the action is final (t) or the closing OTC price on the following day (t+1). For stocks continuing to trade on the primary exchange, if Russell determines that the action is final prior to 1:00 p.m. Eastern Standard Time on a given day, the deletes will be applied after the close of the current day (t), using the last traded price. If, instead, Russell determines that the action is final after 1:00 p.m. Eastern Standard Time on a given day, the deletes will be applied after the close of the following day (t+1), using the closing OTC price. Stocks previously halted that fail to trade on the primary exchange prior to being moved to OTC will always be removed the following day (t+1) at the OTC closing price, regardless of the time of notification.

- Bankruptcy and Voluntary Liquidations — A company that files for a Chapter 7 liquidation bankruptcy or that files a liquidation plan will be removed from the Russell 2000® Index at the time of filing. A company that files for a Chapter 11 reorganization bankruptcy will remain a member of the Russell 2000® Index, unless the company's stock is delisted from the primary exchange, in which case normal delisting rules apply. If a company files for bankruptcy, its stock is delisted, and it can be confirmed that the stock will not trade OTC, Russell may remove the stock at a nominal price of $0.0001.

- Change of Company Structure — In the event that a company changes its corporate designation from that of a Business Development Corporation, Russell will remove the member as ineligible for index inclusion and provide two-days' notice of its removal.

- Stock Distributions — A price adjustment for a stock distribution is applied on the ex-date of the distribution. When the distribution is a fixed amount of stock distributed on the ex-date, Russell increases the number of shares on the ex-date. When the distribution is an undetermined amount of stock based on future earnings and profits to be distributed at a future date, Russell increases the number of shares on the pay-date.

- Dividends — Gross dividends are included in the daily total return calculation of the Russell 2000® Index on the basis of their ex-dates. The ex-date is used rather than the pay-date because the marketplace price adjustment for the dividend occurs on the ex-date. Monthly, quarterly and annual total returns are calculated by compounding the reinvestment of dividends daily. The reinvestment and compounding is at the total index level, not at the security level. Stock prices are adjusted to reflect special cash dividends on the ex-date. If a dividend is payable in stock and cash and the stock rate cannot be determined by the ex-date, the dividend is treated as all cash.

- Halted Stocks — When a stock's trading has been halted, Russell holds the stock at its most recent closing price until trading is resumed or it is officially delisted. In addition, Russell will review stocks in two categories for removal: (1) stocks halted due to financial difficulty, debt or cash flow issues for a period longer than 40 calendar days and (2) those stocks suspended due to exchange listing rules or legal regulatory issues longer than one calendar quarter. Determination for removal will be made on a case-by-case basis and based upon reasonable likelihood of trade resumption and likelihood of residual value returned to equity holders. Should removal be deemed appropriate, it will be announced with monthly share changes and removed on month-end at zero value (though for system purposes the actual value used is $0.0001).

Pricing of Securities Included in the Russell 2000® Index. Primary exchange closing prices are used in the daily Russell 2000® Index calculations. FT Interactive data is used as the primary source for U.S. security prices, income, and total shares outstanding.

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The S&P 500® Index

We have derived all information contained in this private placement memorandum regarding the S&P 500® 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, Standard & Poor's Financial Services LLC ("**S&P**"). The S&P 500® Index was developed by S&P and is calculated, maintained and published by S&P. S&P has no obligation to continue to publish, and may discontinue the publication of, the S&P 500® Index.

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

In July 2012, The McGraw-Hill Companies, Inc. ("McGraw-Hill"), the owner of the S&P Indices business, and CME Group Inc. ("CME Group"), the 90% owner of the CME Group and Dow Jones & Company, Inc. joint venture that owns the Dow Jones Indexes business, formed a new joint venture, S&P Dow Jones Indices, which owns the S&P Indices business and the Dow Jones Indexes business, including the S&P 500® Index.

The S&P 500® Index is intended to provide a performance benchmark for the U.S. equity markets. The calculation of the level of the S&P 500® Index (discussed below in further detail) is based on the relative value of the aggregate Market Value (as defined below) of the common stocks of 500 companies (the "**S&P Component Stocks**") as of a particular time as compared to the aggregate average Market Value of the common stocks of 500 similar companies during the base period of the years 1941 through 1943. Historically, the "Market Value" of any S&P Component Stock was calculated as the product of the market price per share and the number of the then-outstanding shares of such S&P Component Stock. As discussed below, on March 21, 2005, S&P began to use a new methodology to calculate the Market Value of the S&P Component Stocks and on September 16, 2005, S&P completed its transition to the new calculation methodology. The 500 companies are not the 500 largest companies listed on the New York Stock Exchange (the "**NYSE**") and not all 500 companies are listed on such exchange. S&P chooses companies for inclusion in the S&P 500® Index with the objective of achieving a distribution by broad industry groupings that approximates the distribution of these groupings in the common stock population of the U.S. equity market. S&P may from time to time, in its sole discretion, add companies to, or delete companies from, the S&P 500® Index to achieve the objectives stated above. Relevant criteria employed by S&P include the viability of the particular company, the extent to which that company represents the industry group to which it is assigned, the extent to which the company's common stock is widely-held and the Market Value and trading activity of the common stock of that company.

The S&P 500® Index is a float-adjusted index. Under float adjustment, the share counts used in calculating the S&P 500® Index reflect only those shares that are available to investors, not all of a company's outstanding shares. Float adjustment excludes shares that are closely held by control groups, other publicly traded companies or government agencies.

S&P currently defines three groups of shareholders whose holdings are subject to float adjustment if the relevant group's holdings exceed 10% of the outstanding shares:

- holdings by other publicly traded corporations, venture capital firms, private equity firms, strategic partners, or leveraged buyout groups;
- holdings by government entities, including all levels of government in the United States or foreign countries; and
- holdings by current or former officers and directors of the company, founders of the company or family trusts of officers, directors or founders, as well as holdings of trusts, foundations, pension funds, employee stock ownership plans, or other investment vehicles associated with and controlled by the company.

Under the current float-adjustment rules, in cases where holdings in a group exceed 10% of the outstanding shares of a company, the holdings of that group will be excluded from the float-adjusted count of shares to be used in the S&P 500® Index calculation. Mutual funds, investment advisory firms, pension funds or foundations not associated with the company and investment funds in insurance companies and shares that trust beneficiaries may buy or sell without difficulty or significant additional expense beyond typical brokerage fees are currently part of the float.

Beginning in September 2012, all share-holdings with a position greater than 5% of a stock's outstanding shares, other than holdings by "block owners," will be removed from the float for purposes of calculating the S&P 500® Index. Generally, these "control holders" will include officers and directors, private equity, venture capital & special equity firms, other publicly traded companies that hold shares for control, strategic partners, holders of restricted shares, ESOPs, employee and family trusts, foundations associated with the company, holders of unlisted share classes of stock or government entities at all levels (other than government retirement/pension funds) and any individual person who controls a 5% or greater stake in a company as reported in regulatory filings. Holdings by block owners, such as depositary banks, pension funds, mutual funds & ETF providers, 401(k) plans of the company, government retirement/pension funds, investment funds of insurance companies, asset managers and investment funds, independent foundations and savings and investment plans, will ordinarily be considered part of the float.

Treasury stock, stock options, equity participation units, warrants, preferred stock, convertible stock and rights are generally not part of the float. However, shares held in a trust to allow investors in countries outside the country of domicile (*e.g.*, ADRs, CDIs and Canadian exchangeable shares) are normally part of the float unless those shares form a control block. If a company has more than one class of stock outstanding, shares in an unlisted or non-traded class are treated as a control block.

For each stock, an investable weight factor ("**IWF**") is calculated by dividing the available float shares by the total shares outstanding. Available float shares are currently defined as the total shares outstanding less shares held in one or more of the three groups listed above where the group holdings exceed 10% of the outstanding shares. Beginning in September 2012, available float shares will be defined as total shares outstanding less shares held by control holders. The S&P 500® Index is calculated by dividing the sum of the IWF multiplied by both the price and the total shares outstanding for each stock by the Index Divisor.

As of the date of this private placement memorandum, the S&P 500® Index is calculated using a base-weighted aggregate methodology: the level of the S&P 500® Index reflects the total Market Value of all 500 S&P Component Stocks relative to the S&P 500® Index's base period of 1941–43 (the "**Base Period**").

An indexed number is used to represent the results of this calculation in order to make the value easier to work with and track over time.

The actual total Market Value of the S&P Component Stocks during the Base Period has been set equal to an indexed value of 10. This is often indicated by the notation 1941–43=10. In practice, the daily calculation of the S&P 500® Index is computed by dividing the total Market Value of the S&P Component Stocks by a number called the Index Divisor. By itself, the Index Divisor is an arbitrary number. However, in the context of the calculation of the S&P 500® Index, it is the only link to the original Base Period level of the S&P 500® Index. The Index Divisor keeps the S&P 500® Index comparable over time and is the manipulation point for all adjustments to the S&P 500® Index ("**Index Maintenance**").

Index Maintenance includes monitoring and completing the adjustments for company additions and deletions, share changes, stock splits, stock dividends and stock price adjustments due to company restructurings or spin-offs.

To prevent the level of the S&P 500® Index from changing due to corporate actions, all corporate actions which affect the total Market Value of the S&P 500® Index require an Index Divisor adjustment. By adjusting the Index Divisor for the change in total Market Value, the level of the S&P 500® Index remains constant. This helps maintain the level of the S&P 500® Index as an accurate barometer of stock market performance and ensures that the movement of the S&P 500® Index does not reflect the corporate actions of individual companies in the S&P 500® Index. All Index Divisor adjustments are made after the close of trading and after the calculation of the closing level of the S&P 500® Index. Some corporate actions, such as stock splits and stock dividends, require simple changes in the common shares outstanding and the stock prices of the companies in the S&P 500® Index and do not require Index Divisor adjustments.

The table below summarizes the types of Index Maintenance adjustments and indicates whether or not an Index Divisor adjustment is required.

Type of Corporate Action	Comments	Divisor Adjustment
Company added/ deleted	Net change in market value determines divisor adjustment.	Yes
Change in shares outstanding	Any combination of secondary issuance, share repurchase or buy back – share counts revised to reflect change.	Yes
Stock split	Share count revised to reflect new count. Divisor adjustment is not required since the share count and price changes are offsetting.	No
Spin-off	If the spun-off company is not being added to the index, the divisor adjustment reflects the decline in index market value (*i.e.*, the value of the spun-off unit).	Yes
Spin-off	Spun-off company added to the index, another company removed to keep number of names fixed. Divisor adjustment reflects deletion.	Yes
Change in IWF due to a corporate action or a purchase or sale by an inside holder	Increasing (decreasing) the IWF increases (decreases) the total market value of the index. The divisor change reflects the change in market value caused by the change to an IWF.	Yes
Special dividend	When a company pays a special dividend the share price is assumed to drop by the amount of the dividend; the divisor adjustment reflects this drop in index market value.	Yes
Rights offering	Each shareholder receives the right to buy a proportional number of additional shares at a set (often discounted) price. The calculation assumes that the offering is fully subscribed. Divisor adjustment reflects increase in market cap measured as the shares issued multiplied by the price paid.	Yes

Stock splits and stock dividends do not affect the Index Divisor, because following a split or dividend, both the stock price and number of shares outstanding are adjusted by S&P so that there is no change in the Market Value of the S&P Component Stock. All stock split and dividend adjustments are made after the close of trading on the day before the ex-date.

Each of the corporate events exemplified in the table requiring an adjustment to the Index Divisor has the effect of altering the Market Value of the S&P Component Stock and consequently of altering the aggregate Market Value of the S&P Component Stocks (the "**Post-Event Aggregate Market Value**"). In order that the level of the S&P 500® Index (the "**Pre-Event Index Value**") not be affected by the altered Market Value (whether increase or decrease) of the affected Component Stock, a new Index Divisor ("**New Divisor**") is derived as follows:

$$\frac{\text{Post-Event Aggregate Market Value}}{\text{New Divisor}} = \text{Pre-Event Index Value}$$

$$\text{New Divisor} = \frac{\text{Post-Event Aggregate Market Value}}{\text{Pre-Event Index Value}}$$

A large part of the Index Maintenance process involves tracking the changes in the number of shares outstanding of each of the S&P 500® Index companies. Four times a year, on a Friday close to the end of each calendar quarter, the share totals of companies in the S&P 500® Index are updated as required by any changes in the number of shares outstanding. After the totals are updated, the Index Divisor is adjusted to compensate for the net change in the total Market Value of the S&P 500® Index. In addition, any changes over 5% in the current common shares outstanding for the S&P 500® Index companies are carefully reviewed on a weekly basis, and when appropriate, an immediate adjustment is made to the Index Divisor.

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