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**Underlying supplement no. 3-I**

**Registration Statement Nos. 333-222672 and 333-222672-01**

*To the prospectus dated April 5, 2018 and*

**Dated January 28, 2019**

*the prospectus supplement dated April 5, 2018*

**Rule 424(b)(2)**

**JPMorgan Chase & Co.**

*Notes Linked to a European Dividend Futures (USD) Index*

**JPMorgan Chase Financial Company LLC**

*Notes, Fully and Unconditionally Guaranteed by JPMorgan Chase & Co., Linked to a European Dividend Futures (USD) Index*

Each of JPMorgan Chase & Co. and JPMorgan Chase Financial Company LLC may from time to time offer and sell notes linked in whole or in part to the European Dividend Futures 2019 (USD) Index, the European Dividend Futures 2020 (USD) Index or the European Dividend Futures 2021 (USD) Index (each, an “**Index**” and collectively, the “**Indices**”). The issuer of the notes, as specified in the relevant terms supplement, is referred to in this underlying supplement as the “**Issuer**.” The Issuer will be either JPMorgan Chase & Co. or JPMorgan Chase Financial Company LLC. For notes issued by JPMorgan Chase Financial Company LLC, JPMorgan Chase & Co., in its capacity as guarantor of those notes, is referred to in this product supplement as the “**Guarantor**.”

This underlying supplement describes each Index, the relationship between JPMorgan Chase & Co. and the sponsor of the Indices and terms that will apply generally to notes linked in whole or in part to an Index and other relevant information. This underlying supplement supplements the terms described in the accompanying product supplement, the prospectus supplement and the prospectus. A separate term sheet or pricing supplement, as the case may be, will describe terms that apply to specific issuances of the notes, including any changes to description of any relevant Index specified below. These term sheets and pricing supplements are referred to generally in this underlying supplement as terms supplements. If the terms described in the relevant terms supplement are inconsistent with those described in this underlying supplement, any other accompanying underlying supplement, the accompanying product supplement, the prospectus supplement or the prospectus, the terms described in the relevant terms supplement will control. In addition, if this underlying supplement and the accompanying product supplement or another relevant underlying supplement contain information relating to the same Index to which the notes are linked, the information contained in the document with the most recent date will control.

**The notes are not commodity futures contracts or swaps and are not regulated under the Commodity Exchange Act of 1936, as amended (the “Commodity Exchange Act”).** The notes are offered pursuant to an exemption from regulation under the Commodity Exchange Act, commonly known as the hybrid instrument exemption, that is available to securities that have one or more payments indexed to the value, level or rate of one or more commodities,

as set out in section 2(f) of that statute. Accordingly, you are not afforded any protection provided by the Commodity Exchange Act or any regulation promulgated by the Commodity Futures Trading Commission.

**Investing in the notes involves a number of risks. See “Risk Factors” in the accompanying product supplement and “Risk Factors” beginning on page US-5 of this underlying supplement.**

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of the notes or passed upon the accuracy or the adequacy of the relevant terms supplement, this underlying supplement, any other accompanying underlying supplement, the accompanying product supplement, the prospectus supplement or the prospectus. Any representation to the contrary is a criminal offense.

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

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

The notes are not appropriate for all investors and involve a number of risks and important legal and tax consequences that should be discussed with your professional advisers. You should be aware that the regulations of Financial Industry Regulatory Authority, Inc., or FINRA, and the laws of certain jurisdictions (including regulations and laws that require brokers to ensure that investments are suitable for their customers) may limit the availability of the notes. The relevant terms supplement, this underlying supplement, any other accompanying underlying supplement, the accompanying product supplement, the prospectus supplement and the prospectus do not constitute an offer to sell or a solicitation of an offer to buy the notes under any circumstances in which that offer or solicitation is unlawful.

In this underlying supplement “JPMorgan Financial” refers to JPMorgan Chase Financial Company LLC.

## Supplemental Terms of Notes

*The following supplemental terms of the notes supplement, and to the extent they are inconsistent, supersede, the description of the general terms of the debt securities set forth in the accompanying product supplement and under the headings “Description of Notes” in the prospectus supplement and “Description of Debt Securities” in the prospectus. Capitalized terms used but not defined in this underlying supplement have the meanings assigned in the relevant terms supplement, any other accompanying underlying supplement, the accompanying product supplement, the prospectus supplement and the prospectus.*

## General

The notes are linked in whole or in part to the European Dividend Futures 2019 (USD) Index, the European Dividend Futures 2020 (USD) Index or the European Dividend Futures 2021 (USD) Index (each, an “**Index**” and collectively, the “**Indices**”). Each Index aims to replicate the returns of a notional investment in a euro-denominated listed futures contract traded on the Eurex Exchange (with respect to each Index, the “**Futures Contract**”) that has a final settlement price based on the EURO STOXX 50<sup>®</sup> DVP (the “**Dividend Index**”), while attempting to mitigate exposure to fluctuations in the value of the European Union euro relative to the U.S. dollar.

This underlying supplement describes each Index, the relationship between JPMorgan Chase & Co. and the sponsor of the Indices and terms that will apply generally to notes linked in whole or in part to an Index and other relevant information. This underlying supplement supplements the terms described in the accompanying product supplement, the prospectus supplement and the prospectus. A separate term sheet or pricing supplement, as the case may be, will describe terms that apply to specific issuances of the notes, including any changes to description of any relevant Index specified below. These term sheets and pricing supplements are referred to generally in this underlying supplement as terms supplements. If the terms described in the relevant terms supplement are inconsistent with those described in this underlying supplement, any other accompanying underlying supplement, the accompanying product supplement, the prospectus supplement or the prospectus, the terms described in the relevant terms supplement will control. In addition, if this underlying supplement and the accompanying product supplement or another relevant underlying supplement contain information relating to the same Index to which the notes are linked, the information contained in the document with the most recent date will control.

## Postponement of a Determination Date

### *Notes Linked Solely to an Index*

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

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

- (a) the official settlement price (or, if trading in the relevant futures contract has been materially suspended or materially limited, the calculation agent's good faith estimate of the official

settlement price that would have prevailed but for that suspension or limitation or non-trading day) on that Final Disrupted Determination Date of the futures contract included in the Index; and

the exchange rate between the currency in which the Futures Contract is denominated (the “**Relevant Currency**”) (b) and the U.S. dollar (or, if that exchange rate is unavailable, the calculation agent’s good faith estimate of that exchange rate) on that Final Disrupted Determination Date.

*Notes Linked to an Index and Other Reference Assets*

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

(a) the official settlement price (or, if trading in the relevant futures contract has been materially suspended or materially limited, the calculation agent’s good faith estimate of the official settlement price that would have prevailed but for that suspension or limitation or non-trading day) on that Final Disrupted Determination Date of the futures contract included in the Index; and

the exchange rate between the currency in which the Futures Contract is denominated (the “**Relevant Currency**”) (b) and the U.S. dollar (or, if that exchange rate is unavailable, the calculation agent’s good faith estimate of that exchange rate) on that Final Disrupted Determination Date.

*Additional Defined Terms*

Notwithstanding any contrary definition in the accompanying product supplement, with respect to an Index or any relevant successor index, a “**scheduled trading day**” is, unless otherwise specified in the relevant terms supplement, a day, as determined by the calculation agent, on which:

(a) the relevant exchange for that Index or successor index, as applicable, is scheduled to be open for trading for its regular trading session;

- (b) dealings in foreign currency in accordance with the practice of the foreign exchange market are scheduled to occur in the City of New York and the principal financial center for the Relevant Currency,
- (c) banking institutions in the City of New York and that principal financial center are not otherwise authorized or required by law, regulation or executive order to close; and
- (d) that Index or successor index, as applicable, is scheduled to calculate and publish the closing level of that Index (or that successor index).

Notwithstanding any contrary definition in the accompanying product supplement, with respect to an Index or any relevant successor index, a “**trading day**” is, unless otherwise specified in the relevant terms supplement, a day, as determined by the calculation agent, on which:

- (a) trading is generally conducted on the relevant exchange for that Index or successor index, as applicable;
- (b) dealings in foreign currency in accordance with the practice of the foreign exchange market occur in the City of New York and the principal financial center for the Relevant Currency,

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- (c) banking institutions in the City of New York and that principal financial center are not otherwise authorized or required by law, regulation or executive order to close; and
- (d) that Index or successor index, as applicable, is scheduled to calculate and publish the closing level of that Index (or that successor index).

Notwithstanding anything to the contrary in the accompanying product supplement, with respect to an Index or any relevant successor index, “**relevant exchange**” means the primary exchange or market of trading for the futures contract then included in that Index or successor index, as applicable.

### **Market Disruption Events**

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

- (1) any termination or suspension of, or limitation on, trading imposed by the relevant exchange for that Index (or that successor index);
- (2) a failure by the relevant exchange for that Index (or that successor index) to calculate and publish the official settlement price of the futures contract included in that Index (or that successor index) on any day upon which the official settlement price of that futures contract is scheduled to be calculated and published by the relevant exchange;
- (3) the closure of the relevant exchange for that Index (or that successor index) prior to its scheduled closing time unless such earlier closing time is announced at least one hour prior to the actual closing time;
- (4) the failure of any relevant exchange for that Index (or that successor index) to open;
- (5) any other event that disrupts or impairs the ability of market participants in general to effect transactions in, or obtain market values for the futures contract included in that Index (or that successor index);
- (6) the non-publication or unavailability of the exchange rate for the Relevant Currency relative to the U.S. dollar on any relevant Reuters page (or any successor page) at approximately 4:00 p.m., London time; or



(7) the failure of the sponsor of that Index (or that successor index) to calculate and publish the closing level of that Index (or that successor index),

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 the Issuer's ability or the ability of any of its affiliates to adjust or unwind all or a material portion of any hedge with respect to the notes.

A limitation on the hours or number of days of trading will not constitute a market disruption event with respect to an Index or any relevant successor index if the limitation results from an announced change in the regular business hours of the relevant exchange or market.

#### **Discontinuation of an Index; Alteration of Method of Calculation**

The provisions relating to the discontinuation of an Index as set forth in the accompanying product supplement will apply, except that if the calculation agent is to determine the closing level of that Index for any day because no successor index for that Index is available at that time, or the calculation agent has previously selected a successor index for that Index and publication of that successor index is

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discontinued prior to, and that discontinuation is continuing on, that day, then the closing level of that Index for that day will be computed by the calculation agent in accordance with the formula for and method of calculating that Index or successor index, as applicable, last in effect prior to that discontinuation, using:

- (a) the official settlement price (or, if trading in the relevant futures contract has been materially suspended or materially limited, the calculation agent's good faith estimate of the official settlement price that would have prevailed but for that suspension or limitation or non-trading day) on that day of the futures contract included in the Index; and
- (b) the exchange rate between the Relevant Currency and the U.S. dollar (or, if that exchange rate is unavailable, the calculation agent's good faith estimate of that exchange rate) on that day.

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## Risk Factors

*Your investment in the notes will involve certain risks. Investing in the notes is not equivalent to investing directly in an Index, the relevant Futures Contract, the Dividend Index, the EURO STOXX 50® Index, any of the equity securities composing the EURO STOXX 50® Index or exchange-traded or over-the-counter instruments based on, or other instruments linked to any of the foregoing. **You should consider carefully the following discussion of risks as well as the discussion of risks included in the relevant terms supplement, in the accompanying product supplement and in any accompanying underlying supplement before you decide that an investment in the notes is suitable for you.***

## Risks Relating to the Indices

J.P. Morgan Securities LLC, an affiliate of the Issuer and the Guarantor (if applicable), coordinated with Solactive AG in the development of the Indices.

J.P. Morgan Securities LLC, which is referred to in this underlying supplement as JPMS, an affiliate of the Issuer and the Guarantor (if applicable), coordinated with Solactive AG (the “**Index Sponsor**”) in its development of the guidelines and policies governing the composition and calculation of the Indices. Although the Index Sponsor, in developing the Indices, coordinated with JPMS, JPMorgan Chase & Co., as the ultimate parent company of JPMS, ultimately controls JPMS.

In addition, the policies and judgments for which JPMS was responsible could have an impact, positive or negative, on the levels of the Indices and the value of your notes. JPMS was under no obligation to consider your interests as an investor in the notes in its role in developing the guidelines and policies governing the Indices or making judgments that may affect the level of the Indices. Furthermore, the inclusion of equity securities in the Indices is not an investment recommendation by the Issuer, the Guarantor (if applicable) or JPMS of the Futures Contracts underlying the Indices.

Any Index may not be successful or outperform any alternative strategy that might be employed in respect of the relevant Futures Contract.

No assurance can be given that the investment strategy on which any Index is based will be successful or that any Index will outperform any alternative strategy that might be employed with respect to the relevant Futures Contract. While the actual 12-month total dividends on the components of the EURO STOXX 50® Index have tended to be greater than the 12-month expected total dividends implied by the prices of futures contracts referencing those dividends, no assurance can be given that this market trend will be present at any particular time or that it will

continue to be observed at all. Past performance should not be considered indicative of future performance. The Index does not provide exposure to the price performance of the equities securities included in the EURO STOXX 50® Index, and no assurance can be given that the Index will outperform any alternative strategy that provides exposure to the price performance of those equities securities.

Issuance, hedging and other trading activities of financial institutions, including the Issuer, the Guarantor (if applicable) and their affiliates, may adversely affect the value of the notes and may result in conflicts of interest.

The issuance, and related hedging and trading, of products that provide exposure to the price return of the EURO STOXX 50® Index by financial institutions, including the Issuer, the Guarantor (if applicable) and their affiliates, may be one factor underlying the market trend discussed above under which the actual total dividends on the components of the EURO STOXX 50® Index during the 12-month period preceding the expiry of the futures contracts referencing these dividends have tended to be greater than the expected total dividends for the same period implied by the prices of that Futures Contracts referencing those dividends. As part of their hedging or trading activities, issuers of products linked to the price return of the EURO STOXX 50® Index may have acquired long positions in the dividends on the equities securities included in the EURO STOXX 50® Index that can be monetized by selling the Futures

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Contracts. Any such selling may have created downward pressure on the prices of the Futures Contracts, contributing to the market trend discussed above.

Accordingly, changes in the volume of such issuances and in hedging and trading activities related to those issuances may influence this market trend and may adversely affect the prices of the Futures Contracts, the levels of the Indices and the value of the notes. In particular, this market trend may diminish if issuers of products linked to the price return of the EURO STOXX 50<sup>®</sup> Index are able to monetize long positions in the dividends on the equities securities included in the EURO STOXX 50<sup>®</sup> Index by selling products, including the notes, that provide exposure to the Futures Contracts. It is possible that these issuances, or related hedging or trading activities, could result in substantial returns for the Issuer or its affiliates while the value of the notes declines. As a result, the Issuer, the Guarantor (if applicable) or their affiliates may have economic interests that are adverse to those of the holders of the notes.

The issuers of the equity securities composing the EURO STOXX 50<sup>®</sup> Index may reduce the amount of dividends paid or cease to pay dividends at any time in their discretion.

The decisions of the issuers of the equity securities composing the EURO STOXX 50<sup>®</sup> Index regarding whether to pay any dividend, or whether to increase or decrease the amount of the dividend may or may not be correlated with each other. Some or all of these issuers may reduce the amount of dividends paid or cease to pay dividends at any time in their discretion. In addition, the ability of the issuers of the equity securities composing the EURO STOXX 50<sup>®</sup> Index to pay dividends is subject to various legal and regulatory limitations and to their financial results and availability of cash to be used for the payment of dividends. A reduction in, or the failure to pay, dividends by a large number of these issuers during the 12-month period preceding the expiry of the relevant Futures Contract could have a material adverse effect on the Index and, therefore, on the value of the notes.

Prior to the expiry of the relevant Futures Contract, the level of each Index will reflect, among other things, market expectations of the total cash dividends to be paid during the 12-month period preceding the expiry of the relevant Futures Contract.

The final settlement price of each Futures Contract will reflect the total cash distributions on the constituents of the EURO STOXX 50<sup>®</sup> Index during approximately 12 months prior to the expiry of that Futures Contract. Even though each Futures Contract will trade for ten years prior to expiry, the actual cash distributions on the constituents of the EURO STOXX 50<sup>®</sup> Index will not be known until those cash distributions have been declared during the period of approximately 12 months prior to the expiry of that Futures Contract. Accordingly, before the amounts of those cash distributions are known, the prices of the Futures Contracts, and the level of each Index, will reflect the market expectations of the total cash dividends to be paid during the 12-month period preceding the expiry of the relevant Futures Contract. In addition, the prices of the Futures Contracts, and the level of each Index, will be influenced by supply and demand for the Futures Contracts.

Each Index will reflect cash distributions on the constituents of the EURO STOXX 50<sup>®</sup> Index only if those cash distributions have ex-distribution dates during the period from approximately 12 months preceding the expiry of the relevant Futures Contract to the expiry of the relevant Futures Contract.

Even though each Futures Contract will trade for ten years prior to expiry, cash distributions on the constituents of the EURO STOXX 50<sup>®</sup> Index prior to the period of approximately 12 months preceding expiry will not be reflected in the level of the Index.

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

Each Index provides exposure to a single futures contract on the Dividend Index that trades on the Eurex Exchange. The Dividend Index reflects distributions on securities of companies located only in the Eurozone. Accordingly, the notes are less diversified than other funds, investment portfolios or indices investing in or tracking a broader range of products and, therefore, could experience greater volatility.

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You should be aware that other indices may be more diversified than the Indices in terms of both the number and variety of futures contracts and underlying distribution sources. You will not benefit, with respect to the notes, from any of the advantages of a diversified investment and will bear the risks of a highly concentrated investment.

**Each Index is a price return index that does not reflect “total returns.”**

Each Index is a price return index that reflects the price of the relevant Futures Contract, subject to the effect of fluctuations in the value of the European Union euro relative to the U.S. dollar, and does not reflect total returns. As such, each Index differs from other indices that reflect total returns. An index tracking futures contracts that reflects “total returns” would reflect such roll yield in addition to interest that could be earned on funds notionally committed to the trading of the applicable futures contracts. Unlike an index that reflects total returns, each Index is affected solely by day-to-day changes in the settlement prices of the relevant Futures Contract, subject to the effect of fluctuations in the value of the European Union euro relative to the U.S. dollar. The Indices do not reflect the price returns of the constituents of the EURO STOXX 50<sup>®</sup> Index.

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

The European Dividend Futures 2019 (USD) Index was established on May 15, 2015 and the other two Indices were established on September 22, 2016 and therefore has a limited operating history. Any back-testing or similar analysis performed by any person in respect of any Index must be considered illustrative only and may be based on estimates or assumptions not used by the sponsor of that Index when determining the level of that Index. Past performance should not be considered indicative of future performance.

**An investment in the notes will be subject to risks associated with non-U.S. securities markets in the Eurozone.**

The equity securities that constitute the EURO STOXX 50<sup>®</sup> Index have been issued by non-U.S. companies. Investments in notes linked to distributions on such non-U.S. equity securities involve risks associated with the securities markets in the home countries of the issuers of those non-U.S. equity securities, 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 there is about U.S. companies that are subject to the reporting requirements of the Securities and Exchange Commission, 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.

Distributions on securities in non-U.S. markets may be affected by political, economic, financial and social factors in such 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.

Specifically, the securities composing the EURO STOXX 50<sup>®</sup> Index are issued by companies located within the Eurozone. The Eurozone has been and is undergoing financial stress, and the political, legal, regulatory and market ramifications are impossible to predict. Changes within the Eurozone could have a material adverse effect on the performance of European companies, including the issuers of the equity securities that compose the Index. These companies may experience material adverse impacts on their business, operating results and financial condition, which may adversely affect their ability to pay dividends and, therefore, the level of the Index and the value of the notes.

Some or all of these factors may influence the amount of distributions paid or expect to be paid on the equities securities of the EURO STOXX 50<sup>®</sup> Index and, consequently, the value of the relevant Futures Contract and the closing level of an Index. The impact of any of the factors set forth above may enhance

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or offset some or all of any change resulting from another factor or factors. You cannot predict the future performance of any Index based on its historical performance.

**The notes will be subject to currency exchange risk.**

Notwithstanding that each Index attempts to mitigate exposure to fluctuations in the value of the European Union euro relative to the U.S. dollar, the performance of each Index reflects currency exchange rate risk. If the return on the relevant Futures Contract since the last weekly rebalancing is positive, a decline in the value of the European Union euro relative to the U.S. dollar will adversely affect the performance of the Index. Similarly, if the return on the relevant Futures Contract since the last weekly rebalancing is negative, an increase in the value of the European Union euro relative to the U.S. dollar will adversely affect the performance of the Index.

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 in the European Union and in the United States and between each region or country and its major trading partners;
- political, civil or military unrest in the European Union and in the United States; and
- the extent of governmental surpluses or deficits in the European Union 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 of the European Union, the United States and other countries important to international trade and finance.

**The Issuer and the Guarantor (if applicable) have no control over exchange rates.**

Foreign exchange rates can either float or be fixed by sovereign governments. Exchange rates of the currencies used by most economically developed nations are permitted to fluctuate in value relative to the U.S. dollar and to each other. However, from time to time governments and, in the case of countries using the European Union euro, the European Central Bank, may use a variety of techniques, such as intervention by a central bank, the imposition of regulatory controls or taxes or changes in interest rates to influence the exchange rates of their currencies. Governments may also issue a new currency to replace an existing currency or alter the exchange rate or relative exchange characteristics by a devaluation or revaluation of a currency. These governmental actions could change or interfere with currency valuations and currency fluctuations that would otherwise occur in response to economic forces, as well as in response to the movement of currencies across borders. As a consequence, these governmental actions could adversely affect an investment in the notes.

The Issuer and the Guarantor (if applicable) will not make any adjustment or change in the terms of the notes in the event that exchange rates should become fixed, or in the event of any devaluation or revaluation or imposition of exchange or other regulatory controls or taxes, or in the event of other developments affecting the U.S. dollar or the European Union euro. You will bear those risks.

Each Index is subject to significant risks associated with futures contracts, including volatility.

Each Index tracks the returns of futures contracts. The price of a futures contract depends not only on the price of the underlying asset referenced by the futures contract, but also on a range of other factors, including but not limited to changing supply and demand relationships, interest rates, governmental and regulatory policies and the policies of the exchanges on which the futures contracts trade. In addition, the futures markets are subject to temporary distortions or other disruptions due to various factors, including the lack of liquidity in the markets, the participation of speculators and

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government regulation and intervention. These factors and others can cause the prices of futures contracts to be volatile.

**Suspension or disruptions of market trading in futures contracts may adversely affect the value of your notes.**

Futures markets like the Eurex Exchange, the market for the Futures Contracts, are subject to temporary distortions or other disruptions due to various factors, including the lack of liquidity in the markets, the participation of speculators, and government regulation and intervention. In addition, futures exchanges have regulations that limit the amount of fluctuation in some futures contract prices that may occur during a single day. These limits are generally referred to as “daily price fluctuation limits” and the maximum or minimum price of a contract on any given day as a result of these limits is referred to as a “limit price.” Once the limit price has been reached in a particular contract, no trades may be made at a price beyond the limit, or trading may be limited for a set period of time. Limit prices have the effect of precluding trading in a particular contract or forcing the liquidation of contracts at potentially disadvantageous times or prices. These circumstances could affect the level of an Index and therefore could affect adversely the value of your notes.

The settlement price of the relevant Futures Contract may not be readily available.

The official settlement prices of the Futures Contracts are calculated and published by the Eurex Exchange and are used to calculate the levels of the Indices. Any disruption in trading of the relevant Futures Contract could delay the release or availability of the official settlement price and may delay or prevent the calculation of the Indices.

Changes in the margin requirements for the Futures Contract included in an Index may adversely affect the value of the notes.

Futures exchanges require market participants to post collateral in order to open and to keep open positions in futures contracts. If an exchange changes the amount of collateral required to be posted to hold positions in the relevant Futures Contract, market participants may adjust their positions, which may affect the prices of the relevant Futures Contract. As a result, the level of an Index may be affected, which may adversely affect the value of the notes.

Historical performance of an Index should not be taken as an indication of the future performance of that Index during the term of the notes.

The actual performance of an Index over the term of the notes, as well as the amount payable at maturity, may bear little relation to the historical performance of that Index or its hypothetical, back-tested historical performance. In particular, the volatility of a Futures Contract tends to decrease over time, as the total cash distributions can be predicted more accurately closer to the expiry of the Futures Contract, particularly during the final 12 months when the actual relevant cash distributions begin to be determined. The settlement prices of the relevant Futures Contract will determine the level of each Index. As a result, it is impossible to predict whether the level of any Index will rise or fall.

**The notes are not regulated by the Commodity Futures Trading Commission (the “CFTC”).**

The net proceeds to be received by the Issuer from the sale of the notes will not be used to purchase or sell any futures contracts or options on futures contracts for your benefit. An investment in the notes thus does not constitute either an investment in futures contracts or options on futures contracts or an investment in a collective investment vehicle that trades in these futures contracts (*i.e.*, the notes will not constitute a direct or indirect investment by you in the futures contracts), and you will not benefit from the regulatory protections of the CFTC. Among other things, this means that the Issuer and the Guarantor (if applicable) are not registered with the CFTC as a futures commission merchant and you will not benefit from the CFTC’s or any other non-U.S. regulatory authority’s regulatory protections afforded to persons who trade in futures contracts on a regulated futures exchange through a registered futures commission merchant. For example, the price you pay to purchase notes will be used by the Issuer for its own

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purposes and will not be subject to customer funds segregation requirements provided to customers that trade futures on an exchange regulated by the CFTC.

Unlike an investment in the notes, an investment in a collective investment vehicle that invests in futures contracts on behalf of its participants may be subject to regulation as a commodity pool, and its operator may be required to register with and be regulated by the CFTC as a commodity pool operator, or qualify for an exemption from the registration requirement. Because the notes will not be interests in a commodity pool, the notes will not be regulated by the CFTC as a commodity pool, the Issuer and the Guarantor (if applicable) will not be registered with the CFTC as a commodity pool operator and you will not benefit from the CFTC's or any non-U.S. regulatory authority's regulatory protections afforded to persons who invest in regulated commodity pools.

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## The European Dividend Futures (USD) Indices

### General

All information contained in this underlying supplement regarding each of the European Dividend Futures (USD) Indices set forth under Table 1 below (each, an “**Index**” and collectively, the “**Indices**”), including, without limitation, its make-up, method of calculation and changes in its components, has been derived from publicly available information and other information provided by Solactive AG (the “**Index Sponsor**”), without independent verification. This information reflects the policies of, and is subject to change by, the Index Sponsor. The Index was developed by the Index Sponsor, in coordination with J.P. Morgan Securities LLC, and is calculated, maintained and published by the Index Sponsor. The Index Sponsor has no obligation to continue to publish, and may discontinue the publication of, the Index.

The European Dividend Futures 2019 (USD) Index was established on May 15, 2015 and the other two Indices were established on September 22, 2016. Each Index is reported by the Bloomberg Professional<sup>®</sup> service (“**Bloomberg**”) under the applicable ticker symbol set forth under Table 1 below.

Each Index aims to replicate the returns of a notional investment in a euro-denominated listed futures contract traded on the Eurex Exchange (with respect to each Index, the “**Futures Contract**”) that has a final settlement price based on the EURO STOXX 50<sup>®</sup> DVP (the “**Dividend Index**”), while attempting to mitigate exposure to fluctuations in the value of the European Union euro relative to the U.S. dollar.

Unlike equity securities, futures contracts, by their terms, have stated expirations at a specified point in time prior to expiration. The Futures Contract underlying each Index expires on the third Friday of December of the stated expiry year or, if the Eurex Exchange is not open for trading on that day, on the next day on which the Eurex Exchange is open for trading. Each Index will terminate following the expiration of the relevant Futures Contract.

The final settlement price of the Futures Contract underlying each Index is established by the Eurex Exchange at expiry based on the final value of the Dividend Index on the third Friday of December of the relevant year. The Dividend Index is intended to provide a measure of the cumulative cash distributions (net of certain withholding taxes in the case of special cash dividends and capital returns) on the constituents of the EURO STOXX 50<sup>®</sup> Index, expressed in index points of the EURO STOXX 50<sup>®</sup> Index, with respect to each annual period beginning on, but excluding the third Friday in December of each year and ending on, and including the third Friday in December of the following year. The level of the Dividend Index is reset to zero yearly following the third Friday in December. The EURO STOXX 50<sup>®</sup> Index consists of 50 component stocks of market sector leaders from within the Eurozone. See the relevant terms supplement for an illustration of how the Dividend Index works.

Accordingly, the final settlement price of each Futures Contract will reflect the total cash distributions on the constituents of the EURO STOXX 50<sup>®</sup> Index during approximately 12 months prior to the expiry of that Futures Contract. Even though each Futures Contract will trade for ten years prior to expiry, cash distributions on the constituents of the EURO STOXX 50<sup>®</sup> Index prior to the period of approximately 12 months preceding expiry will not be reflected in the final settlement price. Prior to expiry, the prices of the Futures Contracts will reflect market expectations of the total cash dividends to be paid during that period of approximately 12 months prior to the expiry of the relevant Futures Contract, as well as supply and demand for the Futures Contracts. The volatility of futures contracts on the Dividend Index tends to decrease over time, as the total cash distributions can be predicted more accurately closer to the expiry of the relevant futures contract, particularly during the final 12 months when the actual relevant cash distribution begin to be determined.

Subject to the effect of fluctuations in the value of the European Union euro relative to the U.S. dollar, the final level of each Index at the expiry of the relevant Futures Contract is expected to be greater than the level of that Index as of the date of this underlying supplement if the actual total cash distributions on the constituents of the EURO STOXX 50<sup>®</sup> Index during approximately 12 months prior to the expiry of that Futures Contract exceed the total cash distributions on the constituents of the EURO STOXX 50<sup>®</sup> Index during that period implied by the price of that Futures Contract on the date of this underlying supplement.

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On the other hand, subject to the effect of fluctuations in the value of the European Union euro relative to the U.S. dollar, the final level of each Index at the expiry of the relevant Futures Contract is expected to be lower than the level of that Index as of the date of this underlying supplement if the actual total cash distributions on the constituents of the EURO STOXX 50<sup>®</sup> Index during approximately 12 months prior to the expiry of that Futures Contract are less than the total cash distributions on the constituents of the EURO STOXX 50<sup>®</sup> Index during that period implied by the price of that Futures Contract on the date of this underlying supplement.

While the actual 12-month total dividends on the components of the EURO STOXX 50<sup>®</sup> Index have tended to be greater than the 12-month expected total dividends implied by the prices of futures contracts referencing those dividends, no assurance can be given that this market trend will be present at any particular time or that it will continue to be observed at all. Past performance should not be considered indicative of future performance.

Each Index attempts to mitigate exposure to fluctuations in the value of the European Union euro relative to the U.S. dollar. Under the methodology used to calculate the Indices, each Index rebalances weekly, and changes in the value of the European Union euro relative to the U.S. dollar affect only the return on the relevant Futures Contract since the last weekly rebalancing. For example, if the return on the relevant Futures Contract since the last weekly rebalancing is 1%, and European Union euro has depreciated relative to the U.S. dollar by 1% over the same period, the level of the Index will increase over that period by 0.99%. By contrast, if the relevant Index were exposed to currency exchange risk but did not include a feature to mitigate exposure to fluctuations in the value of the European Union euro relative to the U.S. dollar, under these circumstances, the 1% return on the Futures Contract would be almost entirely offset by the 1% depreciation of the European Union euro relative to the U.S. dollar.

Notwithstanding this feature, the performance of each Index reflects currency exchange rate risk. If the return on the relevant Futures Contract since the last weekly rebalancing is positive, a decline in the value of the European Union euro relative to the U.S. dollar will adversely affect the performance of the Index. Similarly, if the return on the relevant Futures Contract since the last weekly rebalancing is negative, an increase in the value of the European Union euro relative to the U.S. dollar will adversely affect the performance of the Index.

The Indices are not total return indices and do not reflect interest that could be earned on funds notionally committed to the trading of the relevant Futures Contract. The Indices do not reflect the price returns of the constituents of the EURO STOXX 50<sup>®</sup> Index.

For more information about the Dividend Index and the EURO STOXX 50<sup>®</sup> Index, see “Background on EURO STOXX 50<sup>®</sup> Index Dividend Futures” and “Background on the EURO STOXX 50<sup>®</sup>DVP” in this underlying supplement.

## **The European Dividend Futures (USD) Indices**



Table 1 below sets forth the name of each Index and, with respect to each Index, the Bloomberg ticker, the expiration month and year of the applicable Futures Contract and the Bloomberg ticker of the applicable Futures Contract.

**Table 1**

<b>Index Name</b>	<b>Bloomberg Ticker of Index</b>	<b>Futures Contract Expiry</b>	<b>Bloomberg Ticker of Futures Contract</b>
European Dividend Futures 2019 (USD) Index	SOLEDF19	December 2019	DEDZ9
European Dividend Futures 2020 (USD) Index	SOLEDF20	December 2020	DEDZ0
European Dividend Futures 2021 (USD) Index	SOLEDF21	December 2021	DEDZ1
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### Calculation and Publication of the Index Level

The level of each Index is calculated in U.S. dollars on each Index Business Day to and including the expiration of the relevant Futures Contract and is published via the price marketing services of Boerse Stuttgart AG and distributed to all affiliated vendors (such as Reuters). Each Index will terminate following the expiration of the relevant Futures Contract. In the event that data cannot be provided to the pricing services of Boerse Stuttgart AG on any Index Business Day, the Index will not be published in respect of that Index Business Day.

An “**Index Business Day**” means a day on which the Eurex Exchange is scheduled to be open for trading during its regular trading session.

The index level of each Index was 100.00 on January 4, 2013 (the “**Index Base Date**”). The Index Base Date will be deemed to be a Rebalancing Day. With respect to each Index Business Day (t) following the Index Base Date, the level of each Index is calculated by adjusting the level of that Index on the immediately preceding Rebalancing Day(k) to reflect the currency-adjusted performance of the relevant Futures Contract since that Rebalancing Day(k), in accordance with the following formula:

where:

means the Index level on Index Business Day (t);

means the Index level on the immediately preceding Rebalancing Day (k);

means the settlement price of the relevant Futures Contract on Index Business Day (t);

means the settlement price of the relevant Futures Contract on the immediately preceding Rebalancing Day (k);

means the Exchange Rate on Index Business Day (t); and

means the Exchange Rate on the immediately preceding Rebalancing Day (k).

A “**Rebalancing Day**” means each Friday, *provided* that if any Friday is not an Index Business Day, the Rebalancing Day will be the immediately following Index Business Day.

The “**Exchange Rate**” on any day means the WM Company 4pm London fixing EURUSD spot rate on that day.

If no settlement price is available for the relevant Futures Contract, the most recent settlement price for that Futures Contract is used. If no Exchange Rate is available, the most recent Exchange Rate is used.

Any incorrect calculation will be adjusted on a retrospective basis.

#### Index Committee

A committee composed of staff of Solactive AG (the “**Index Committee**”) will determine the implementation of any necessary adjustments to any Index. The Index Committee will also determine the future composition of any Index in the event that any Extraordinary Event occurs and persists for several Index Business Days.

An “**Extraordinary Event**” occurs if the settlement price of the relevant Futures Contract is no longer available generally.

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In addition, the market environment, supervisory, legal, financial, or tax reasons may require changes to be made to an Index's methodology. The Index Sponsor may also make changes to the terms and conditions of an Index and an Index's methodology that it deems to be necessary and desirable in order to prevent obvious or demonstrable error or to remedy, correct or supplement incorrect terms and conditions. The Index Committee will make all decisions and any amendments to the Index guidelines in a commercially reasonable basis.

#### Disclaimer

JPMorgan Chase & Co. or its affiliate has entered into a license agreement with Solactive AG that provides for the license to it and certain of its affiliated or subsidiary companies, in exchange for a fee, of the right to use the Indices, which are owned and published by Solactive AG, in connection with the notes.

The notes are not sponsored, promoted, sold or supported in any other manner by Solactive AG nor does Solactive AG offer any express or implicit guarantee or assurance either with regard to the results of using the Indices and/or Index trade mark or the level of any Index at any time or in any other respect. Each Index is calculated and published by Solactive AG. Solactive AG uses its best efforts to ensure that each Index is calculated correctly. Irrespective of its obligations towards the Issuer, the Guarantor (if applicable) or any of their affiliates, Solactive AG has no obligation to point out errors in any Index to third parties including but not limited to investors and/or financial intermediaries of the notes. Neither publication of any Index by Solactive AG nor the licensing of any Index or Index trade mark for the purpose of use in connection with the notes constitutes a recommendation by Solactive AG to invest capital in the notes nor does it in any way represent an assurance or opinion of Solactive AG with regard to any investment in the notes.

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## Background on EURO STOXX 50<sup>®</sup> Index Dividend Futures

EURO STOXX 50<sup>®</sup> Index Dividend Futures (the “**Futures Contracts**”) are euro-denominated futures contracts on the EURO STOXX 50<sup>®</sup> DVP (the “**Dividend Index**”) traded on the Eurex Exchange. Eurex is a derivatives exchange owned by Deutsche Börse AG.

The Futures Contracts expire on the third Friday of December of the stated expiry year or, if the Eurex Exchange is not open for trading on that day, on the next day on which the Eurex Exchange is open for trading. At any time, Futures Contracts with expiries in each of the nearest ten years are available for trading. Accordingly, as of the date of this underlying supplement, futures contracts expiring in December of 2019 through 2028 are available for trading.

The final settlement price at expiry of the Futures Contract underlying each Index is established by the Eurex Exchange at expiry based on the final value of the Dividend Index on the third Friday of December of the relevant year.

Prior to expiry, the official settlement price of the Futures Contract underlying each Index on any day during the current maturity month is derived from the volume-weighted average of the prices of all transactions during the minute before 17:30 Central European Time, *provided* that more than five trades transacted within this period. In all other cases, the official settlement price is determined based on the average bid/ask spread of the combination order book.

## Overview of Futures Markets

Futures contracts are traded on regulated futures exchanges, in the over-the-counter market and on various types of electronic trading facilities and markets. As of the date of this underlying supplement, all of the Futures Contracts are exchange-traded futures contracts. A futures contract provides for a specified settlement month in which the cash settlement is made by the seller (whose position is therefore described as “short”) and acquired by the purchaser (whose position is therefore described as “long”).

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

By depositing margin, which may vary in form depending on the exchange, with the clearing house or broker involved, a market participant may be able to earn interest on its margin funds, thereby increasing the total return that it may realize from an investment in futures contracts. The Indices are not total return indices and do not reflect interest that could be earned on funds notionally committed to the trading of futures contracts.

At any time prior to the expiration of a futures contract, a trader may elect to close out its position by taking an opposite position on the exchange on which the trader obtained the position, subject to the availability of a liquid secondary market. This operates to terminate the position and fix the trader's profit or loss. Futures contracts are cleared through the facilities of a centralized clearing house and a brokerage firm that is a member of the clearing house.

Futures exchanges may adopt rules and take other actions that affect trading, including imposing speculative position limits, maximum price fluctuations and trading halts and suspensions and requiring liquidation of contracts in certain circumstances.

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## Background on the EURO STOXX 50<sup>®</sup> DVP

All information contained in this underlying supplement regarding the EURO STOXX 50<sup>®</sup> DVP (the “**Dividend Index**”), including, without limitation, its make-up, method of calculation and changes in its components, has been derived from publicly available information, without independent verification. This information reflects the policies of, and is subject to change by, STOXX Limited, a wholly owned subsidiary of Deutsche Börse AG. The Dividend Index is calculated, maintained and published by STOXX Limited. STOXX Limited has no obligation to continue to publish, and may discontinue publication of, the Dividend Index.

The Dividend Index was created by STOXX Limited. Publication of the Dividend Index began on June 16, 2008. The Dividend Index is disseminated 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 Dividend Index is reported by Bloomberg under the ticker symbol “SX5ED.”

The Dividend Index is intended to provide a measure of the cumulative cash distributions (net of certain withholding taxes in the case of special cash dividends and capital returns) on the constituents of the EURO STOXX 50<sup>®</sup> Index, expressed in index points of the EURO STOXX 50<sup>®</sup> Index, with respect to each annual period beginning on, but excluding the third Friday in December of each year and ending on, and including the third Friday in December of the following year. The level of the Dividend Index is reset to zero yearly following the third Friday in December.

For more information about the EURO STOXX 50<sup>®</sup> Index, see “— The EURO STOXX<sup>®</sup> 50 Index” below.

## Dividend Index Calculation

The Dividend Index is calculated on an end-of-day basis by adding the dividend points on the relevant day to the level of the Dividend Index on the immediately preceding day. The “dividend points” on any day are calculated using the following formula:

$$\text{dividend points} = \frac{\text{dividend amount}}{\text{divisor of the EURO STOXX 50<sup>®</sup> Index}}$$

The “dividend amount” on any day is equal to the sum of the products of, for each constituent of the EURO STOXX 50<sup>®</sup> Index with an ex-distribution date occurring on that day, (a) the cash distributions per share (net of certain withholding taxes in the case of special cash dividends and capital returns) on that constituent with an ex-distribution date on that day, (b) the number of shares of that constituent included in the EURO STOXX 50<sup>®</sup> Index that are eligible for dividends, (c) the free-float factor of that constituent used in calculating the EURO STOXX 50<sup>®</sup> Index and (d) the weighting cap factor of that constituent used in calculating the EURO STOXX 50<sup>®</sup> Index. See “—The EURO STOXX 50<sup>®</sup> Index” below. The ex-distribution date of a cash distribution is the first day on which a stock trades without the right to receive that cash distribution.

The cash distributions reflected in the Dividend Index include (a) gross cash dividends (cash distributions that are within the scope of the regular dividend policy or that the company defines as a regular distribution), (b) special cash dividends (cash distributions that are outside the scope of the regular dividend policy or that the company defines as an extraordinary distribution), net of withholding taxes, and (c) capital returns, net of withholding taxes. The withholding taxes relating to each country are provided 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.

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If, following the ex-distribution date, a cash distribution is declared unpaid or if the amount of a cash distribution is changed, a correction will be applied to subsequent index values to deduct or adjust, as applicable, the amount of the cash distribution included on the ex-distribution date. Past index values will not be corrected.

### The EURO STOXX 50<sup>®</sup> Index

All information contained in this underlying supplement regarding the EURO STOXX 50<sup>®</sup> Index, including, without limitation, its make-up, method of calculation and changes in its components, has been derived from publicly available information, without independent verification. This information reflects the policies of, and is subject to change by, STOXX Limited. The EURO STOXX 50<sup>®</sup> 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<sup>®</sup> Index.

### *EURO STOXX 50<sup>®</sup> Index Composition and Maintenance*

The EURO STOXX 50<sup>®</sup> Index is composed of 50 component stocks of market sector leaders in terms of free-float market capitalization from within the 19 EURO STOXX<sup>®</sup> Supersector indices, which includes stocks selected from 11 Eurozone countries: Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain. At any given time, some eligible countries may not be represented in the EURO STOXX 50<sup>®</sup> Index.

The composition of the EURO STOXX 50<sup>®</sup> Index is reviewed annually in September, based on the closing stock data on the last trading day in August. Changes to the component stocks are implemented on the third Friday in September and are effective the following trading day. For each of the 19 EURO STOXX Supersector indices, the stocks are ranked in terms of free-float market capitalization. The largest stocks are added to the selection list until the coverage is close to, but still less than, 60% of the free-float market capitalization of the corresponding EURO STOXX Total Market Indices (TMI) Supersector Index. If the next highest-ranked stock brings the coverage closer to 60% in absolute terms, then it is also added to the selection list. All current EURO STOXX 50<sup>®</sup> Index stocks are added to the selection list. All the stocks on the selection list are then ranked in terms of free-float market capitalization to produce the final index selection list. The largest 40 stocks on the selection list are selected; the remaining 10 stocks are selected from the largest remaining current stocks ranked between 41 and 60; if the number of stocks selected is still below 50, then the largest remaining stocks are selected until there are 50 stocks.

In addition, stocks must meet the following minimum liquidity criteria to be eligible for inclusion in the EURO STOXX 50<sup>®</sup> Index. For each company, only the most liquid stock is considered. Stocks must have a minimum liquidity of greater than €1 million measured over 3-month average daily trading volume.

Components of the EURO STOXX 50<sup>®</sup> Index are capped at a maximum weight of 10% quarterly.

The composition of the EURO STOXX 50<sup>®</sup> Index is also reviewed on an ongoing basis as follows:

*Replacements.* A deleted stock is replaced immediately to maintain the fixed number of stocks. The replacement is based on the latest selection list that is updated monthly. In case of merger and acquisition where a blue-chip stock is involved, the original stock is replaced by the new stock. If a stock is deleted from the EURO STOXX Index in between the regular review dates but is still a component of the EURO STOXX Total Market Index, then this stock will remain in the EURO STOXX 50<sup>®</sup> Index until the next regular review.

*Fast exit.* The components are monitored for any changes based on the monthly selection list ranking (*i.e.*, on an ongoing monthly basis). A component is deleted if it ranks 75 or below on the monthly selection list and it ranked 75 or below or below on the selection list of the previous month. The announcement will be on the first trading day of the month after close of markets. The addition will be announced based on the monthly selection list (*i.e.*, the highest-ranked non-component will be selected). Changes will be implemented on the close of the fifth trading day and are effective the next trading day.

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*Fast entry.* All stocks on the latest selection lists and initial public offering (IPO) stocks are reviewed for a fast-track addition on a quarterly basis. A stock is added, if it qualifies for the latest blue-chip selection list generated at the end of February, May, August or November, and it ranks within the lower buffer (ranks 1 – 25) on this selection list. If it is added, the stock replaces the smallest stock in the EURO STOXX 50® Index. The announcement will be on the first trading day of the month after close of markets.

*Spin-offs.* Each spin-off stock qualifies for addition if it lies within the lower buffer (ranks 1 – 40) on the latest selection list for the EURO STOXX 50® Index. The spin-off replaces the lowest ranked stock in the EURO STOXX 50® Index as determined by the selection list. Qualifying spin-off stocks are added in sequence: The largest qualifying spin-off stock replaces the original stock in the EURO STOXX 50® Index. The next qualifying spin-off stock replaces the lowest ranked stock in the EURO STOXX 50® Index. Likewise for the other qualifying spin-off stocks.

*Free float factors and weighting cap factors.* 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 weighting cap factors are published on Wednesday two trading days prior to quarterly review using Tuesday's closing prices.

*Corporate actions.* 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 at any time can be expressed as follows:

$$\text{Index} = \frac{\text{free float market capitalization of the EURO STOXX 50® Index}}{\text{Divisor}}$$

The “free float market capitalization of the EURO STOXX 50® Index” is equal to the sum of the products of the price, number of shares, free float factor and weighting cap factor for each component stock as of the time the EURO STOXX 50® Index is being calculated. Each component's weight is capped at 10% of the free float market capitalization of the EURO STOXX 50® Index.

The divisor for the EURO STOXX 50<sup>®</sup> Index is adjusted to maintain the continuity of EURO STOXX 50<sup>®</sup> 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) *Special cash dividend:*

Cash distributions that are outside the scope of the regular dividend policy or that the company defines as an extraordinary distribution

Adjusted price = closing price – dividend announced by the company × (1 – withholding tax if applicable)

Divisor: decreases

(2) *Split and reverse split:*

Adjusted price = closing price × A / B

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New number of shares = old number of shares  $\times$  B / A

Divisor: unchanged

(3) *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.

In case the share increase is greater than or equal to 100% ( $B / A \geq 1$ ), the adjustment of the shares and weight factors are delayed until the new shares are listed.

Adjusted price = (closing price  $\times$  A + subscription price  $\times$  B) / (A + B)

New number of shares = old number of shares  $\times$  (A + B) / A

Divisor: increases

(4) *Stock dividend:*

Adjusted price = closing price  $\times$  A / (A + B)

New number of shares = old number of shares  $\times$  (A + B) / A

Divisor: unchanged

(6) *Stock dividend of another company:*

Adjusted price = (closing price  $\times$  A – price of other company  $\times$  B) / A

(5) *Stock dividend (from treasury stock):*

Adjusted only if treated as extraordinary dividend.

Adjusted close = close – close  $\times$  B / (A + B)

Divisor: decreases

(7) *Return of capital and share consolidation:*

Adjusted price = (closing price – capital return announced by company  $\times$  (1-withholding tax))  $\times$  A / B

Divisor: decreases

$$\text{New number of shares} = \text{old number of shares} \times \frac{B}{A}$$

Divisor: decreases

(8) *Repurchase of shares / self-tender:*

(9) *Spin-off:*

$$\text{Adjusted price} = \frac{(\text{price before tender} \times \text{old number of shares}) - (\text{tender price} \times \text{number of tendered shares})}{\text{old number of shares} - \text{number of tendered shares}}$$

$$\text{Adjusted price} = \frac{(\text{closing price} \times A - \text{price of spun-off shares} \times B)}{A}$$

$$\text{New number of shares} = \text{old number of shares} - \text{number of tendered shares} \quad \text{Divisor: decreases}$$

Divisor: decreases

(10) *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 US-19

rights offering for every A share held.

If A is not equal to one share, all the following “new number of shares” formulas need to be divided by A:

- *If rights are applicable after stock distribution (one action applicable to other):*

- *If stock distribution is applicable after rights (one action applicable to other):*

Adjusted price = (closing price × A + subscription price × C × (1 + B / A)) / ((A + B) × (1 + C / A))

Adjusted price = (closing price × A + subscription price × C) / ((A + C) × (1 + B / A))

New number of shares = old number of shares × ((A + B) × (1 + C / A)) / A

New number of shares = old number of shares × ((A + C) × (1 + B / A))

Divisor: increases

Divisor: increases

- *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

(11) *Addition / deletion of a company:*

(12) *Free float and shares changes:*

No price adjustments are made. The net change in market capitalization determines the divisor adjustment.

No price adjustments are made. The net change in market capitalization determines the divisor adjustment.