

# JPMORGAN CHASE & CO.

## ***Notes Linked to one or more J.P. Morgan Bespoke Commodity Indices***

JPMorgan Chase & Co. may, from time to time, offer and sell notes linked to one or more commodity indices governed by the J.P. Morgan Bespoke Commodity Index Standard Terms, which we refer to as the Standard Terms. We refer to any relevant commodity index governed by the Standard Terms to which the notes are linked as a Bespoke Commodity Index. This underlying supplement no. 2-B-I describes the Bespoke Commodity Indices, the relationship between JPMorgan Chase & Co. and the sponsor of the Bespoke Commodity Indices and terms that will apply generally to notes linked to one or more Bespoke Commodity Indices and other relevant information. This underlying supplement no. 2-B-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 the terms specified below. We refer to such term sheets and pricing supplements generally as terms supplements. The relevant terms supplement or another underlying supplement will describe the specific terms of a Bespoke Commodity Index to which the notes are linked. The accompanying product supplement, the relevant terms supplement or another accompanying underlying supplement will describe any other index or reference asset to which the notes are linked. If the terms described in the relevant terms supplement are inconsistent with those described herein or in any other related 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. 2-B-I and the accompanying product supplement or another accompanying 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 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-6.**

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of the notes or passed upon the accuracy or the adequacy of this underlying supplement no. 2-B-I, the accompanying product supplement, prospectus supplement and prospectus, or any other related 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

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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 other related underlying supplement, this underlying supplement no. 2-B-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. 2-B-I, together with the relevant terms supplement, any other related underlying supplement and the accompanying product supplement, prospectus supplement and prospectus, 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 other related underlying supplement, this underlying supplement no. 2-B-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 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. 2-B-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. 2-B-I, any other 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. To the extent applicable, each of the indices described in this underlying supplement no. 2-B-I are deemed to be one of the "Indices" referred to in the accompanying product supplement.

## SUPPLEMENTAL TERMS OF NOTES

*The following supplemental terms of the notes supplement, and to the extent they are inconsistent, supersede, the description of the general terms of the debt securities set forth in the accompanying product supplement and under the headings "Description of Notes" in the accompanying 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. The relevant terms supplement or an additional underlying supplement will describe the specific terms of the commodity index governed by the Standard Terms to which the notes are linked. Capitalized terms used but not defined in this underlying supplement no. 2-B-I have the meanings assigned in the accompanying product supplement, prospectus supplement, prospectus, the relevant terms supplement and any other related underlying supplement.*

### General

The notes are senior unsecured obligations of JPMorgan Chase & Co. that are linked to one or more commodity indices governed by the J.P. Morgan Bespoke Commodity Index Standard Terms (the "**Standard Terms**"), which we refer to as a Bespoke Commodity Index. Unless otherwise specified in the relevant terms supplement, a Bespoke Commodity Index will be composed of one or more components (each, an "**Index Component**," and collectively, the "**Index Components**"), and each Index Component will consist of a single commodity index or two commodity indices (each such commodity index, an "**Index Constituent**" and, collectively, the "**Index Constituents**").

The specific terms of the notes will be described in the relevant terms supplement accompanying this underlying supplement no. 2-B-I and any additional underlying supplement. The terms described in that document supplement those described herein and in any other related underlying supplement, the accompanying product supplement, prospectus supplement and prospectus. If the terms described in the relevant terms supplement are inconsistent with those described herein or in any other related underlying supplement, the accompanying, product supplement, prospectus supplement or prospectus, the terms described in the relevant terms supplement will control.

### Payment at Maturity

Notwithstanding any contrary definition in the accompanying product supplement, the "**Index Closing Level**," with respect to a Bespoke Commodity Index, on any Index Business Day will equal the official index level of the Bespoke Commodity Index or any successor index thereto (as described below under "—Discontinuation of a Bespoke Commodity Index; Alteration of Method of Calculation") published with respect to that Index Business Day. In certain circumstances, the Index Closing Level of a Bespoke Commodity Index will be based on the alternative calculation of the Bespoke Commodity Index described below under "— Postponement of a Valuation Date" or "— Discontinuation of a Bespoke Commodity Index; Alteration of Method of Calculation."

An "**Index Business Day**" is, unless otherwise specified in the relevant terms supplement, a day, as determined by the Note Calculation Agent, on which the New York Stock Exchange is scheduled to be open for trading for its regular trading session, without regard to after hours trading or any other trading outside of the regular trading session hours.

Notwithstanding any contrary definition in the accompanying product supplement, "**Relevant exchange**" means, with respect to an Index Constituent, the primary exchange or market of trading for any futures contracts included in such Index Constituent.

Notwithstanding any contrary definition in the accompanying product supplement, the “**Index Calculation Agent**,” with respect to a Bespoke Commodity Index, means, unless otherwise specified in the relevant terms supplement, the entity that calculates and publishes the official closing level of that Bespoke Commodity Index, which is currently J.P. Morgan Securities Ltd. (“**JPMSL**”). For more information about the Index Calculation Agent, see “The J.P. Morgan Bespoke Commodity Indices — Index Calculation Agent; Index Calculation Standards and Index Calculation Determinations” in this underlying supplement.

## **Postponement of a Valuation Date**

### ***Notes linked to a single Bespoke Commodity Index***

If the notes are linked to a single Bespoke Commodity Index, unless otherwise specified in the relevant terms supplement, notwithstanding anything to the contrary in the accompanying product supplement, if a Valuation Date is not an Index Business Day or if there is a market disruption event on any Valuation Date (such day, a “**Disrupted Day**”), the applicable Valuation Date will be postponed to the immediately succeeding Index Business Day that is not a Disrupted Day; *provided* that the Index Closing Level for that Valuation Date, as postponed, will be determined by the Note Calculation Agent and will be either:

- (a) calculated in accordance with the formula for and method of calculating the Index Closing Level last in effect prior to that Disrupted Day, using:
  - (i) with respect to each futures contract underlying an Index Constituent included in an Index Component that is not affected by that Disrupted Day (an “**Unaffected Contract**”), the official settlement price or fixing level, as applicable (such price or level, the “**Contract Price**”), as of the originally scheduled Valuation Date (including any delayed publication of the Contract Price for the originally scheduled Valuation Date that occurred on or prior to the determination of the postponed Valuation Date); and
  - (ii) with respect to each futures contract underlying an Index Constituent included in an Index Component that is affected by that Disrupted Day (an “**Affected Contract**”), the Contract Price for that Affected Contract as of the immediately succeeding Index Business Day that is not a Disrupted Day; or
- (b) the Adjusted Index Level with respect to the applicable Valuation Date calculated on that succeeding Index Business Day as provided by the Index Calculation Agent to the Note Calculation Agent. See “The J.P. Morgan Bespoke Commodity Index Series — Publication of the Index Level” for a description of how the Adjusted Index Level is calculated.

Any Valuation Date may be postponed as described above up to five Index Business Days following the date originally scheduled to be that Valuation Date. On the fifth Index Business Day following the originally scheduled Valuation Date, if the Contract Price with respect to any Affected Contract has not been determined in accordance with the immediately preceding paragraph (a “**Final Affected Contract**”), the Note Calculation Agent will determine the Index Closing Level for that Valuation Date on that fifth Index Business Day following the originally scheduled Valuation Date and that Index Closing Level will be either:

- (a) calculated in accordance with the formula for and method of calculating the Index Closing Level last in effect prior to the applicable Disrupted Day, using:
  - (i) with respect to each Unaffected Contract, the applicable Contract Price as of the originally scheduled Valuation Date (including any delayed publication as described above);

- (ii) with respect to each Affected Contract (other than any Final Affected Contract), the applicable Contract Price for that Affected Contract determined in the manner described in the immediately preceding paragraph; and
- (iii) with respect to each Final Affected Contract, the Note Calculation Agent's good faith estimate of the applicable Contract Price for that Final Affected Contract on that fifth Index Business Day that would have prevailed but for that Disrupted Day; or
- (b) the Adjusted Index Level with respect to the applicable Valuation Date calculated on that fifth Index Business Day as provided by the Index Calculation Agent to the Note Calculation Agent.

***Notes linked to a Bespoke Commodity Index and other reference assets***

If the notes are linked to a Bespoke Commodity Index and other reference assets, the provisions relating to postponement of a Valuation Date as set forth in the accompanying product supplement will apply, except that:

- (a) if a Valuation Date is a Disrupted Day with respect to a Bespoke Commodity Index (a "**Disrupted Bespoke Index**"), the applicable Valuation Date will be postponed as described in the accompanying product supplement, *provided* that the Index Closing Level for that Disrupted Bespoke Index on that Valuation Date, as postponed, will be determined by the Note Calculation Agent and that Index Closing Level will be either:
  - (i) calculated in accordance with the formula for and method of calculating the Index Closing Level for that Disrupted Bespoke Index last in effect prior to that Disrupted Day, using:
    - (1) with respect to each Unaffected Contract, the applicable Contract Price as of the originally scheduled Valuation Date (including any delayed publication of the Contract Price for the originally scheduled Valuation Date that occurred on or prior to the determination of the postponed Valuation Date); and
    - (2) with respect to each Affected Contract, the Contract Price for that Affected Contract as of the immediately succeeding Index Business Day that is not a Disrupted Day; or
  - (ii) the Adjusted Index Level for that Disrupted Bespoke Index with respect to the applicable Valuation Date calculated on that succeeding Index Business Day as provided by the Index Calculation Agent to the Note Calculation Agent. See "The J.P. Morgan Bespoke Commodity Index Series — Publication of the Index Level" for a description of how the Adjusted Index Level is calculated; or
- (b) if a Valuation Date has been postponed to that fifth Index Business Day following the originally scheduled Valuation Date and if any Disrupted Bespoke Index includes a Final Affected Contract (a "**Final Disrupted Bespoke Index**"), the Note Calculation Agent will determine the Index Closing Level for that Final Disrupted Bespoke Index for that Valuation Date on that fifth Index Business Day following the originally scheduled Valuation Date and that Index Closing Level will be either:
  - (i) calculated in accordance with the formula for and method of calculating the Index Closing Level for that Final Disrupted Bespoke Index last in effect prior to the applicable Disrupted Day, using:
    - (1) with respect to each Unaffected Contract, the applicable Contract Price as of the originally scheduled Valuation Date (including any delayed publication as described above);

- (2) with respect to each Affected Contract (other than any Final Affected Contract), the applicable Contract Price for that Affected Contract determined in the manner described under subclause (a) above; and
  - (3) with respect to each Final Affected Contract, the Note Calculation Agent's good faith estimate of the applicable Contract Price for that Final Affected Contract on that fifth Index Business Day that would have prevailed but for that Disrupted Day; or
- (ii) the Adjusted Index Level for that Final Disrupted Bespoke Index with respect to the applicable Valuation Date calculated on that fifth Index Business Day as provided by the Index Calculation Agent to the Note Calculation Agent.

### **Market Disruption Events**

With respect to the Bespoke Commodity Index and any relevant successor index, a **"market disruption event,"** unless otherwise specified in the relevant terms supplement, means:

- (1) a material limitation, suspension, discontinuation or disruption of trading in one or more options or futures contracts on a relevant commodity or commodities related to an Index Constituent, which results in failure by the relevant exchange on which such option(s) and/or futures contract(s) is/are traded to report an official settlement price for such option(s) and/or futures contract(s) on the day on which such event occurs or any succeeding day on which it continues;
- (2) a limitation, suspension or disruption of trading in one or more options or futures contracts on a relevant commodity or commodities related to an Index Constituent, by reason of movements exceeding "limit up" or "limit down" levels permitted by the relevant exchange and which, in the opinion of the Note Calculation Agent, is material to trading volume and market conditions in such option(s) or futures contract(s) on such Index Business Day;
- (3) publication by the relevant exchange of a "limit price" as the official settlement price for any futures contract on the relevant commodity or commodities related to an Index Constituent (by reason of movements exceeding "limit up" or "limit down" levels permitted by the relevant exchange);
- (4) failure by the Index Calculation Agent to announce publicly or publish the official index level of the Bespoke Commodity Index by 12:30 p.m. London time on the following Calculation Day;
- (5) the relevant exchange for futures contracts included in an Index Constituent is not open for trading during its regular trading session, regardless of whether any such exchange closes prior to its scheduled closing time; or
- (6) a commodity hedging disruption event,

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

- in the case of an event described in clause (1), (2), (3), (4) or (5) above, a determination by the Note Calculation Agent, in its sole discretion, that the applicable event described above materially interfered with our ability or the ability of any of our affiliates to adjust or unwind all or a material portion of any hedge with respect to the notes.

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

## Discontinuation of a Bespoke Commodity Index; Alteration of Method of Calculation

If the sponsor of a Bespoke Commodity Index (the “**Index Sponsor**”) discontinues publication of the Bespoke Commodity Index and the Index Sponsor or another entity publishes a successor or substitute index that the Note Calculation Agent determines, in its sole discretion, to be comparable to the discontinued Bespoke Commodity Index (such index being referred to herein as a “**successor index**”), then the Index Closing Level on any Valuation Date or any other relevant date on which the Index Closing Level is to be determined will be determined by reference to the level of such successor index at the close of trading on the relevant exchange for such successor index on such day.

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

If the Index Sponsor discontinues publication of the Bespoke Commodity Index prior to, and such discontinuation is continuing on, a Valuation Date or any other relevant date on which the Index Closing Level is to be determined, and the Note Calculation Agent determines, in its sole discretion, that no successor index is available at such time, or the Note Calculation Agent has previously selected a successor index and publication of such successor index is discontinued prior to, and such discontinuation is continuing on, such Valuation Date or such other relevant date, then the Note Calculation Agent will determine the Index Closing Level for such Valuation Date or such other relevant date on such date. The Index Closing Level will be computed by the Note Calculation Agent in accordance with the formula for and method of calculating the Bespoke Commodity Index or successor index, as applicable, last in effect prior to such discontinuation, using the applicable Contract Price (or, if trading in the relevant futures contract has been materially suspended or materially limited, the Note Calculation Agent’s good faith estimate of the applicable Contract Price that would have prevailed but for such suspension or limitation) at the close of the principal trading session on such date of each futures contract most recently composing the Bespoke Commodity Index Constituents or successor index, as applicable. Notwithstanding these alternative arrangements, discontinuation of the publication of the Bespoke Commodity Index or its successor index, as applicable, may adversely affect the value of the notes.

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

## RISK FACTORS

*Your investment in the notes will involve certain risks. Investing in the notes is not equivalent to investing directly (or taking a short position) in a Bespoke Commodity Index, any of the Index Constituents or any of the futures contracts underlying the Index Constituents or any futures contracts or exchange-traded or over-the-counter instruments based on, or other instruments linked to, a Bespoke Commodity Index or the Index Constituents. 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.*

**There may be potential conflicts between your interests and those of JPMorgan Chase & Co., the Note Calculation Agent, the Index Calculation Agent, the Index Sponsor and other affiliates of ours.**

Unless otherwise specified in the relevant terms supplement, we and our affiliates play a variety of roles in connection with the notes linked to the Bespoke Commodity Indices, including acting as issuer, Note Calculation Agent, Index Calculation Agent and the sponsor of the relevant Bespoke Commodity Index (the "Index Sponsor") and hedging our obligations under such notes. In performing these duties, the economic interests of ours, the Note Calculation Agent, the Index Calculation Agent, the Index Sponsor and other affiliates of ours would be potentially adverse to your interests as an investor in such notes. Additionally, we and our affiliates may from time to time develop other indices or products that may take positions that are contrary to your economic interests.

**The Index Calculation Agent has discretion in relation to any relevant Bespoke Commodity Index and is under no obligation to consider your interests as holder of the notes.**

Unless otherwise specified in the relevant terms supplement, JPMSL, one of our affiliates, acts as the Index Calculation Agent and sponsor of any relevant Bespoke Commodity Index and is responsible for calculating and maintaining that Bespoke Commodity Index and developing the guidelines and policies governing its composition and calculation. JPMSL is entitled to exercise discretion in relation to any relevant Bespoke Commodity Index, including but not limited to, the determination of the level to be used in the event of market disruptions that affect its ability to calculate and publish that Bespoke Commodity Index and the interpretation of rules governing that Bespoke Commodity Index. In addition, JPMSL has discretion, acting in good faith and in a commercially reasonable manner, to include, exclude or substitute any Index Constituent or to amend the rules governing any relevant Bespoke Commodity Index upon the occurrence of certain extraordinary events. Unlike other indices, the maintenance of the Bespoke Commodity Indices is not governed by an independent committee. Although judgments, policies and determinations concerning the Index are made by JPMSL, JPMorgan Chase & Co., as the parent company of JPMSL, ultimately controls JPMSL.

Although JPMSL will make all determinations and take all action in relation to the Bespoke Commodity Indices acting in good faith, it should be noted that such discretion could have an impact, positive or negative, on the level of any relevant Bespoke Commodity Index and the value of your notes. JPMSL is under no obligation to consider your interests as a holder of the notes in taking any actions that might affect the value of your notes. Furthermore, the inclusion of the Index Constituents in any relevant Bespoke Commodity Index is not an investment recommendation by us or JPMSL of the Index Constituents or the futures contracts underlying the Index Constituents.

**A Bespoke Commodity Index comprises notional assets.**

The exposures to the commodity futures contracts underlying the Index Constituents are purely notional and will exist solely in the records maintained by or on behalf of the Note Calculation Agent. There is no actual portfolio of assets to which any person is entitled or in which any person has any ownership interest. Consequently, you will not have any claim against any of the commodity futures contracts underlying the Index Constituents.



**A Bespoke Commodity Index may not be successful and may not outperform any alternative strategy that might be employed with respect to the commodity futures contracts underlying the Index Constituents.**

A Bespoke Commodity Index will follow a proprietary strategy that operates on the basis of pre-determined rules. No assurance can be given that the investment strategy on which the Bespoke Commodity Index is based will be successful or that such Bespoke Commodity Index will outperform any alternative strategy that might be employed with respect to the commodity futures contracts underlying the Index Constituents.

**A Bespoke Commodity Index may have a limited operating history and may perform in unanticipated ways.**

A Bespoke Commodity Index may have limited historical performance. The relevant terms supplement will specify the date on which any relevant Bespoke Commodity Index was established. Any back-testing or similar analysis in respect of a Bespoke Commodity Index must be considered illustrative only and may be based on estimates or assumptions not used by the Index Calculation Agent when determining the level of such Bespoke Commodity Index. Past performance should not be considered indicative of future performance.

**The reported level of a Bespoke Commodity Index may include the deduction of an adjustment factor.**

One way in which a Bespoke Commodity Index may differ from a typical index is that its daily reported level may include a deduction from the aggregate performance of the Index Component of an adjustment factor assessed at an annual rate specified in the relevant terms supplement. If applicable, this adjustment factor will be deducted daily and calculated based on an actual/360 accrual basis. As a result of the deduction of this amount, the level of such Bespoke Commodity Index will trail the value of a hypothetical identically constituted synthetic portfolio from which no such amount is deducted.

**The Index Constituents may be changed in certain extraordinary events.**

Following the occurrence of certain extraordinary events with respect to an Index Constituent as described under “The J.P. Morgan Bespoke Commodity Index Series — Extraordinary Events Affecting the Index Constituents,” the affected Index Constituent may be excluded or replaced by a substitute index. You should realize that the changing of an Index Constituent may affect the performance of a Bespoke Commodity Index, and therefore, the return on the notes, as the replacement index may perform significantly better or worse than the affected Index Constituent.

**The notes may be subject to increased volatility due to the use of leverage.**

A Bespoke Commodity Index and some Index Components may use leverage to increase or decrease the volatility of the Bespoke Commodity Index or a short Index Constituent included in an Index Component, as applicable. Where a Bespoke Commodity Index or an Index Constituent is leveraged, any price movements in such Bespoke Commodity Index or Index Constituent, as applicable, may result in greater changes in the level of such Bespoke Commodity Index or Index Constituent, as applicable, than if leverage was not used. In particular, the use of leverage will magnify any negative performance of a Bespoke Commodity Index or Index Constituents, as applicable, which in turn could cause you to receive a lower payment at maturity or upon early repurchase or redemption than you would otherwise receive.

**If a Bespoke Commodity Index employs a volatility targeting strategy, the volatility targeting strategy may not achieve its intended results.**

Volatility targeting is a mechanism that adjusts the overall leverage of an index in order to target a certain level of realized volatility of the index. If a Bespoke Commodity Index employs a volatility targeting strategy, no assurance can be given that the strategy will be successful or that such Bespoke Commodity Index will outperform any alternative strategy that might be employed. Furthermore, no assurance can be given that such Bespoke Commodity Index will achieve its target volatility. The actual realized volatility of such Bespoke Commodity Index may be greater or less than the target volatility.

**For any Index Components that employ a long-short strategy, your payment at maturity depends on the net performance of the applicable Index Constituents, not on the absolute performance of such Index Constituents.**

An Index Component may consist of the net return of a synthetic long position in one Index Constituent and a synthetic short position in a different Index Constituent. This technique is generally known as a “long-short” strategy. Your return on the notes attributable to any Index Components that employ a long-short strategy is dependent on the performance of the Index Constituent that has a notional long position (*i.e.*, to which the relevant Index Component has long exposure) minus the performance of the Index Constituent that has a notional short position (*i.e.*, to which such Index Constituent has short exposure). The absolute performance of the levels of the long and short Index Constituents is not relevant to the return on your notes.

**If a Bespoke Commodity Index employs a volatility matching strategy with respect to long-short Index Components, the volatility matching strategy may not achieve its intended results.**

A Bespoke Commodity Index may employ a volatility matching strategy with respect to long-short Index Components in order to limit realized volatility. Volatility matching attempts to match the volatility of the short Index Constituent to the volatility of the long Index Constituent by adjusting the leverage of the short Index Constituent to reduce exposure to the short Index Constituent where the volatility of the short Index Constituent is greater than the volatility of the long Index Constituent based on their past historical realized volatility and by adjusting the leverage of the short Index Constituent to increase exposure to the short Index Constituent where the volatility of the short Index Constituent is less than the volatility of the long Index Constituent based on their past historical realized volatility. A Bespoke Commodity Index may also include a minimum and/or maximum leverage for the short Index Constituent. The volatility matching mechanism seeks to maximize the offsetting effect of the long Index Constituent and the short Index Constituent. Because the long Index Constituent and the short Index Constituent may not be sufficiently correlated to achieve the desired offsetting effect and because past historical realized volatility may not be a good estimate of future realized volatility, there can be no guarantee that the volatility matching mechanism will achieve its intended results.

**For any Index Component that includes a synthetic short position on an Index Constituent, there is unlimited loss exposure to the short Index Constituent, and that exposure may result in a significant drop in the level of that Index Component.**

Any Index Component that includes a synthetic short position on an Index Constituent will suffer from a positive return in the short Index Constituent when the level of the short Index Constituent increases. The maximum increase of the value of any short exposure is limited to the loss of the entire value of the short Index Constituent, and the maximum decrease in value of such short exposure is unlimited. Because there is no limit to possible increases in the level of the short Index Constituent, the losses that may result from short exposure are potentially unlimited.

**A Bespoke Commodity Index may not be a fully diversified portfolio.**

Diversification is generally considered to reduce the amount of risk associated with generating returns. A Bespoke Commodity Index will be concentrated in commodities generally and may be concentrated in a few particular commodities only. There can be no assurance that a Bespoke Commodity Index will be sufficiently diversified at any time.

**You will be exposed to the risks associated with each Index Constituent.**

You will be exposed to the risks associated with each Index Constituent underlying any Bespoke Commodity Index to which the notes are linked. See the relevant terms supplement or the accompanying product supplement for a discussion of the risks associated with the Index Constituents.

**The relevant terms supplement or a separate underlying supplement will provide additional risk factors relating the commodity index governed by the Standard Terms or any other index or reference assets to which the notes are linked.**

## THE J.P. MORGAN BESPOKE COMMODITY INDICES

### General

The J.P. Morgan Bespoke Commodity Indices (each, a “Bespoke Commodity Index” and collectively, the “Bespoke Commodity Indices”) are developed and will be maintained and calculated by J.P. Morgan Securities Ltd. (which we refer to as “JPMSL”), unless otherwise specified in the relevant terms supplement. Unless otherwise specified in the relevant terms supplement, each Bespoke Commodity Index is a notional rules-based proprietary commodity index of JPMSL composed of one or more components (each, an “Index Component,” and collectively, the “Index Components”), and each Index Component will consist of a single commodity index or two commodity indices (each such commodity index, an “Index Constituent” and, collectively, the “Index Constituents”). We refer to any Index Constituent that underlies a synthetic long position as a “Long Constituent” and to any Index Constituent that underlies a synthetic short position as a “Short Constituent.”

The description of the general terms of the J.P. Morgan Bespoke Commodity Index Series included in this product supplement is based on standard terms formulated by JPMSL (which we refer to as the “Standard Terms”) that describe general terms relating to the J.P. Morgan Bespoke Commodity Indices. The relevant terms supplement or a separate underlying supplement will include a description of the specific terms that apply to the relevant Bespoke Commodity Index, which description will be based on a supplement to the Standard Terms formulated by JPMSL (which we refer to as an “Index Rules Supplement”) that will describe the specific terms that apply to any particular Bespoke Commodity Index. Any relevant Index Rules Supplement will be included in the relevant terms supplement. The Index Rules Supplement, when read together with the Standard Terms, constitutes the index rules (the “Index Rules”). This description and the description to be included in the relevant terms supplement are qualified by the full text of the Index Rules. The Index Rules, and not this description or the description in the relevant terms supplement, will govern the calculation and constitution of the Bespoke Commodity Indices and other decisions and actions related to their maintenance. The Standard Terms in effect as of the date of this product supplement are attached as Annex A to this product supplement, and the Index Rules Supplement in effect as of the date of the relevant terms supplement will be attached as an annex to the relevant terms supplement. The Index Rules are the intellectual property of JPMSL, and JPMSL reserves all rights with respect to its ownership of the Bespoke Commodity Indices.

The Bespoke Commodity Indices are rebalanced periodically on the Rebalancing Date (as defined below). If a Bespoke Commodity Index includes one or more Index Components that consist of a Long Constituent and a Short Constituent, the relevant terms supplement may specify that Volatility Matching applies with respect to any or all such Index Components. Volatility Matching is a mechanism used to adjust the weight given to the Short Constituent within a Component, with the intention of accounting for a difference in volatility between the Short Constituent and the Long Constituent in that Component. In addition, the relevant terms supplement may specify that Volatility Targeting applies with respect to a Bespoke Commodity Index. Volatility Targeting is a mechanism that adjusts the overall leverage of the Bespoke Commodity Index, with the intention of targeting a certain level of realized volatility of the Bespoke Commodity Index. The relevant terms supplement may specify additional strategies that apply with respect to the relevant Bespoke Commodity Index.

Each Bespoke Commodity Index will either be an excess return or total return index, as specified in the relevant terms supplement. The relevant terms supplement will specify the Index Constituents, which will be described in the accompanying product supplement or the relevant terms supplement. The Bespoke Commodity Indices may have limited historical performance. The relevant terms supplement will specify the date on which the relevant Bespoke Commodity Index was established (the “Index Inception Date”).

Each Bespoke Commodity Index is described as a “notional” or “synthetic” portfolio or basket because its reported value does not represent the value of any actual assets held by any person and there is no actual portfolio of assets in which any person has any ownership interest. The level of each Bespoke Commodity Index at any point is the return of the hypothetical uncollateralized portfolio of the Index Components. In addition, the value for each Bespoke Commodity Index at any point may be adjusted by an adjustment factor (the “Replication Adjustment Factor”) as specified in the relevant terms supplement, calculated and deducted daily.

### **Calculation and Publication of the Index Level**

Unless otherwise specified in the relevant terms supplement, JPMSL, or any affiliate or subsidiary designated by it, will act as calculation agent for each Bespoke Commodity Index (the “Index Calculation Agent”). Subject to the occurrence or existence of an Index Market Disruption Event affecting an Index Constituent or a futures contract underlying such Index Constituent, the Index Calculation Agent will calculate and publish the level (the “Index Level”) of a Bespoke Commodity Index on each Calculation Day, reported to four (4) decimal places, on the Bloomberg ticker page identified for the Bespoke Commodity Index in the relevant terms supplement.

### ***Bespoke Commodity Index Rebalancing***

Each Bespoke Commodity Index will be rebalanced on each Rebalancing Date to adjust the synthetic exposure of each Index Constituent to account for the performance of the Bespoke Commodity Index and the Index Constituents and the effects, if applicable, of Volatility Matching and/or Volatility Targeting since the immediately preceding Rebalancing Date. The rebalancing will reset the exposure to the Index Constituents and, if applicable, change (a) the leverage of a Short Constituent for which Volatility Matching is applicable (as described below under “— Volatility Matching”) and (b) the leverage of the Bespoke Commodity Index if Volatility Targeting is applicable (as described below under “— Volatility Targeting”).

A “Rebalancing Date” is a specific Calculation Day within each Rebalancing Period, as specified in the relevant terms supplement. For example, the relevant terms supplement may specify that the second Calculation Day of each Rebalancing Period is a Rebalancing Date.

A “Calculation Day” is any day on which the New York Stock Exchange is scheduled to be open for trading for its regular trading session, without regard to after hours trading or any other trading outside of the regular trading session hours.

A “Rebalancing Period” is the period from but excluding the Index Inception Date to and including the following Rebalancing Determination Date, and with respect to any subsequent Rebalancing Period, the period from but excluding the Rebalancing Determination Date to and including the following Rebalancing Determination Date.

A “Rebalancing Determination Date” is a day determined as described in the relevant terms supplement. The Rebalancing Determination Dates may occur periodically (*e.g.*, the first of the month) or upon any external or definable event (*e.g.*, the crossing of two moving averages), as described in the relevant terms supplement.

### ***The Index Level for an Excess Return Index***

The Index Level for an excess return index is determined in respect of each Calculation Day. The Index Level is calculated by adjusting the Index Level as of the immediately preceding Rebalancing Date to reflect (a) the weighted average performance of each Index Component since such Rebalancing Date, taking into account Index Leverage (if applicable) and (b) the applicable Replication Adjustment Factor. If an Index Market Disruption Event occurred with respect to any Index Constituent on the Rebalancing Date immediately preceding any Calculation Day or if an Index Market Disruption

Event has occurred or is continuing with respect to any Index Constituent on such Calculation Day, the Index Level for such Calculation Day will be determined as described below, subject to the modifications described under “Market Disruptions” below.

Unless otherwise specified in the relevant terms supplement, the Index Level on the Initial Index Day will be equal to 100. With respect to each Calculation Day following the Initial Index Day, the Index Calculation Agent will calculate the Index Level for an excess return index in accordance with the following formula:

$$Index_{ER}(t) = \left[ Index_{ER}(RD_{n-1}) + Index_{ER}(RD_{n-1}) \times IndexLeverage(RD_{n-1}) \times \sum_{i=1}^{NS} W_i \times PTDCP_i(t) \right] \times (1 - RAF_t);$$

where:

$Index_{ER}(t)$	means the Index Level on Calculation Day t.
$Index_{ER}(RD_{n-1})$	means, with respect to Calculation Day t, the Index Level on the Rebalancing Date immediately preceding Calculation Day t, rounded to 4 decimals.
$IndexLeverage(RD_{n-1})$	means, with respect to Calculation Day t, the Index Leverage on the Rebalancing Date immediately preceding Calculation Day t, determined as described below under “— Volatility Targeting.”
$NS$	means the total number of Index Components.
$W_i$	means the Component Weight of the i-th component, determined as described below under “— Component Weights.”
$PTDCP_i(t)$	means the Period-To-Date Component Performance for the i-th Index Component on Calculation Day t, determined as described below under “— Period-To-Date Component Performance.”
$RAF_t$	means the Replication Adjustment Factor with respect to Calculation Day t, determined as described below under “— Replication Adjustment Factor.”

#### ***The Index Level for a Total Return Index***

The Index Level for a total return index is determined in respect of each Calculation Day. The Index Level is calculated by adjusting the Index Level as of the immediately preceding Calculation Day to reflect (a) the weighted average performance of each Index Component since such immediately preceding Calculation Day, taking into account Index Leverage (if applicable), (b) the return associated with synthetic exposure to three month U.S. Treasury bills, as represented by the T-Bill Rate, and (c) the applicable Replication Adjustment Factor. With respect to any Calculation Day, if an Index Market Disruption Event has occurred with respect to any Index Constituent on any Calculation Day from and including the Rebalancing Date immediately preceding such Calculation Day to and including such Calculation Day, the Index Level for such Calculation Day will be determined as described below, subject to the modifications described under “Market Disruptions” below.

The “T-Bill Rate” on any Calculation Day is the three month weekly Auction High Discount Rate for United States Treasury bills on such Calculation Day, as reported on the Bloomberg® index USB3MTA; *provided, however* if such rate is not available at the applicable Bloomberg page, the rate will be determined in as described under “Market Disruptions — The T-Bill Rate” below.

Unless otherwise specified in the relevant terms supplement, the Index Level on the Initial Index Day will be equal to 100. With respect to each Calculation Day following the Initial Index Day, the Index Calculation Agent will calculate the Index Level for a total return index in accordance with the following formula:

$$Index_{TR}(t) = Index_{TR}(t-1) \times \left[ \frac{\left[ 1 + IndexLeverage(RD_{n-1}) \times \sum_{i=1}^{NS} W_i \times PTDCP_i(t) \right]}{\left[ 1 + IndexLeverage(RD_{n-1}) \times \sum_{i=1}^{NS} W_i \times \delta(t-1) \times PTDCP_i(t-1) \right]} + TBR_t \right] \times (1 + TBR_t)^{A(t)} \times (1 - RAF_t)$$

where:

$Index_{TR}(t)$	means the Index Level on Calculation Day t.
$Index_{TR}(t-1)$	means the Index Level on Calculation Day t-1.
$IndexLeverage(RD_{n-1})$	means, with respect to Calculation Day t, the Index Leverage on the Rebalancing Date immediately preceding Calculation Day t, determined as described below under “— Volatility Targeting.”
$NS$	means the total number of Index Components.
$W_i$	means the Component Weight of the i-th component, determined as described below under “— Component Weights.”
$PTDCP_i(t)$	means the Period-To-Date Component Performance for the i-th Index Component on Calculation Day t, determined as described below under “— Period-To-Date Component Performance.”
$PTDCP_i(t-1)$	means the Period-To-Date Component Performance for the i-th Index Component on Calculation Day t-1, determined as described below under “— Period-To-Date Component Performance.”
$\delta(t-1)$	is equal to 0 if Calculation Day t-1 is a Rebalancing Date, otherwise 1
$TBR_t$	means, with respect to Calculation Day t, the return associated with the T-Bill Rate on Calculation Day t, calculated using the following formula:
	$\left( \left( 1 - \frac{91}{360} \times TBILL_{t-1} \right)^{\frac{-1}{91}} \right) - 1$
$TBILL_{t-1}$	means the T-Bill Rate on Calculation Day t-1.
$A(t)$	means the number of calendar days that are not Calculation Days from (and excluding) Calculation Day t-1 to (and including) Calculation Day t.
$RAF_t$	means the Replication Adjustment Factor with respect to Calculation Day t, determined as described below under “—Replication Adjustment Factor.”

### **Component Weights**

The Component Weight with respect to each Index Component will be a percentage determined as specified in the relevant terms supplement. The relevant terms supplement may specify fixed percentages for the Component Weights or may specify a formula or formulas to be used to determine

the Components Weights. The sum of the Component Weights need not be 100%. In addition, one or more Component Weights may be negative. If a Long Constituent has a negative Component Weight, the Bespoke Commodity Index will experience synthetic short exposure to such Long Constituent, and if a Short Constituent has a negative Component Weight, the Bespoke Commodity Index will experience synthetic long exposure to such Short Constituent.

### ***Period-To-Date Component Performance***

For each Index Component, the “Period-To-Date Performance” on any Calculation Day represents the net return of such Index Component from the Rebalancing Date immediately preceding such Calculation Day.

Accordingly, the Index Calculation Agent will calculate the Period-To-Date Performance for each Index Component with respect to each Calculation Day in accordance with the following formula:

$$PTDCP_i(t) = \left( \frac{Level_{Long}(t)}{Level_{Long}(RD_{n-1})} - 1 \right) - SCL_i(RD_{n-1}) \left( \frac{Level_{Short}(t)}{Level_{Short}(RD_{n-1})} - 1 \right)$$

where:

$PTDCP_i(t)$	means the Period-To-Date Performance for the i-th Index Component on Calculation Day t.
$Level_{Long}(t)$	is 100 if the i-th Component has no Long Constituent; otherwise, the U.S. Dollar Level of the Long Constituent of the i-th Index Component on Calculation Day t.
$Level_{Short}(t)$	is 100 if the i-th Component has no Short Constituent; otherwise, the U.S. Dollar Level of the Short Constituent of the i-th Index Component on Calculation Day t.
$Level_{Long}(RD_{n-1})$	is 100 if the i-th Component has no Long Constituent; otherwise, the U.S. Dollar Level of the Long Constituent of the i-th Index Component on the Rebalancing Date immediately preceding Calculation Day t.
$Level_{Short}(RD_{n-1})$	is 100 if the i-th Component has no Short Constituent; otherwise, the U.S. Dollar Level of the Short Constituent of the i-th Index Component on the Rebalancing Date immediately preceding Calculation Day t.
$SCL(RD_{n-1})$	is 0 if the i-th Component has no Short Constituent; otherwise, the Short Constituent Leverage for the Rebalancing Date immediately preceding Calculation Day t, determined as described below under “— Volatility Matching.”

With respect to an Index Constituent and a Calculation Day, the “U.S. Dollar Level” means (a) the official closing level of the Underlying Index of such Index Constituent as published by the relevant Index Sponsor; *provided, however* that if the Index Calculation Agent determines that such official closing level reflects manifest error on the part of the relevant Index Sponsor, the Index Calculation Agent will determine the closing level of the Underlying Index in good faith and in a commercially reasonable manner or (b) in such circumstances as set out in the definition of Non-Publication Event (as defined below under “Market Disruptions — Index Market Disruption Events”) relating to the calculation of a Proxy Calculated Level (as defined below under “Market Disruptions — Index Market Disruption Events”), the U.S. Dollar Level will be the Proxy Calculated Level.

“Underlying Index” means, with respect to each Index Constituent, the commodity index underlying such Index Constituent.



“Index Sponsor” means, with respect to each Index Constituent, the corporation or other entity that (a) is responsible for setting and reviewing the rules and procedures and the methods of calculation and adjustments, if any, related to the Index Constituent and (b) announces (directly or through an agent) the level of the Index Constituent on a regular basis; and with respect to any Bespoke Commodity Index, JPMSL or its successors or assigns.

### ***Volatility Matching***

If the Bespoke Commodity Index includes one or more Index Components that consist of a Long Constituent and a Short Constituent, the relevant terms supplement may specify that Volatility Matching applies with respect to any or all such Index Components. “Volatility Matching” is a mechanism used to adjust the weight given to the Short Constituent within a Component, with the intention of accounting for a difference in volatility between the Short Constituent and the Long Constituent in that Component.

With respect to each Rebalancing Date, the Index Calculation Agent will determine the Short Constituent Leverage for any Index Component to which Volatility Matching applies. As set forth below, for each such Index Component, the Index Calculation first determines the volatility ratio between the realized volatility of the Long Constituent and the realized volatility of the Short Constituent over a period preceding such Rebalancing Date (the “Volatility Matching Period”), as specified in the relevant terms supplement. The Short Constituent Leverage for such Index Component will be equal to the volatility ratio, subject to any Maximum Short Constituent Leverage and/or Minimum Short Constituent Leverage specified in the relevant terms supplement. The Short Constituent for such Index Component on such Rebalancing Date will be used to calculate the Period-To-Date Performance for such Index Component.

Accordingly, the Index Calculation Agent will calculate the Short Constituent Leverage for any Index Component to which Volatility Matching applies in accordance with the following formula:

$$SCL(RD_{n-1}) = \text{Min}(\text{MaxLeverage}, \text{Max}(\text{MinLeverage}, \text{VolRatio}(RD_{n-1})))$$

where:

*SCL(RD<sub>n-1</sub>)* means, in respect of any Calculation Day, the Short Constituent Leverage for the immediately preceding Rebalancing Date.

*MaxLeverage* means the Maximum Short Constituent Leverage, as specified in the relevant terms supplement, if applicable.

*MinLeverage* means the Minimum Short Constituent Leverage, as specified in the relevant terms supplement, if applicable.

*VolRatio(RD<sub>n-1</sub>)* is equal to 1 with respect to any Index Component to which Volatility Matching does not apply and is otherwise calculated in accordance with the following formula:

$$\text{VolRatio}(RD_{n-1}) = \frac{\sqrt{\frac{252}{m-1} \times \sum_{j=1}^m \left( Rtn_{Long}(j) - \frac{1}{m} \sum_{k=1}^m Rtn_{Long}(k) \right)^2}}{\sqrt{\frac{252}{m-1} \times \sum_{j=1}^m \left( Rtn_{Short}(j) - \frac{1}{m} \sum_{k=1}^m Rtn_{Short}(k) \right)^2}}$$

where:

$m$  means the Volatility Matching Lookback, as specified in the relevant terms supplement, if applicable.

$Rtn_{Long}(j)$  means the return of the Long Constituent on the j-th day of the Volatility Matching Period( $RD_{n-1}$ ), defined as follows:

$$Rtn_{Long}(j) = \frac{LookbackLevel_{Long}(j)}{LookbackLevel_{Long}(j-1)} - 1$$

$Rtn_{Long}(k)$  means the return of the Long Constituent on the k-th day of the Volatility Matching Period( $RD_{n-1}$ ), defined as follows:

$$Rtn_{Long}(k) = \frac{LookbackLevel_{Long}(k)}{LookbackLevel_{Long}(k-1)} - 1$$

$Rtn_{Short}(j)$  means the return of the Short Constituent on the j-th day of the Volatility Matching Period( $RD_{n-1}$ ), defined as follows:

$$Rtn_{Short}(j) = \frac{LookbackLevel_{Short}(j)}{LookbackLevel_{Short}(j-1)} - 1$$

$Rtn_{Short}(k)$  means the return of the Short Constituent on the k-th day of the Volatility Matching Period( $RD_{n-1}$ ), defined as follows:

$$Rtn_{Short}(k) = \frac{LookbackLevel_{Short}(k)}{LookbackLevel_{Short}(k-1)} - 1$$

where:

$LookbackLevel_{Long}(j)$  means the U.S. Dollar Level of the Long Constituent on the j-th day of the Volatility Matching Period( $RD_{n-1}$ ).

$LookbackLevel_{Long}(k)$  means the U.S. Dollar Level of the Long Constituent on the k-th day of the Volatility Matching Period( $RD_{n-1}$ ).

$LookbackLevel_{Short}(j)$  means the U.S. Dollar Level of the Short Constituent on the j-th day of the Volatility Matching Period ( $RD_{n-1}$ ).

$LookbackLevel_{Short}(k)$  means the U.S. Dollar Level of the Short Constituent on the k-th day of the Volatility Matching Period( $RD_{n-1}$ ).

$LookbackLevel_{Long}(j-1)$  means the U.S. Dollar Level of the Long Constituent on the (j-1)th day of the Volatility Matching Period( $RD_{n-1}$ ).

$LookbackLevel_{Long}(k-1)$  means the U.S. Dollar Level of the Long Constituent on the (k-1)th day of the Volatility Matching Period( $RD_{n-1}$ ).

$LookbackLevel_{Short}(j-1)$  means the U.S. Dollar Level of the Short Constituent on the (j-1)th day of the Volatility Matching Period( $RD_{n-1}$ ).

$LookbackLevel_{Short}(k-1)$  means the U.S. Dollar Level of the Short Constituent on the (k-1)th day of the Volatility Matching Period( $RD_{n-1}$ ).

If the Short Constituent exhibits greater volatility over any Volatility Matching Period than the Long Constituent, exposure to the Short Constituent will be smaller than 100%, *provided* that the Short Constituent Leverage will not be less than any applicable Minimum Short Constituent Leverage. If the Short Constituent exhibits lesser volatility over any Volatility Matching Period than the Long Constituent, exposure to the Short Constituent will be greater than 100%, *provided* that the Short Constituent Leverage will not be greater than any applicable Maximum Short Constituent Leverage.

### ***Volatility Targeting***

The relevant terms supplement may specify that Volatility Targeting applies with respect to the Bespoke Commodity Index. “Volatility Targeting” is a mechanism that adjusts the overall leverage of the Bespoke Commodity Index, with the intention of targeting a certain level of realized volatility of the Bespoke Commodity Index. If the relevant Index Rules Supplement specifies that Volatility Targeting does not apply to a Bespoke Commodity Index, the Index Leverage with respect to each Rebalancing Date will be equal to 1.

If the relevant Index Rules Supplement specifies that Volatility Targeting applies to a Bespoke Commodity Index, the Index Calculation Agent will determine the Index Leverage with respect to each Rebalancing Date. As set forth below, the Index Calculation Agent first determines index volatility based on the hypothetical realized volatility of a Non-Volatility Targeted Index over two periods preceding such Rebalancing Date (each, a “Volatility Targeting Period”), as specified in the relevant terms supplement. The “Non-Volatility Targeted Index” is a hypothetical index identical to the Bespoke Commodity Index, except that the Index Leverage is set equal to 100% for all prior Rebalancing Dates and the Replication Adjustment Rate is set equal to 0.0%. The Index Leverage will be equal to a percentage equivalent to a fraction, the numerator of which is the Target Index Volatility, as specified in the relevant terms supplement, and the denominator of which is the index volatility from Volatility Targeting Period with the greater index volatility, subject to any Maximum Index Leverage and/or Minimum Index Leverage specified in the relevant terms supplement.

Accordingly, the Index Calculation Agent will calculate the Index Leverage for any Bespoke Commodity Index to which Volatility Targeting applies in accordance with the following formula:

$$IndexLeverage(RD_{n-1}) = \text{Max} \left( \text{Min} \left( \frac{TargetVol}{IndexVol(RD_{n-1})}, MaxLeverage \right), MinLeverage \right)$$

where:

*IndexLeverage(RD<sub>n-1</sub>)* means, in respect of any Calculation Day, the Index Leverage for the immediately preceding Rebalancing Date, which will equal 100% if Volatility Targeting is not applicable to the Bespoke Commodity Index.

*MinLeverage* means the Minimum Index Leverage, as specified in the relevant terms supplement, if applicable.

*MaxLeverage* means the Maximum Index Leverage, as specified in the relevant terms supplement, if applicable.

*TargetVol* means the Target Index Volatility, as specified in the relevant terms supplement, if applicable.

$$IndexVol(RD_{n-1}) = \text{Max}(VolMeasure_1(RD_{n-1}), VolMeasure_2(RD_{n-1}))$$

where:

$$VolMeasure_1(RD_{n-1}) = \sqrt{\frac{252}{m_1 - 1} \times \sum_{j=1}^{m_1} \left( Rtn_{Long}(j, 1, n-1) - \frac{1}{m_1} \sum_{k=1}^{m_1} Rtn_{Long}(k, 1, n-1) \right)^2}$$

$$VolMeasure_2(RD_{n-1}) = \sqrt{\frac{252}{m_2 - 1} \times \sum_{j=1}^{m_2} \left( Rtn_{Long}(j, 2, n-1) - \frac{1}{m_2} \sum_{k=1}^{m_2} Rtn_{Long}(k, 2, n-1) \right)^2}$$

where:

$m_1$  means Volatility Targeting Lookback 1, as specified in the relevant terms supplement, if applicable.

$m_2$  means Volatility Targeting Lookback 2, as specified in the relevant terms supplement, if applicable.

$Rtn(j, 1, n-1)$  means the return of the Non-Volatility Targeted Index on the j-th day of the Volatility Targeting Period 1( $RD_{n-1}$ ), defined as follows:

$$Rtn(j, 1, n-1) = \frac{NVTIndex(j, 1, n-1)}{NVTIndex(j-1, 1, n-1)} - 1$$

$Rtn(j, 2, n-1)$  means the return of the Non-Volatility Targeted Index on the k-th day of the Volatility Targeting Period 2( $RD_{n-1}$ ), defined as follows:

$$Rtn(j, 2, n-1) = \frac{NVTIndex(j, 2, n-1)}{NVTIndex(j-1, 2, n-1)} - 1$$

$Rtn(k, 1, n-1)$  means the return of the Non-Volatility Targeted Index on the j-th day of the Volatility Targeting Period 1( $RD_{n-1}$ ), defined as follows:

$$Rtn(k, 1, n-1) = \frac{NVTIndex(k, 1, n-1)}{NVTIndex(k-1, 1, n-1)} - 1$$

$Rtn(k, 2, n-1)$  means the return of the Non-Volatility Targeted Index on the k-th day of the Volatility Targeting Period 2( $RD_{n-1}$ ), defined as follows:

$$Rtn(k, 2, n-1) = \frac{NVTIndex(k, 2, n-1)}{NVTIndex(k-1, 2, n-1)} - 1$$

where:

$NVTIndex(j, 1, n-1)$	means the Non-Volatility Targeted Index Level of the Long Constituent on the j-th day of Volatility Targeting Period 1(RD <sub>n-1</sub> ).
$NVTIndex(j, 2, n-1)$	means the Non-Volatility Targeted Index Level of the Long Constituent on the j-th day of Volatility Targeting Period 2(RD <sub>n-1</sub> ).
$NVTIndex(j-1, 1, n-1)$	means the Non-Volatility Targeted Index Level of the Short Constituent on the (j-1)th day of the Volatility Targeting Period 1(RD <sub>n-1</sub> ).
$NVTIndex(j-1, 2, n-1)$	means the Non-Volatility Targeted Index Level of the Short Constituent on the (j-1)th day of the Volatility Targeting Period 2(RD <sub>n-1</sub> ).
$NVTIndex(k, 1, n-1)$	means the Non-Volatility Targeted Index Level of the Long Constituent on the k-th day of the Volatility Targeting Period 1(RD <sub>n-1</sub> ).
$NVTIndex(k, 2, n-1)$	means the Non-Volatility Targeted Index Level of the Long Constituent on the k-th day of the Volatility Targeting Period 2(RD <sub>n-1</sub> ).
$NVTIndex(k-1, 1, n-1)$	means the Non-Volatility Targeted Index Level of the Short Constituent on the (k-1)th day of the Volatility Targeting Period 1(RD <sub>n-1</sub> ).
$NVTIndex(k-1, 2, n-1)$	means the Non-Volatility Targeted Index Level of the Short Constituent on the (k-1)th day of the Volatility Targeting Period 2(RD <sub>n-1</sub> ).

If the volatility of the Non-Volatility Targeted Index over any Volatility Targeting Period is greater than the Target Index Volatility, exposure to the Bespoke Commodity Index will be smaller than 100%, *provided* that the Index Leverage will not be less than any applicable Minimum Index Leverage. If the volatility of the Non-Volatility Targeted Index over any Volatility Targeting Period is less than the Target Index Volatility, exposure to the Bespoke Commodity Index will be greater than 100%, *provided* that the Index Leverage will not be greater than any applicable Maximum Index Leverage.

### ***The Replication Adjustment Rate***

The Index Level for any excess return index or total return index may be calculated and published net of an adjustment based on the Replication Adjustment Factor, which is calculated and deducted daily. The Index Calculation Agent will calculate the Replication Adjustment Factor in accordance with the following formula:

$$RAF_t = 1 - (1 - RAR)^{\frac{\text{CalendarDays}}{360}}$$

where:

***RAR*** is the Replication Adjustment Rate, as specified in the relevant terms supplement, if applicable. The Replication Adjustment Rate will be equal to 0.00% if not specified in the relevant terms supplement.

*Calendar Days* is the number of calendar days from and including the Rebalancing Date immediately preceding Calculation Day  $t$  to but excluding Calculation Day  $t$ .

If the Replication Adjustment Factor applies to the Bespoke Commodity Index, the level of the Bespoke Commodity Index will trail the value of a hypothetical identically constituted synthetic portfolio from which no Replication Adjustment Factor applies is deducted. Accordingly, the Replication Adjustment Factor is a drag on Bespoke Commodity Index performance.

### **Publication of the Index Level**

With respect to each Calculation Day, unless otherwise specified in the relevant terms supplement, the Index Calculation Agent will endeavor to publish the Index Level for such Calculation Day before, at or around 12:00 p.m. London time on the following Calculation Day. The Index Level will be published on a Bloomberg page and the Bloomberg website at the pages indicated by the Index Ticker specified in the relevant terms supplement. The Index Level will be published to 4 decimal places.

Although the Index Calculation Agent will endeavor to publish the Index Level even with respect to a Calculation Day that is an Index Disrupted Day, the Index Calculation Agent is not obligated to publish the Index Level with respect to any Calculation Day that is an Index Disrupted Day. The Index Level published with respect to any Calculation Day that is an Index Disrupted Day will be considered solely indicative and is not intended to provide information regarding “tradable levels.” The Index Calculation Agent generally will not revise a published Index Level once published. However, where the Index Level on subsequent Calculation Days depends on the Index Level on prior Calculation Days (e.g., the Index Level on the previous Rebalancing Date), the Index Calculation Agent will apply the Adjusted Index Level, which is different from the published level. See “Market Disruptions — Effect of an Index Disrupted Day on Later Calculations” below.

The Index Calculation Agent will calculate, but not publish, an Adjusted Index Level for any Calculation Day that is an Index Disrupted Day. Upon request, the Index Calculation Agent will provide such Adjusted Index Level, as calculated on any succeeding Calculation Day. The Adjusted Index Level with respect to an Index Disrupted Day, as calculated on a succeeding Calculation Day, is calculated in the same manner as the Index Level on such Index Disrupted Day, except that the Index Calculation Agent will use the Adjusted U.S. Dollar Level with respect to such Index Disrupted Day, as calculated on such succeeding Calculation Day, instead of the U.S. Dollar Level on such Index Disrupted Day, for each Disrupted Constituent. See “Market Disruptions — Effect of an Index Disrupted Day on Later Calculations” below.

### **Market Disruptions**

The following sections summarize the effects that an Index Market Disruption Event has on the calculation of the Bespoke Commodity Index. For a complete description of the manner in which the Index Calculation Agent will calculate the Bespoke Commodity Index upon the occurrence of an Index Market Disruption Event, please refer to the Standard Terms.

#### ***Calculation of the Index Level on an Index Disrupted Day***

If, with respect to any Calculation Day, an Index Market Disruption Event has occurred or is continuing (such day, an “Index Disrupted Day”), the Index Calculation Agent will calculate the Index Level in the manner described in “Calculation and Publication of the Index Level” above (as modified by “— Effect of an Index Disrupted Day on Later Calculations” below, if applicable), unless a Non-Publication Event has occurred or is continuing with respect to any Index Constituent on such Index Disrupted Day (such day, a “Non-Publication Day”). If such Index Disrupted Day is a Non-Publication Day with respect to any Index Constituent, for purposes of calculating the Index Level on such Index Disrupted Day, the U.S. Dollar Level of such Index Constituent will be equal to the U.S. Dollar Level of such Index Constituent on the immediately preceding Calculation Day that was not a Non-Publication Day with respect to such Index Constituent.

### ***Effect of an Index Disrupted Day on Later Calculations***

As described under “Calculation and Publication of the Index Level” above, when calculating the Index Level on any Calculation Day, the Index Calculation Agent references the Index Level and the U.S. Dollar Levels of the Index Constituents on one or more prior Calculation Days. With respect to an excess return index, the Index Calculation Agent references the Index Level and the U.S. Dollar Levels of the Index Constituents on the immediately preceding Rebalancing Date. With respect to a total return index, the Index Calculation Agent references the Index Level and the U.S. Dollar Levels of the Index Constituents on each Calculation Day from and including the immediately preceding Rebalancing Date, to and including the immediately preceding Calculation Day. In this product supplement, we refer to each of these prior Calculation Days as a “Prior Date.”

If, with respect to any Calculation Day, any Prior Date was an Index Disrupted Day, the Index Calculation Agent will calculate the Index Level for such Calculation Day in the manner described in “Calculation and Publication of the Index Level” above (as modified by “— Calculation of the Index Level on an Index Disrupted Day” above, if applicable), with the following exceptions:

- with respect to any Disrupted Constituent, the Index Calculation Agent will use the Adjusted U.S. Dollar Level with respect to such Prior Date, as calculated on such Calculation Day, instead of the U.S. Dollar Level on such Prior Date for such Index Constituent; and
- with respect to any Prior Date that was an Index Disrupted Day, the Index Calculation Agent will use the Adjusted Index Level with respect to such Prior Date, as calculated on such Calculation Day, instead of the Index Level calculated on such Prior Date; *provided* that, with respect to a total return index, the Index Calculation Agent will use the Index Level calculated on such Prior Date if such Prior Date is the immediately preceding Calculation Date.

With respect to any Calculation Day, an Index Constituent is a “Disrupted Constituent” if either (a) an Index Market Disruption Event with respect to such Index Constituent has occurred or is continuing on such Calculation Day or (b) with respect to any Index Constituent underlying an Index Component that includes two Index Constituents, an Index Market Disruption Event with respect to either Index Constituent underlying such Index Component has occurred or is continuing on such Calculation Day.

With respect to any Disrupted Constituent for which the Underlying Index consists of a single commodity, the Adjusted U.S. Dollar Level on a Prior Date, as calculated on a Calculation Day, will generally be the U.S. Dollar Level of such Disrupted Constituent on the first Calculation Day following such Prior Date that is not an Index Disrupted Day with respect to such Disrupted Constituent; *provided* that, if each of the five Calculation Days immediately succeeding the Prior Date are Index Disrupted Days with respect to such Disrupted Constituent, the Index Calculation Agent will determine the Adjusted U.S. Dollar Level in good faith and in a commercially reasonable manner. With respect to a Calculation Day that is fewer than five Calculation Days after the Prior Date, if each Calculation Day from the Prior Date to and including such Calculation Day is an Index Disrupted Day with respect to such Disrupted Constituent, the Adjusted U.S. Dollar Level on such Prior Date, as calculated on such Calculation Day, will be equal to the U.S. Dollar Level on such Calculation Day.

With respect to any Disrupted Constituent for which the Underlying Index consists of more than one commodity, the Adjusted U.S. Dollar Level on a Prior Date, as calculated on a Calculation Day, will be calculated by the Index Calculation Agent in good faith and in a commercially reasonable manner, using the prices described below:

- with respect to each commodity underlying such Disrupted Constituent that is not affected by an Index Market Disruption Event (each, a “Non-Disrupted Commodity”), the Index Calculation Agent will use the official settlement price of the applicable futures contract(s) on such Prior Day; and

- with respect to each commodity underlying such Disrupted Constituent that is affected by an Index Market Disruption Event (each, a “Disrupted Commodity”),
- if any Calculation Day from the Prior Date to and including such Calculation Day is not an Index Disrupted Day with respect to such Disrupted Commodity, the Index Calculation Agent will use the official settlement price of the applicable futures contract(s) on the first Calculation Day following such Prior Date that is not an Index Disrupted Day with respect to such Disrupted Commodity;
- if such Calculation Day is fewer than five Calculation Days after the Prior Date and each Calculation Day from the Prior Date to and including such Calculation Day is an Index Disrupted Day with respect to such Disrupted Commodity, the Index Calculation Agent will use the official settlement price of the applicable futures contract(s) on such Calculation Day; *provided* that if such official settlement price is unavailable, the Index Calculation Agent will determine the applicable price in good faith and in a commercially reasonable manner; or
- if each of the five Calculation Days immediately succeeding the Prior Date are Disrupted Days with respect to such Disrupted Commodity, the Index Calculation Agent will determine the applicable price in good faith and in a commercially reasonable manner.

The Adjusted Index Level with respect to a Prior Date, as calculated on a Calculation Day, is calculated in the same manner as the Index Level on such Prior Date, except that the Index Calculation Agent will use the Adjusted U.S. Dollar Level with respect to such Prior Date, as calculated on such Calculation Day, instead of the U.S. Dollar Level on such Prior Date, for each Disrupted Constituent.

For additional information regarding the calculation of the Adjusted U.S. Dollar Level and the Adjusted Index Level, please refer to the Standard Terms. For the avoidance of doubt, the Index Calculation Agent will not update any Short Constituent Leverage or Index Leverage (each, if applicable) once they are calculated with respect to a Rebalancing Date to reflect Adjusted Index Levels or Adjusted U.S. Dollar Levels determined after such Rebalancing Date.

### ***Index Market Disruption Events***

“Index Market Disruption Event” means, with respect to any Calculation Day,

- a material limitation, suspension, discontinuation or disruption of trading in one or more options or futures contracts on a relevant commodity or commodities related to the Underlying Index of an Index Constituent, which results in failure by the Relevant Exchange on which such option(s) and/or futures contract(s) is/are traded to report an official settlement price for such option(s) and/or futures contract(s) on the day on which such event occurs or any succeeding day on which it continues;
- a limitation, suspension or disruption of trading in one or more options or futures contracts on a relevant commodity or commodities related to the Underlying Index of an Index Constituent, by reason of movements exceeding “limit up” or “limit down” levels permitted by the Relevant Exchange and which, in the opinion of the Index Calculation Agent, is material to trading volume and market conditions in such option(s) or futures contract(s) on such Calculation Day;
- publication by the Relevant Exchange of a “limit price” as the official settlement price for any futures contract on the relevant commodity or commodities related to the Underlying Index of an Index Constituent (by reason of movements exceeding “limit up” or “limit down” levels permitted by the relevant exchange);
- the occurrence of a Non-Publication Event; or



- the Relevant Exchange for futures contracts on the relevant commodity or commodities related to the Underlying Index of an Index Constituent is not open for trading during its regular trading session, regardless of whether any such exchange closes prior to its scheduled closing time (a "Non-Commodity Business Day").

A Index Market Disruption Event for an Index Constituent will also constitute (a) an Index Market Disruption Event for any Component of which that Constituent is a part and (b) an Index Market Disruption Event for any Index that includes any Component of which that Constituent is a part. Any Calculation Day on which an Index Market Disruption Event occurs or is continuing for an Index Constituent will be an Index Disrupted Day for that Constituent and an Index Disrupted Day for any Component of which that Constituent is a part and an Index Disrupted Day for any Index that includes any Component of which that Constituent is a part.

"Non-Publication Event" means the failure by the Relevant Exchange, Index Sponsor or other price source to announce publicly or publish the following (or the information necessary for determining the following): (a) the official settlement price for any relevant futures contract on the relevant commodity or commodities related to the Underlying Index of an Index Constituent or (b) the closing level of the Underlying Index of an Index Constituent, in either case by noon (London time) on the immediately following Calculation Day; *provided, however* that the occurrence of such an event will not constitute a "Non-Publication Event" in the case of clause (b) hereof if the Index Calculation Agent determines in its sole discretion by noon (London time) on such immediately following Calculation Day that the information necessary for determining the closing level of the relevant Underlying Index of an Index Constituent has been announced publicly or published by the Relevant Exchange, Index Sponsor or other price source in which case the Index Calculation Agent will determine the U.S. Dollar Level of such Constituent (the U.S. Dollar Level so determined being a "Proxy Calculated Level") in good faith and in a commercially reasonable manner.

"Relevant Exchange" means, with respect to any Underlying Commodity of an Index Constituent, the applicable commodities futures exchange on which the future contracts for that Underlying Commodity trade as determined by the index rules or methodology of the Underlying Index related to the applicable Constituent.

"Underlying Commodity" means, with respect to each Index Constituent, the commodity (or commodities) referenced by the Underlying Index of such Index Constituent as determined in accordance with the Index Rules.

### ***The T-Bill Rate***

With respect to a Bespoke Commodity Index that is a total return index, if on any Calculation Day the T-Bill Rate for such Calculation Day does not appear on Bloomberg® ticker USB3MTA (or any official successor page thereto), the T-Bill Rate for such Calculation Day will be the bond equivalent yield of the rate displayed in H.15 Daily Update, currently <http://www.federalreserve.gov/releases/h15/update/>, or any official successor page thereto, or such other recognized electronic source used for the purpose of displaying such 3-month T-bill rate for that day under the caption "U.S. Government Securities/Treasury bills/Auction high" converted by the Index Calculation Agent in a commercially reasonable manner to bank discount basis such that it is expressed in the same manner as the T-Bill Auction High Rate. Information contained in the Federal Reserve website is not incorporated by reference in, and should not be considered a part of, this underlying supplement or the relevant terms supplement.

If such rate for such date does not appear on Bloomberg® ticker USB3MTA (or any official successor page thereto) and such 3-month rate is not displayed in the H.15 Daily Update under the caption "U.S. Government securities/Treasury bills/Auction high" or another recognized electronic source, the T-Bill Rate for such Calculation Day will be the bond equivalent yield of the auction rate for those treasury bills as announced by the United States Department of Treasury, converted by the Index Calculation Agent in a commercially reasonable manner to bank discount basis such that it is expressed in the same manner as the T-Bill Auction High Rate.

If the rate for United States 3-month Treasury bills is still not available, the T-Bill Rate will be determined by the Index Calculation Agent in good faith and in a commercially reasonable manner.

## **Extraordinary Events Affecting the Index Constituents**

### ***Successor Index Constituent***

If any Index Constituent is (a) not calculated and announced by the Index Sponsor but is calculated and announced by a successor sponsor acceptable to the Index Calculation Agent or (b) replaced by a successor index using, in the determination of the Index Calculation Agent, the same or substantially similar formula for and method of calculation as used in the calculation of such Index Constituent, then such index will be deemed to be the index so calculated and announced by that successor index sponsor or that successor index, as the case may be.

### ***Material Change in the Method or Formula of Calculating an Index Constituent***

If on or prior to any Calculation Day on which the Index Calculation Agent is determining the Index Level, the Index Sponsor makes a material change in the formula for or the method of calculating a relevant Index Constituent (other than a modification prescribed in that formula or method to maintain such index in the Constituent or prescribed routine events) that affects the ability of the Index Calculation Agent to calculate the Index Level, then the Index Calculation Agent will, in good faith, make such adjustment(s) that it determines to be appropriate to any variable, calculation, methodology or detail in the specified in the Index Rules or any other input in relation to the Bespoke Commodity Index to account for such modification.

### ***Non-Publication of an Index Constituent as a result of Cancellation of the Index Constituent***

On or prior to any Calculation Day on which the Index Calculation Agent is determining the Index Level, if an Index Sponsor permanently cancels the an Index Constituent, and no successor index exists, the Index Calculation Agent will, in good faith, either:

- continue to calculate the Index Level of the relevant Index using the latest terms specified in the Index Rules Supplement at the time the Index Constituent was cancelled; or
- make such adjustment(s) that it determines to be appropriate to any variable, calculation, methodology, valuation terms or any other rule in relation to the relevant Bespoke Commodity Index to account for such cancellation, including but not limited to excluding or substituting a relevant Index Constituent.

### ***Change in Law Event***

Without prejudice to the ability of the Index Calculation Agent to amend the Index Rules as described elsewhere in this product supplement, the Index Calculation Agent may, acting in good faith and in a commercially reasonable manner:

- exclude; or
- substitute,

any Index Constituent following the occurrence (and/or continuation) of a Change in Law or in circumstances where it considers it reasonably necessary to do so to reflect the intention of the Bespoke Commodity Index, including (without prejudice to the generality of the foregoing) any perception among market participants generally that the published price of the relevant Index Constituent is inaccurate (and the Relevant Exchange fails to correct such level of the underlying futures contract or Index Sponsor fails to correct such level of the Underlying Index), and if it so

excludes or substitutes any Index Constituent, then the Index Calculation Agent may adjust the Index Rules as it determines in good faith to be appropriate to account for such exclusion or substitution on such date(s) selected by the Index Calculation Agent. The Index Calculation Agent is under no obligation to continue the calculation and publication of any Index upon the occurrence or existence of a Change in Law; and the Index Calculation Agent may decide to cancel any Index if it determines, acting in good faith, that the objective of the relevant Bespoke Commodity Index can no longer be achieved.

“Change in Law” means:

- due to:
  - the adoption of, or any change in, any applicable law, regulation or rule (including, without limitation, any tax law); or
  - the promulgation of, or any change in, the interpretation by any court, tribunal or regulatory authority with competent jurisdiction of any applicable law, rule, regulation or order (including, without limitation, as implemented by the U.S. Commodity and Futures Trading Commission or any exchange or trading facility),

in either case, the Index Calculation Agent determines in good faith that (a) it is contrary to such law, rule, regulation or order for any market participants that are brokers or financial intermediaries (individually or collectively) to hold, acquire or dispose of (in whole or in part) any Index Constituent of the relevant Bespoke Commodity Index, any transaction referencing the Index Constituent or any component of the Index Constituent (including without limitation, commodities futures contracts) or, (b) holding a position in any Index Constituent of the relevant Bespoke Commodity Index, any transaction referencing the Index Constituent or any component of the Index Constituent (including without limitation, commodity futures) is (or, but for the consequent disposal or termination thereof, would otherwise be) in excess of any allowable position limit(s) applicable to any market participants that are brokers or financial intermediaries (individually or collectively) under any such law, rule, regulation in relation to such Index Constituent, transaction referencing the Index Constituent or component of the Index Constituent traded on any exchange(s) or other trading facility (including, without limitation, any relevant exchange); or

- the occurrence or existence of any:
  - suspension or limitation imposed on trading futures contracts (relating to any Index Constituent, any transaction referencing the Index Constituent or any component of the Index Constituent) including without limitation, commodities futures contracts; or
  - any other event that causes trading in futures contracts (relating to any Index Constituent, any transaction referencing the Index Constituent or any component of the Index Constituent) to cease including without limitation, commodities futures contracts.

***Cancellation of an Index License relating to an Index Constituent***

With respect to any Bespoke Commodity Index, if, at any time, the license granted to the Index Calculation Agent (or its affiliates) to use any Index Constituent for the purposes of the Bespoke Commodity Index terminates, or the Index Calculation Agent’s rights to use any Index Constituent for the purpose of the Bespoke Commodity Index is otherwise disputed, impaired or ceases (for any reason), the Index Calculation Agent may (a) remove such Index Constituent from the Bespoke Commodity Index or (b) replace such Constituent and may make such adjustments to the Index Rules as it determines in good faith to be appropriate to account for such event on such dates as selected by the Index Calculation Agent.

## **Additional Terms**

### ***Amendments***

The Index Rules may be amended from time to time at the discretion of the Index Calculation Agent and will be re-published (in a manner determined by the Index Calculation Agent from time to time) no later than thirty calendar days following such amendment. The Index Rules are intended to be comprehensive; however, ambiguities may arise. If an ambiguity does arise, the Index Calculation Agent will resolve such ambiguities and, if necessary, amend the Index Rules to reflect such resolution.

### ***No Investment Advice and No Fiduciary Duty***

The Index Calculation Agent and its affiliates, officers, agents or employees (a) have not rendered legal, regulatory, investment, tax, accounting or other advice to an investor in relation to any product that is linked to or references a Bespoke Commodity Index and (b) are not fiduciaries under applicable law governing such product or in the jurisdiction in which any investor purchases a product that is linked to or references a Bespoke Commodity Index. Each investor should make its own investment decision based on its own judgment and on its own examination of the Bespoke Commodity Index and the applicable product, and each investor should consult its own legal, regulatory, investment, tax, accounting and other professional advisers as it deems necessary in connection with the relevant transaction.

### ***Index Calculation Agent; Index Calculation Standards and Index Calculation Determinations***

Unless otherwise specified in the relevant terms supplement, J.P. Morgan Securities Ltd. or any affiliate or subsidiary designated by it will act as calculation agent in connection with each Bespoke Commodity Index. The Index Calculation Agent will act in good faith and in a commercially reasonable manner with respect to determinations made by it pursuant to the Index Rules for a Bespoke Commodity Index.

All determinations of the Index Calculation Agent pursuant to the Index Rules and interpretation of the Index Rules will be final, conclusive and binding and no person will be entitled to make any claim against the Index Calculation Agent or any of the Relevant Persons in respect thereof. Neither the Index Calculation Agent nor any Relevant Person will:

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

“Relevant Persons” means JPMSL, any of its affiliates or subsidiaries or their respective directors, officers, employees, representatives, delegates or agents.

### ***Corrections***

With respect to any Bespoke Commodity Index,

- if the level of an Index Constituent, variable or other input that is used for any calculation relevant to the Index Level for any Calculation Day is subsequently corrected and the correction is published by the relevant Index Sponsor or relevant publication source; or

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

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

### ***Index Cancellation***

If the Index Calculation Agent determines that any adjustment that can be made with respect to any of the events discussed above in “Extraordinary Events Affecting the Index Constituents” cannot or would not produce a commercially reasonable result, then the Index Calculation Agent may cease calculating and publishing the Bespoke Commodity Index from the date of such determination by the Index Calculation Agent.

### **Disclaimer**

Neither JPMSL nor any of its Relevant Persons make any representation or warranty, whatsoever, express or implied, as to the results that may be obtained through the use of these Rules or the Bespoke Commodity Index strategy. Each Relevant Person hereby expressly disclaims all warranties of accuracy, completeness, merchantability, or fitness for a particular purpose with respect to any information contained in these Rules and no Relevant Person will have any liability (direct or indirect, special, punitive consequential or otherwise) to any person even if notified of the possibility of any such damages.

The Index Calculation Agent is under no obligation to continue the calculation, publication and dissemination of the Bespoke Commodity Index, or of any indices or strategies that may be potential components of the Bespoke Commodity Index. The Index Calculation Agent need not publish the index level(s), Index Level(s) or similar information related to the Bespoke Commodity Index if the relevant Bloomberg ticker (as identified in the relevant Index Rules Supplement) is subject to any delay in or interruptions of publication for any reason including the occurrence of an Extraordinary Event (as defined herein).

No one may reproduce or disseminate the information contained in the Index Rules without the prior written consent of the Index Calculation Agent. The Index Rules are not intended for distribution to, or use by, any person in a jurisdiction where such distribution is prohibited by law or regulation.

ANNEX A

J.P. Morgan Bespoke Commodity Index  
Standard Terms

February 2011

**J.P.Morgan**

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## 1. An Introduction to the J.P. Morgan Bespoke Commodity Index Standard Terms

The J.P. Morgan Bespoke Commodity Index Standard Terms is a methodology developed by J.P. Morgan that applies a long, short or long-short strategy to various Constituents (each such strategy, an “**Index**” or “**Bespoke Index**” and collectively, the “**Indices**” or “**Bespoke Indices**”). Indices that incorporate the J.P. Morgan Bespoke Commodity Index Standard Terms may seek to track exposure to (a) an index or basket of indices, (b) the difference between two indices, which we refer to as Components, or a basket of Components with either static or dynamic weights for such Components or (c) some other strategy that will be set forth in the relevant Index Supplement. Each Index will either be an Excess Return or Total Return Index, and the Index Type will be specified in the Index Supplement. Please see “Disclaimers and Conflicts of Interest” as set forth in these Standard Terms.

## 2. This Document

This document, the J.P. Morgan Bespoke Commodity Index Standard Terms (the “**Standard Terms**”), sets forth the framework for each J.P. Morgan Bespoke Commodity Index (the “**Indices**” or “**Bespoke Indices**”).

This document should be read in conjunction with the specific Index Supplement for any Bespoke Index. This document explains index construction in a general form, with certain concepts or particulars left unspecified (for example, the Index Supplement will specify the Constituents of the relevant Bespoke Index and the applicable Component Weights). The Index Supplement will be used to specify these index specific terms, and when read together with the Standard Terms, the Index Supplement and the Standard Terms will constitute the “**Index Rules**.” Each Bespoke Index shall have an Index Supplement, which incorporates these Standard Terms, and sets out the Index Name and any additional terms or details required by the Index Calculation Agent to determine the Index Level.

For the avoidance of doubt, the Index Supplement may include a provision, formula or definition, and such provision, formula or definition will supersede and replace any provision, formula or definition set forth herein for the purpose of calculating the Index or Indices described in that specific Index Supplement.

This document may be amended or supplemented from time to time at the discretion of the Index Calculation Agent and will be re-published no later than thirty (30) calendar days following such amendment or supplement.

This document is published by J.P. Morgan Securities, Ltd. (“**JPMSL**”) of 125 London Wall, London EC2Y 5AJ, United Kingdom, in its capacity as the Index Sponsor. A copy of this document is available from the Index Calculation Agent (as defined in the Index Supplement) or the Index Sponsor.

ALL PERSONS READING THIS DOCUMENT SHOULD REFER TO THE DISCLAIMERS AND CONFLICTS SECTIONS SET OUT AT THE END OF THIS DOCUMENT AND CONSIDER THE INFORMATION CONTAINED IN THIS DOCUMENT IN LIGHT OF SUCH DISCLAIMERS AND CONFLICTS OF INTEREST.

NOTHING HEREIN CONSTITUTES AN OFFER TO BUY OR SELL ANY FINANCIAL PRODUCT, PARTICIPATE IN ANY TRANSACTION OR ADOPT ANY INVESTMENT STRATEGY OR LEGAL, TAX, REGULATORY OR ACCOUNTING ADVICE. SEE SECTION 8.2 HEREIN.

Each of JPMSL and its affiliates may have positions or engage in transactions in securities or other financial instruments based on or indexed or otherwise related to the Bespoke Indices.

## 3. Definitions

Capitalised terms used in this document should be interpreted according to the definitions given below. In many cases there is a further explanation of the term or concept in the body of this document. All

capitalised terms in the Index Supplement shall be deemed to have the same meaning in this document unless otherwise specified in the Index Supplement. In the event of a conflict between definitions used in the Index Supplement and this document, the term set forth in the Index Supplement will prevail.

Unless otherwise specified, references to “Sections” in this document shall mean sections in this document.

The following terms are defined as follows:

**Bloomberg Page:** With respect to any Index, the Index Supplement will identify a ticker symbol that will reference an electronic page published by Bloomberg L.P. or one of its affiliates.

The Bloomberg Page will be specified in the relevant Index Supplement.

**Calculation Day:** Any day on which the New York Stock Exchange is scheduled to be open for trading for its regular trading session, without regard to after hours trading or any other trading outside of the regular trading session hours.

**Change in Law means:**

- (a) due to:
  - (i) the adoption of, or any change in, any applicable law, regulation or rule (including, without limitation, any tax law); or
  - (ii) the promulgation of, or any change in, the interpretation by any court, tribunal or regulatory authority with competent jurisdiction of any applicable law, rule, regulation or order (including, without limitation, as implemented by the U.S. Commodity and Futures Trading Commission or any exchange or trading facility),

in either case, the Index Calculation Agent determines in good faith that (x) it is contrary to such law, rule, regulation or order for any market participants that are brokers or financial intermediaries (individually or collectively) to hold, acquire or dispose of (in whole or in part) any Constituent of the relevant Index, any transaction referencing the Constituent or any component of the Constituent (including without limitation, commodities futures contracts) or, (y) holding a position in any Constituent of the relevant Index, any transaction referencing the Constituent or any component of the Constituent (including without limitation, commodity futures) is (or, but for the consequent disposal or termination thereof, would otherwise be) in excess of any allowable position limit(s) applicable to any market participants that are brokers or financial intermediaries (individually or collectively) under any such law, rule, regulation in relation to such Constituent, transaction referencing the Constituent or component of the Constituent traded on any exchange(s) or other trading facility (including, without limitation, any relevant exchange); or

- (b) the occurrence or existence of any:
  - (i) suspension or limitation imposed on trading futures contracts (relating to any Constituent, any transaction



referencing the Constituent or any component of the Constituent) including without limitation, commodities futures contracts; or

- (ii) any other event that causes trading in futures contracts (relating to any Constituent, any transaction referencing the Constituent or any component of the Constituent) to cease including without limitation, commodities futures contracts.

Component(s):

The Index will be comprised of one or more Components set forth in the relevant Index Supplement. Each Component will be composed of either one (1) Constituent (which may have a Market Position of Long or Short) or two (2) Constituents (one of which will have a Market Position of Long and the other of which will have a Market Position of Short). Each Component will have a Component Weight. Components will be enumerated 1 to n in the relevant Index Supplement where “n” is the number of Components in the Index, and the ith Component will be referred to as Component i.

Each of the Components will be specified in the relevant Index Supplement.

Component Weight(s):

With respect to each Component, the applicable Component Weight for that Component will be specified as a percentage in the relevant Index Supplement. Component Weight<sub>i</sub> refers to the Component Weight for Component i. For the avoidance of doubt, the sum of the Component Weights for all Components in the Index need not be 100%.

The Component Weight for each Component i, including any formula for calculating such Component Weight, will be specified in the relevant Index Supplement. For the avoidance of doubt, the Component Weight(s) may be negative, which indicates that the Index is short the value of such Component (regardless of whether a Constituent in that Component is a Long Constituent). For example, a Component that has a negative Component Weight will essentially be short a Long Constituent.

Constituent(s):

Each Constituent will be a commodity index (known as the “Underlying Index” of the Constituent). Each Constituent, as specified in the relevant Index Supplement, will be associated with one or more Components. Each Constituent in a particular Component will have an associated Market Position of either Long or Short.

Each of the Constituents of a Component i will be specified in the relevant Index Supplement.

For the avoidance of doubt, an Underlying Index may appear as a Constituent associated with more than one Component in the same Index (e.g., the S&P GSCI™ Corn Excess Return Index could appear as the Short Constituent in one Component paired with the JPMCCI Corn Excess Return Index, and the S&P GSCI™ Corn Excess Return Index could also be paired in another Component with the J.P. Morgan Seasonal Corn Index-Excess Return). In such a case, Constituents associated with different Components remain distinct Constituents, even though they relate to the same Underlying Index. In particular,

Market Disruption Events may affect such Constituents differently because they are associated with distinct Components.

Disrupted Commodity:	Disrupted Commodity will have the meaning set forth in Section 6.5 ( <i>Disruption of Constituents with more than one Underlying Commodity</i> ).
Disrupted Day:	will have the meaning set forth in the definition of “Market Disruption Event.”
Extraordinary Event:	Extraordinary Events means each of the events set forth in Section 7 ( <i>Extraordinary Events</i> ) of these Standard Terms.
Final Adjusted Level:	The Final Adjusted Level will have the meaning set forth in Section 6.3 ( <i>Time Frame of Various Calculation Agent Determinations</i> ).
Index:	means an Index composed of the Components specified in the relevant Index Supplement.  The name of the Index will be specified in the relevant Index Supplement.
Index Calculation Agent:	Unless otherwise specified in the Index Supplement, J.P. Morgan Securities Ltd. or any of its successors or assigns.
Index Inception Date:	With respect to any Index, the date specified in the relevant Index Supplement. For any Index for which the Initial Index Level is not 100.0000, the Index Supplement will specify the Initial Index Level.
Index Leverage(RDn):	The overall leverage applied to the Index on Rebalancing Date n as determined in accordance with the provisions and/or formula set forth in the relevant Index Supplement.
Index Level (t):	means, with respect to the Index and a Calculation Day t, the nominal level of the Index, which the Index Calculation Agent will calculate in respect of each such Calculation Day t in accordance with the provisions set forth in Section 4 ( <i>Calculation and Determination of the Index Level</i> ) of these Standard Terms and publish such Index Level (t) on the immediately following Calculation Day t+1 in accordance with the provisions set forth in Section 5 ( <i>Publication of the Index Level</i> ) of these Standard Terms.

For the avoidance of doubt, the Index Supplement may provide alternative provisions for calculating and determining the Index Level and such provisions as set forth in the Index Supplement will govern the calculation, determination and publication of the Index Level.

Notwithstanding anything to the contrary, if a Market Disruption Event has occurred or is continuing on such Calculation Day t or occurred on the immediately prior Rebalancing Date n-1, the Index Calculation Agent may adjust the Index Level with respect to Calculation Day t, for the purposes of calculating amounts set forth herein in accordance with the Disruption Fallbacks set forth in Section 6 (*Market Disruption Events and the Calculation and Determination of the Index Level upon the Occurrence or Continuation of a Market Disruption Event*) to these Standard Terms.

For the avoidance of doubt, the Index Calculation Agent will publish the Index Level (t) (subject to the provisions set forth in Section 5 (Publication) in accordance with the formulas set forth in Section 4 (*Calculation and Determination of the Index Level*) to these Standard Terms, rounding the Index Level (t) published on such Calculation Day t to the fourth decimal place; *provided, however* that if a Market Disruption Event has occurred or is continuing on such Calculation Day t or occurred on the immediately prior Rebalancing Date n-1, the Index Calculation Agent will calculate the Index Level (t) in accordance with the Disruption Fallbacks set forth in Section 6 (*Market Disruption Events and the Calculation and Determination of the Index Level upon the Occurrence or Continuation of a Market Disruption Event*) to these Standard Terms. **The Index Level, as published, may not be tradable.** Furthermore, such published Index Level will only be subsequently revised in certain limited circumstances (such as manifest error) and will not be subsequently revised solely because such Calculation Day t was a Disrupted Day. The Index Calculation Agent may calculate the Index Level (t) with respect to any Calculation Day to greater specificity for internal purposes and any rounding in publication will be based on the internally calculated price with respect to such Calculation Day, which is determined without regard to any rounding, except such rounding as described in Section 4 (*Calculation and Determination of the Index Level*) to these Standard Terms.

Index Rebalancing:

The Index will be rebalanced on each Rebalancing Date. If a Market Disruption Event has occurred or is continuing on a Rebalancing Date with respect to any Constituent within the Index, the Rebalancing Date will not be postponed, and the Rebalancing Date will be the originally scheduled Rebalancing Date; the Index Level, however, will be determined in accordance with Section 6 (*Market Disruption Events and the Calculation and Determination of the Index Level upon the Occurrence or Continuation of a Market Disruption Event*) to these Standard Terms.

On each Rebalancing Date, the Index Calculation Agent will rebalance the Index based on its Components and Component Weights, apply Volatility Matching, if applicable, to any Short Constituents within a Component and apply Volatility Targeting, if applicable, to the Index.

Index Sponsor:

With respect to each Constituent, the corporation or other entity that (a) is responsible for setting and reviewing the rules and procedures and the methods of calculation and adjustments, if any, related to the Constituent and (b) announces (directly or through an agent) the level of the Constituent on a regular basis; and with respect to any Bespoke Index, JPMSL or its successors or assigns.

Index Type:

With respect to each Index, the relevant Index Supplement will specify whether the Index is an excess return index or a total return index. If a Market Disruption Event has not occurred or is not continuing, the Index Level will be calculated in accordance with Section 4.6 (*Calculations for an Excess Return Index on each Calculation Day t*) for any Index that is an excess return index and the Index Level will be calculated in accordance with Section 4.7 (*Calculations for a Total Return Index on each Calculation Day t*) for any Index that is a total return index.

IndexVol(RDn):	With respect to Volatility Targeting, a measurement of the hypothetical realized volatility that the Index would have had, over period(s) preceding the nth Rebalancing Date.
Initial Adjusted Level:	The Initial Adjusted Level will have the meaning set forth in Section 6.3 ( <i>Time Frame of Various Calculation Agent Determinations</i> ).
Initial Index Level:	Unless otherwise specified in the relevant Index Supplement, 100.0000.
Interim Adjusted Level:	The Interim Adjusted Level will have the meaning set forth in Section 6.3 ( <i>Time Frame of Various Calculation Agent Determinations</i> ).
Long Constituent(s):	<p>means any Constituent specified in the relevant Index Supplement with a Long Market Position.</p> <p>The delineation of whether a Constituent is a Long Constituent will be specified in the relevant Index Supplement.</p>
Market Disruption Events:	<p>means, with respect to any Calculation Day:</p> <ul style="list-style-type: none"> <li>(i) A material limitation, suspension, discontinuation or disruption of trading in one or more options or futures contracts on a relevant commodity or commodities related to the Underlying Index of a Constituent, which results in failure by the Relevant Exchange on which such option(s) and/or futures contract(s) is/are traded to report an official settlement price for such option(s) and/or futures contract(s) on the day on which such event occurs or any succeeding day on which it continues;</li> <li>(ii) a limitation, suspension or disruption of trading in one or more options or futures contracts on a relevant commodity or commodities related to the Underlying Index of a Constituent, by reason of movements exceeding “limit up” or “limit down” levels permitted by the Relevant Exchange and which, in the opinion of the Index Calculation Agent, is material to trading volume and market conditions in such option(s) or futures contract(s) on such Calculation Day;</li> <li>(iii) publication by the Relevant Exchange of a “limit price” as the official settlement price for any futures contract on the relevant commodity or commodities related to the Underlying Index of a Constituent (by reason of movements exceeding “limit up” or “limit down” levels permitted by the relevant exchange);</li> <li>(iv) the occurrence of a Non-Publication Event; or</li> <li>(v) the Relevant Exchange for futures contracts on the relevant commodity or commodities related to the Underlying Index of a Constituent is not open for trading during its regular trading session, regardless of whether any such exchange closes prior to its scheduled closing time (a “<u>Non-Commodity Business Day</u>”).</li> </ul>

A Market Disruption Event for a Constituent shall also constitute (a) a Market Disruption Event for any Component of which that Constituent is a part and (b) a Market Disruption Event for any Index that includes any Component of which that Constituent is a part.

Any Calculation Day on which a Market Disruption Event occurs or is continuing (such day, a “Disrupted Day”) for a Constituent shall be a Disrupted Day for that Constituent and a Disrupted Day for any Component of which that Constituent is a part and a Disrupted Day for any Index that includes any Component of which that Constituent is a part.

Market Position:

The Market Position refers to the direction of exposure to each Constituent (either “Long” or “Short”). For a Long Constituent, the Market Position of that Constituent is “Long”. For a Short Constituent, the Market Position of that Constituent is “Short”.

If the Index is “Long” a specific Constituent, then the Index will benefit from a positive return in the Constituent, and if the Index is “Short” a specific Constituent, then the Index will benefit from a negative return in the Constituent.

For the avoidance of doubt, the Market Position is determined with respect to the Constituent and irrespective of the Component Weight.

Maximum Index Leverage:

A positive percentage as specified in the relevant Index Supplement.

Maximum Short  
Constituent Leverage:

With respect to Component i, a positive percentage as specified in the relevant Index Supplement.

Period-To-Date Component  
Performance

will have the meaning set forth under Section 4 (*Calculation and Determination of the Index Level*) to these Standard Terms.

Minimum Index Leverage:

A non-negative percentage, less than or equal to the Maximum Index Leverage, as specified in the relevant Index Supplement.

Minimum Short  
Constituent Leverage:

With respect to Component i, a percentage that is less than the Maximum Short Constituent Leverage, and greater than or equal to zero, as specified in the relevant Index Supplement.

Non-Disrupted Commodity:

Non-Disrupted Commodity will have the meaning set forth in Section 6.5 (*Disruption of Constituents with more than one Underlying Commodity*).

Non-Publication Day:

means, with respect to any Calculation Day, a Calculation Day on which a Non-Publication Event has occurred or is continuing.

Non-Publication Event:

The failure by the Relevant Exchange, Index Sponsor or other price source to announce publicly or publish the following (or the information necessary for determining the following) (a) the official settlement price for any relevant futures contract on the relevant commodity or commodities related to the Underlying Index of a Constituent or (b) the closing level of the Underlying Index of a

Constituent, in either case by noon (London time) on the immediately following Calculation Day, *provided, however* that the occurrence of such an event shall not constitute a “Non-Publication Event” in the case of clause (b) hereof if the Index Calculation Agent determines in its sole discretion by noon (London time) on such immediately following Calculation Day that the information necessary for determining the closing level of the relevant Underlying Index of a Constituent has been announced publicly or published by the Relevant Exchange, Index Sponsor or other price source in which case the Index Calculation Agent shall determine the U.S. Dollar Level of such Constituent (the U.S. Dollar Level so determined being a “Proxy Calculated Level”) in good faith and in a commercially reasonable manner.

**Non-Volatility Targeted Index:** The Non-Volatility Targeted Index is a hypothetical Index calculated similarly to the actual Index but without applying Volatility Targeting and Disruption Fallbacks, except that if such Calculation Day is a Non-Publication Day, the U.S. Dollar Level of the Constituent affected by such Non-Publication Day will be equal to the U.S. Dollar Level of such Constituent on the latest Calculation Day preceding Calculation Day t for which a U.S. Dollar Level of such Constituent is available. The hypothetical levels of the Non-Volatility Targeted Index (“Non-Volatility Targeted Index Levels”) in respect of each relevant day a Volatility Targeting Period are the basis of the Volatility Targeting calculation.

**Proxy Calculated Level:** will have the meaning set forth under the definition of “Non-Publication Event”.

**Rebalancing Date:** With respect to the Index and the determination of the Index Level (t), the Rebalancing Date will be Calculation Day d of each Rebalancing Period, where “d” is equal to the “Rebalancing Date Integer”, which is greater than or equal to 1 as indicated in the relevant Index Supplement.

The Rebalancing Date will be the specific Calculation Day in the Rebalancing Period corresponding to d (*e.g.*, if Rebalancing Date Integer is equal to 1, each Rebalancing Date will be the 1<sup>st</sup> Calculation Day of the relevant Rebalancing Period and if Rebalancing Date Integer is equal to 2, each Rebalancing Date will be the 2<sup>nd</sup> Calculation Day in the relevant Rebalancing Period).

Additionally, for the purposes of Section 4 (*Calculation and Determination of the Index Level*) of these Standard Terms, the Rebalancing Dates will be enumerated with the zero-th Rebalancing Date being a hypothetical Rebalancing Date that would have immediately preceded the Index Inception Date (such zero-th Rebalancing Date being necessary in some situations for calculation of Volatility Matching or Volatility Targeting). The nth Rebalancing Date shall be referred to as Rebalancing Date<sub>n</sub> (abbreviated as RD<sub>n</sub>).

**Rebalancing Date Integer:** With respect to the Rebalancing Date, the Rebalancing Date Integer is a whole number specified in the Index Supplement. See “Rebalancing Date” herein.

	The Rebalancing Date Integer will be specified in the relevant Index Supplement.
Rebalancing Period:	With respect to the initial Rebalancing Period, the period from but excluding the Index Inception Date to and including the following Rebalancing Determination Date, and with respect to any subsequent Rebalancing Period, the period from but excluding the Rebalancing Determination Date to and including the following Rebalancing Determination Date.
Rebalancing Determination Date:	The date determined in accordance with the description set forth in the relevant Index Supplement. For the avoidance of doubt, the Rebalancing Determination Date may be with respect to a certain defined date that occurs periodically ( <i>e.g.</i> , the first of the month), upon the occurrence of an event ( <i>e.g.</i> , two moving averages crossing) or any other external or definable event, as set forth in the relevant Index Supplement.
Replication Adjustment Factor:	The Replication Adjustment Factor will have the effect of reducing the Index Level by the Replication Adjustment Rate per annum, on an actual/360 basis.
Replication Adjustment Rate:	A percentage specified in the relevant Index Supplement for the relevant Index. If no Replication Adjustment Rate is specified or if the Replication Adjustment Rate specified is zero (0), there is no Replication Adjustment Factor.
Relevant Exchange:	means, with respect to any Underlying Commodity of a Constituent, the applicable commodities futures exchange on which the future contracts for that Underlying Commodity trade as determined by the index rules or methodology of the Underlying Index related to the applicable Constituent.
Short Constituent(s):	means any Constituent specified in the relevant Index Supplement with a Short Market Position.  The delineation of whether a Constituent is a Short Constituent will be specified in the relevant Index Supplement.
Short Constituent Leverage	Short Constituent Leverage has the meaning set forth under Section 4 ( <i>Calculation and Determination of the Index Level</i> ) to these Standard Terms.
T-Bill Rate:	means, with respect to each Calculation Day, the three month weekly Auction High Discount Rate for United States Treasury bills on the relevant Calculation Day, as reported on the Bloomberg® index USB3MTA; <i>provided, however</i> if such rate is not available at the applicable Bloomberg page, the rate will be determined in accordance with Section 6.10 ( <i>T-Bill Rate</i> ) below.
Target Index Volatility:	A positive percentage specified in the relevant Index Supplement.
Volatility Matching:	With respect to each Component i, Volatility Matching will be specified as either “Applicable” or “Not Applicable” in the relevant Index Supplement to indicate whether Volatility Matching applies to that Component.

If Volatility Matching applies to a Component, the Volatility Matching Lookback, the Maximum Short Constituent Leverage and the Minimum Short Constituent Leverage for the Short Constituent of that Component will be as specified in the relevant Index Supplement.

Volatility Matching is a mechanism to adjust the weight given to the Short Constituent within a Component, with the intention of accounting for a difference in volatility between the Short Constituent and the Long Constituent in that Component.

Volatility Matching cannot be used for Components that do not have both a Long Constituent and a Short Constituent.

As set forth in Section 4 (*Calculation and Determination of the Index Level*) of these Standard Terms, the Index Calculation Agent will calculate the VolRatio(RD<sub>n</sub>) (as defined in Section 4.3 herein), which is the ratio of the realized volatility of the Long Constituent to the realized volatility of the Short Constituent of Component *i* over a period preceding the *n*th Rebalancing Date. Subject to the Maximum Short Constituent Leverage *i* and Minimum Short Constituent Leverage *i*, the VolRatio(RD<sub>n</sub>) will determine the Short Constituent Leverage *i*(RD<sub>n</sub>) applied to the Short Constituent of Component *i* on the *n*th Rebalancing Date. Therefore, unless otherwise constrained by the Maximum Short Constituent Leverage *i* or Minimum Short Constituent Leverage *i*, if the Short Constituent exhibits greater volatility than the Long Constituent, the Short Constituent Leverage will be less than 100%, and if the Short Constituent exhibits lesser volatility than the Long Constituent, the Short Constituent Leverage will be greater than 100%.

Volatility Matching Lookback<sub>*i*</sub>: With respect to Component *i*, the relevant Index Supplement will specify an integer greater than or equal to 2 that will indicate the number of Calculation Days' returns that will be used for Volatility Matching for that Component, if applicable.

If Volatility Matching is "Not Applicable," Volatility Matching Lookback<sub>*i*</sub> with respect to Component *i* will also be "Not Applicable."

Volatility Matching Period<sub>*i*</sub>(RD<sub>*n*</sub>) With respect to Component *i* and Rebalancing Date<sub>*n*</sub>, the chronologically ordered set of Volatility Matching Lookback *i* plus one consecutive Calculation Days ending with the Calculation Day immediately preceding Rebalancing Date<sub>*n*</sub>. The number of days is one greater than Volatility Matching Lookback *i* because, in order to measure *k* consecutive returns, one needs *k* + 1 levels.

The earliest day of the Volatility Matching Period<sub>*i*</sub>(RD<sub>*n*</sub>) shall be regarded as the zero-th day of such period and the latest day of the Volatility Matching Period<sub>*i*</sub>(RD<sub>*n*</sub>) shall be the Volatility Matching Lookback *i*-th day.

Volatility Targeting: With respect to an Index, the relevant Index Supplement will specify whether Volatility Targeting is "Applicable" or "Not Applicable" to the Index and the calculation of the Index Level.



If Volatility Targeting applies to an Index, the Target Index Volatility, Volatility Targeting Lookback 1, Volatility Targeting Lookback 2, Maximum Index Leverage and Minimum Index Leverage for the Index will be as specified in the relevant Index Supplement.

Volatility Targeting is a mechanism to adjust the overall leverage of the Index (called the Index Leverage(RDn)), with the intention of targeting a certain level of realized volatility of the Index.

As set forth in Section 4 (*Calculation and Determination of the Index Level*) to these Standard Terms, the Index Calculation Agent will calculate the IndexVol(RDn) were the Index Leverage(RDn) to have been 100% for all previous Rebalancing Dates and the Replication Adjustment Rate was set equal to zero. The volatility is measured over two periods (or, optionally, effectively just one period, by setting the two periods to be identical) with the maximum of the two measurements used in the foregoing calculation.

Given the Target Index Volatility and subject to the Maximum Index Leverage and Minimum Index Leverage, the IndexVol(RDn) will determine the Index Leverage(RDn) applied to the Index on the nth Rebalancing Date.

Volatility Targeting Lookback 1  
and  
Volatility Targeting Lookback 2:

The relevant Index Supplement will specify two integers that are each greater than or equal to 2, to indicate the number of Calculation Days' returns which will be used in the two measurements of volatility used for Volatility Targeting for the Index.

These two numbers can be the same, in which case there is effectively only one measurement of volatility for the Index.

If Volatility Targeting is "Not Applicable," Volatility Targeting Lookback 1 and Volatility Targeting Lookback 2 will also be "Not Applicable."

Volatility Targeting Period 1  
(RDn) and Volatility Targeting  
Period 2(RDn):

With respect to Rebalancing Date<sub>n</sub>, the two sets of consecutive Calculation Days used in the calculation of IndexVol(RDn), both ending with the Calculation Day immediately preceding Rebalancing Date<sub>n</sub>.

Volatility Targeting  
Period 1(RDn)

consists of a number of consecutive Calculation Days equal to 1 plus Volatility Targeting Lookback 1.

Volatility Targeting  
Period 2(RDn)

consists of a number of consecutive Calculation Days equal to 1 plus Volatility Targeting Lookback 2.

The number of Calculation Days is 1 greater than the corresponding Volatility Targeting Lookback, because in order to measure k consecutive returns you need k + 1 levels.

The earliest day of each Volatility Targeting Period shall be regarded as the zero-th day of the period, so that the latest day shall be the corresponding Volatility Targeting Lookback-th day.

U.S. Dollar Level: With respect to an Underlying Index and a Calculation Day, (a) the official closing level of the Underlying Index as published by the relevant Index Sponsor; *provided, however* that if the Index Calculation Agent determines that such official closing level reflects manifest error on the part of the relevant Index Sponsor, the Index Calculation Agent shall determine the closing level of the Underlying Index in good faith and in a commercially reasonable manner or (b) in such circumstances as set out in the definition of Non-Publication Event relating to the calculation of a Proxy Calculated Level, the U.S. Dollar Level will be the Proxy Calculated Level.

Underlying Commodity: means, with respect to each Constituent, the commodity (or commodities) referenced by the Underlying Index of such Constituent as determined in accordance with the Index Rules or methodology for that Underlying Index.

Underlying Index: The “Underlying Index” of each Constituent will be a commodity index. The name and Bloomberg Page of each Underlying Index will be set forth in the relevant Index Supplement.

The Underlying Index will be specified in the relevant Index Supplement.

#### 4. Calculation and Determination of the Index

##### 4.1 Overview

For an Index that is an excess return index, on each Calculation Day, if a Market Disruption Event has not occurred and is not continuing with respect to any Constituent within the Index on Rebalancing Date<sub>n-1</sub> and if a Market Disruption Event has not occurred (and is not continuing) with respect to any Constituent within the Index on such Calculation Day t, the Index Calculation Agent will calculate and determine the Index Level(t) with respect to such Calculation Day based on the formulae set forth in this section and the additional terms and details specified in the Index Supplement.

If a Market Disruption Event occurred with respect to any Constituent within the Index on Rebalancing Date<sub>n-1</sub> or if a Market Disruption Event has occurred (or is continuing) with respect to any Constituent within the Index on any Calculation Day t, the Index Level(t) will be determined in accordance with Section 6 (*Market Disruption Events and the Calculation and Determination of the Index Level upon the Occurrence or Continuation of a Market Disruption Event*) in these Standard Terms.

For an Index that is a total return index, on each Calculation Day, if a Market Disruption Event has not occurred and is not continuing with respect to any Constituent within the Index on Rebalancing Date<sub>n-1</sub> and if a Market Disruption Event has not occurred (and is not continuing) with respect to any Constituent within the Index on such Calculation Day t (or any Calculation Days from but excluding Calculation Day t to but excluding Calculation Day RD n-1), the Index Calculation Agent will calculate and determine the Index Level t with respect to such Calculation Day based on the formulae set forth in this section and the additional terms and details specified in the Index Supplement.

If a Market Disruption Event occurred with respect to any Constituent within the Index on Rebalancing Date<sub>n-1</sub> or if a Market Disruption Event has occurred (or is continuing) with respect to any Constituent within the Index on such Calculation Day t (or any Calculation Days from but excluding

Calculation Day  $t$  to but excluding Calculation Day  $RD_{n-1}$ ), the Index Level  $t$  will be determined in accordance with the formulas set forth herein, subject to the terms set forth under Section 6 (*Market Disruption Events and the Calculation and Determination of the Index Level upon the Occurrence or Continuation of a Market Disruption Event*) in these Standard Terms.

#### 4.2 Index Rebalancing

Subject to the occurrence or the continuation of a Market Disruption Event, the Index will be rebalanced on each Rebalancing Date to adjust the synthetic exposure of the Long Constituent and the Short Constituent for each Component  $i$  in the Index to account for the performance of the Index and such Constituents since the immediately preceding Rebalancing Date, and the effects, if applicable, of the Volatility Matching and/or Volatility Targeting as well as any other formulas set forth in the Index Supplement. The effect of the rebalancing will be to reset the exposure to the Constituents of any Component  $i$ , and, if applicable, change (a) the leverage of a Short Constituent with respect to Components where Volatility Matching is “Applicable” and (b) the leverage in the case of the overall Index exposure in the case of which Volatility Targeting is “Applicable,” each as described below.

#### 4.3 Volatility Matching

Volatility Matching is a mechanism used to adjust the weighting of the Short Constituent within any Component in the relevant Index described in the Index Supplement. The relevant Index Supplement will specify whether Volatility Matching applies to all, none or a portion of the Components within the Index. If Volatility Matching is “Applicable”, the purpose of this function is an attempt to account for a difference in volatility between the Short Constituent and the Long Constituent for that specific Component within the relevant Index.

If Volatility Matching is “Applicable” for a specific Component in the Index, the Index Calculation Agent will determine the Short Constituent Leverage with respect to a Rebalancing Date ( $RD_{n-1}$ ) for that specific Component. The Index Calculation Agent will calculate the volatility ratio ( $VolRatio(RD_{n-1})$ ) between the realized volatility of the Long Constituent and the realized volatility of the Short Constituent over a period preceding such Rebalancing Date (Volatility Matching Period ( $RD_{n-1}$ )). The Index Calculation Agent will then determine the Short Constituent Leverage( $RD_{n-1}$ ) with respect to such Component  $i$  as set forth below, based on the  $VolRatio(RD_{n-1})$ , the Maximum Short Constituent Leverage and Minimum Short Constituent Leverage. The Maximum Short Constituent Leverage and the Minimum Short Constituent Leverage, if applicable, are specified in the Index Supplement. The Short Constituent Leverage on Rebalancing Date ( $RD_{n-1}$ ) will be used to calculate the Period-To-Date Performance for the  $i^{th}$  Component as set forth in Section 4.5 (*Calculating the Period-To-Date Component Performance*) of these Standard Terms.

The Short Constituent Leverage is determined by the Index Calculation Agent with respect to Calculation Day  $d$  in accordance with the following formula:

$$SCL(RD_{n-1}) = Min(MaxLeverage, Max(MinLeverage, VolRatio(RD_{n-1})))$$

where

$SCL(RD_{n-1})$  means, with respect to Calculation Day  $d$ , the Short Constituent Leverage for the immediately preceding Rebalancing Date  $RD_{n-1}$ .

$MaxLeverage$  means the Maximum Short Constituent Leverage.

$MinLeverage$  means the Minimum Short Constituent Leverage.

$VolRatio(RD_{n-1})$  is 1 if Volatility Matching is “Not Applicable” with respect to Component i, as indicated in the relevant Index Supplement and otherwise is defined by the following formula:

$$VolRatio(RD_{n-1}) = \frac{\sqrt{\frac{252}{m-1} \times \sum_{j=1}^m \left( Rtn_{Long}(j) - \frac{1}{m} \sum_{k=1}^m Rtn_{Long}(k) \right)^2}}{\sqrt{\frac{252}{m-1} \times \sum_{j=1}^m \left( Rtn_{Short}(j) - \frac{1}{m} \sum_{k=1}^m Rtn_{Short}(k) \right)^2}}$$

where

$m$  means the Volatility Matching Lookback

$Rtn_{Long}(j)$  means the return of the Long Constituent on the  $j$ -th day of the Volatility Matching Period( $RD_{n-1}$ ), defined as follows:

$$Rtn_{Long}(j) = \frac{LookbackLevel_{Long}(j)}{LookbackLevel_{Long}(j-1)} - 1$$

$Rtn_{Long}(k)$  means the return of the Long Constituent on the  $k$ -th day of the Volatility Matching Period( $RD_{n-1}$ ), defined as follows:

$$Rtn_{Long}(k) = \frac{LookbackLevel_{Long}(k)}{LookbackLevel_{Long}(k-1)} - 1$$

$Rtn_{Short}(j)$  means the return of the Short Constituent on the  $j$ -th day of the Volatility Matching Period( $RD_{n-1}$ ), defined as follows:

$$Rtn_{Short}(j) = \frac{LookbackLevel_{Short}(j)}{LookbackLevel_{Short}(j-1)} - 1$$

$Rtn_{Short}(k)$  means the return of the Short Constituent on the  $k$ -th day of the Volatility Matching Period( $RD_{n-1}$ ), defined as follows:

$$Rtn_{Short}(k) = \frac{LookbackLevel_{Short}(k)}{LookbackLevel_{Short}(k-1)} - 1$$

where

$LookbackLevel_{Long}(j)$  means the U.S. Dollar Level of the Long Constituent on the  $j$ -th day of the Volatility Matching Period( $RD_{n-1}$ ).

$LookbackLevel_{Long}(k)$	means the U.S. Dollar Level of the Long Constituent on the $k$ -th day of the Volatility Matching Period( $RD_{n-1}$ ).
$LookbackLevel_{Short}(j)$	means the U.S. Dollar Level of the Short Constituent on the $j$ -th day of the Volatility Matching Period( $RD_{n-1}$ ).
$LookbackLevel_{Short}(k)$	means the U.S. Dollar Level of the Short Constituent on the $k$ -th day of the Volatility Matching Period( $RD_{n-1}$ ).
$LookbackLevel_{Long}(j-1)$	means the U.S. Dollar Level of the Long Constituent on the $(j-1)$ -th day of the Volatility Matching Period( $RD_{n-1}$ ).
$LookbackLevel_{Long}(k-1)$	means the U.S. Dollar Level of the Long Constituent on the $(k-1)$ -th day of the Volatility Matching Period( $RD_{n-1}$ ).
$LookbackLevel_{Short}(j-1)$	means the U.S. Dollar Level of the Short Constituent on the $(j-1)$ -th day of the Volatility Matching Period( $RD_{n-1}$ ).
$LookbackLevel_{Short}(k-1)$	means the U.S. Dollar Level of the Short Constituent on the $(k-1)$ -th day of the Volatility Matching Period( $RD_{n-1}$ ).

#### 4.4 Volatility Targeting

Volatility Targeting is a mechanism that adjusts the overall leverage of the Index ( $Index\ Leverage(RD_{n-1})$ ) in order to target a certain level of realized volatility of the Index. Volatility Targeting will be specified in the relevant Index Supplement, and the relevant Index Supplement will specify whether Volatility Targeting is “Applicable” or “Not Applicable” to the Index described therein.

If the relevant Index Supplement specifies that Volatility Targeting is “Applicable” for an Index, the Index Calculation Agent will determine the Index Leverage applicable for the immediately preceding Rebalancing Date ( $RD_{n-1}$ ). The Index Calculation Agent will calculate index volatility ( $IndexVol(RD_{n-1})$ ) based on the hypothetical realized volatility of a Non-Volatility Targeted Index over the Rebalancing Period (Volatility Targeting Period 1( $RD_n$ ) and Volatility Targeting Period 2( $RD_n$ ) (each a “**Volatility Targeting Period**”). The Non-Volatility Targeted Index is a hypothetical index identical to the Index, except that the  $IndexLeverage(RD_n)$  is considered to have been 100% for all previous Rebalancing Dates and the Replication Adjustment Rate will be set equal to zero.

The  $Index\ Leverage(RD_{n-1})$  applied to the Index on Rebalancing Date ( $RD_{n-1}$ ) will be determined by the Index Calculation Agent and will be equal to a percentage equivalent of the fraction, the numerator of which is the Target Index Volatility and the denominator of which is  $IndexVol(RD_n)$ ; however, such percentage cannot be greater than the Maximum Index Leverage or less than the Minimum Index Leverage.

The Index Leverage is determined by the Index Calculation Agent with respect to the Rebalancing Date ( $RD_{n-1}$ ) immediately preceding each Calculation Day  $d$  in accordance with the following formula:

$IndexLeverage(RD_{n-1})$  means, with respect to Volatility Targeting, if Volatility Targeting is specified as “Not Applicable”, 1; otherwise:

$$IndexLeverage(RD_{n-1}) = \text{Max} \left( \text{Min} \left( \frac{TargetVol}{IndexVol(RD_{n-1})}, MaxLeverage \right), MinLeverage \right)$$

where

$MinLeverage$  means the Minimum Index Leverage

$MaxLeverage$  means the Maximum Index Leverage

$TargetVol$  means the Target Index Volatility

$$IndexVol(RD_{n-1}) = \text{Max}(VolMeasure_1(RD_{n-1}), VolMeasure_2(RD_{n-1}))$$

where

$$VolMeasure_1(RD_{n-1}) = \sqrt{\frac{252}{m_1 - 1} \times \sum_{j=1}^{m_1} \left( Rtn(j, 1, n-1) - \frac{1}{m_1} \sum_{k=1}^{m_1} Rtn(k, 1, n-1) \right)^2}$$

$$VolMeasure_2(RD_{n-1}) = \sqrt{\frac{252}{m_2 - 1} \times \sum_{j=1}^{m_2} \left( Rtn(j, 2, n-1) - \frac{1}{m_2} \sum_{k=1}^{m_2} Rtn(k, 2, n-1) \right)^2}$$

$m_1$  means Volatility Targeting Lookback 1

$m_2$  means Volatility Targeting Lookback 2

$Rtn(j, 1, n-1)$  means the return of the Non-Volatility Targeted Index on the  $j$ -th day of Volatility Targeting Period 1( $RD_{n-1}$ ), defined as follows:

$$Rtn(j, 1, n-1) = \frac{NVTIndex(j, 1, n-1)}{NVTIndex(j-1, 1, n-1)} - 1$$

$Rtn(j, 2, n-1)$  means the return of the Non-Volatility Targeted Index on the  $j$ -th day of Volatility Targeting Period 2( $RD_{n-1}$ ), defined as follows:

$$Rtn(j, 2, n-1) = \frac{NVTIndex(j, 2, n-1)}{NVTIndex(j-1, 2, n-1)} - 1$$

$Rtn(k, 1, n-1)$  means the return of the Non-Volatility Targeted Index on the  $k$ -th day of Volatility Targeting Period 1( $RD_{n-1}$ ), defined as follows:

$$Rtn(k,1,n-1) = \frac{NVTIndex(k,1,n-1)}{NVTIndex(k-1,1,n-1)} - 1$$

$Rtn(k,2,n-1)$  means the return of the Non-Volatility Targeted Index on the  $k$ -th day of Volatility Targeting Period 2( $RD_{n-1}$ ), defined as follows:

$$Rtn(k,2,n-1) = \frac{NVTIndex(k,2,n-1)}{NVTIndex(k-1,2,n-1)} - 1$$

$NVTIndex(j,1,n-1)$  means the Non-Volatility Targeted Index Level on the  $j$ -th day of Volatility Targeting Period 1( $RD_{n-1}$ )

$NVTIndex(j,2,n-1)$  means the Non-Volatility Targeted Index Level on the  $j$ -th day of Volatility Targeting Period 2( $RD_{n-1}$ )

$NVTIndex(j-1,1,n-1)$  means the Non-Volatility Targeted Index Level on the  $j-1$ -th day of Volatility Targeting Period 1( $RD_{n-1}$ )

$NVTIndex(j-1,2,n-1)$  means the Non-Volatility Targeted Index Level on the  $j-1$ -th day of Volatility Targeting Period 2( $RD_{n-1}$ )

$NVTIndex(k,1,n-1)$  means the Non-Volatility Targeted Index Level on the  $k$ -th day of Volatility Targeting Period 1( $RD_{n-1}$ )

$NVTIndex(k,2,n-1)$  means the Non-Volatility Targeted Index Level on the  $k$ -th day of Volatility Targeting Period 2( $RD_{n-1}$ )

$NVTIndex(k-1,1,n-1)$  means the Non-Volatility Targeted Index Level on the  $k-1$ -th day of Volatility Targeting Period 1( $RD_{n-1}$ )

$NVTIndex(k-1,2,n-1)$  means the Non-Volatility Targeted Index Level on the  $k-1$ -th day of Volatility Targeting Period 2( $RD_{n-1}$ )

#### 4.5 Calculating the Period-To-Date Component Performance for each Component

The Period-To-Date Performance for the  $i^{\text{th}}$  Component on Calculation Day  $t$  (henceforth  $PTDCP_i(t)$ ) represents the net return of such Component  $i$  from the Rebalancing Date immediately preceding Calculation Day  $t$  (henceforth, such Rebalancing Date will be referred to as Calculation Day ( $RD_{n-1}$ )).

The Period-To-Date Performance is determined by the Index Calculation Agent with respect to Calculation Day  $t$  in accordance with the following formula:

$$PTDCP_i(t) = \left( \frac{Level_{Long}(t)}{Level_{Long}(RD_{n-1})} - 1 \right) - SCL_i(RD_{n-1}) \left( \frac{Level_{Short}(t)}{Level_{Short}(RD_{n-1})} - 1 \right)$$

$RD_{n-1}$  is the Rebalancing Date immediately preceding the relevant Calculation Day

$Level_{Long}(t)$  is 100 if the  $i^{th}$  Component has no Long Constituent, otherwise the U.S. Dollar Level of the Long Constituent of the  $i^{th}$  Component, with respect to Calculation Day  $t$ .

$Level_{Short}(t)$  is 100 if the  $i^{th}$  Component has no Short Constituent, otherwise the U.S. Dollar Level of the Short Constituent of the  $i^{th}$  Component, with respect to Calculation Day  $t$ .

$Level_{Long}(RD_{n-1})$  is 100 if the  $i^{th}$  Component has no Long Constituent, otherwise the U.S. Dollar Level of the Long Constituent of the  $i^{th}$  Component, on Rebalancing Date  $n-1$ .

$Level_{Short}(RD_{n-1})$  is 100 if the  $i^{th}$  Component has no Short Constituent, otherwise the U.S. Dollar Level of the Short Constituent of the  $i^{th}$  Component, on Rebalancing Date  $n-1$ .

$SCL_i(RD_{n-1})$  is 0 if the  $i^{th}$  Component has no Short Constituent, otherwise the Short Constituent Leverage for Component  $i$  for Rebalancing Date  $n-1$ , as defined pursuant to Section 4.3 of these Standard Terms.

#### 4.6 Calculations for an Excess Return Index on each Calculation Day $t$

Unless otherwise specified in the Index Supplement, the Initial Index Level will be equal to 100.0000 on the Index Inception Date, or:

$$Index(t_0) = 100.0000$$

the Index Inception Date will be set forth in the relevant Index Supplement.

With respect to each Calculation Day  $t$  following the Index Inception Date, if the Index is an excess return index, the Index Level will be determined by the Index Calculation Agent as follows:

$$Index_{ER}(t) = \left[ Index_{ER}(RD_{n-1}) + Index_{ER}(RD_{n-1}) \times IndexLeverage(RD_{n-1}) \times \sum_{i=1}^{NS} W_i \times PTDCP_i(t) \right] \times (1 - RAF_t)$$

$Index_{ER}(RD_{n-1})$  means, with respect to each Calculation Day  $t$ , the Index Level on the Rebalancing Date immediately preceding Calculation Day  $t$ , rounded to 4 decimals.

$IndexLeverage(RD_{n-1})$  means, with respect to each Calculation Day  $t$ , the Index Leverage on the Rebalancing Date immediately preceding Calculation Day  $t$  determined in Section 4.4 (*Volatility Targeting*) above.

$NS$  means the total number of Components in the Index.

$W_i$  means Component Weight <sub>$i$</sub>

$PTDCP_i(t)$  means the Period-To-Date Component Performance for the  $i^{th}$  Component on Calculation Day  $t$  as determined in accordance with Section 4.5 (*Calculating the Period-To-Date Component Performance for each Component*) above.



$RAF_t$  means, with respect to Calculation Day t, the Replication Adjustment Factor, calculated by the Index Calculation Agent as follows:

$$RAF_t = 1 - (1 - RAR)^{\frac{\text{CalendarDays}}{360}}$$

where:

$RAR$  is the Replication Adjustment Rate, if applicable.

$\text{CalendarDays}$  is the number of calendar days from, and including, the Rebalancing Date immediately preceding Calculation Day t to, but excluding, Calculation Day t.

#### 4.7 Calculations for a Total Return Index on each Calculation Day t

With respect to a particular Index, if the Index Type is a total return index, the Index Calculation Agent will calculate the Index Level to reflect the returns associated with the synthetic exposure in the Index and the returns associated with synthetic exposure to three month U.S. T-bills.

The Total Return Index is calculated as follows:

$$Index_{TR}(t) = Index_{TR}(t-1) \times \left[ \frac{\left[ 1 + IndexLeverage(RD_{n-1}) \times \sum_{i=1}^{NS} W_i \times PTDCP_i(t) \right]}{\left[ 1 + IndexLeverage(RD_{n-1}) \times \sum_{i=1}^{NS} W_i \times \delta(t-1) \times PTDCP_i(t-1) \right]} + TBR_t \right] \times (1 + TBR_t)^{A(t)} \times (1 - RAF_t)$$

where:

$Index_{TR}(t)$  means, with respect to a total return index, the Index Level on Calculation Day t;

$Index_{TR}(t-1)$  means, with respect to a total return index, the Index Level on Calculation Day t-1.

$IndexLeverage(RD_{n-1})$  means, with respect to each Calculation Day t, the Index Leverage on the Rebalancing Date immediately preceding Calculation Day t determined in Section 4.4 (*Volatility Targeting*) above.

$NS$  means the total number of Components in the Index.

$W_i$  means Component Weight<sub>i</sub>

$PTDCP_i(t)$  means the Period-To-Date Component Performance for the i<sup>th</sup> Component on Calculation Day t as determined in accordance with Section 4.6 (*Calculating the Period-To-Date Component Performance for each Component*) above.

$PTDCP_i(t-1)$  means, with respect to any Calculation Day t, the Period-To-Date Component Performance for each Component i on Calculation Day t-1.

$\delta(t-1)$  is equal to 0 if Calculation Day t-1 is a Rebalancing Date, otherwise 1

$TBR_t$  means, with respect to Calculation Day t, the return associated with the T-Bill Rate on Calculation Day t, calculated using the following formula:

$$\left( \left( 1 - \frac{91}{360} \times TBILL_{t-1} \right)^{\frac{-1}{91}} \right) - 1$$

$TBILL_{t-1}$  means the T-Bill Rate on Calculation Day t-1 as defined in section 3 (*Definitions*) herein.

$A(t)$  means the number of calendar days that are not Calculation Days from (and excluding) Calculation Day t-1 to (and including) Calculation Day t.

$RAF_t$  means, with respect to Calculation Day t, the Replication Adjustment Factor, calculated by the Index Calculation Agent as follows:

$$RAF_t = 1 - \left( 1 - RAR \right)^{\frac{\text{CalendarDays}}{360}}$$

where:

$RAR$  is the Replication Adjustment Rate, if applicable.

$\text{CalendarDays}$  is the number of calendar days from, and including, the Rebalancing Date immediately preceding Calculation Day t to, but excluding, Calculation Day t.

## 5. Publication

With respect to each Calculation Day t, unless otherwise specified in the relevant Index Supplement, the Index Calculation Agent will endeavor to publish the Index Level(t) for each Calculation Day t before, at or around 12:00 p.m. noon London time on the following Calculation Day.

Although the Index Calculation Agent will endeavor to publish the Index Level even with respect to a Calculation Day that is a Disrupted Day, the Index Calculation Agent is not obligated to publish the Index Level with respect to any Calculation Day that is a Disrupted Day. The Index Level published with respect to any Calculation Day that is a Disrupted Day will be considered solely indicative and is not intended to provide information regarding “tradable levels”.

For the avoidance of doubt, the Index Calculation Agent will endeavor to publish an Index Level with respect to each Calculation Day, whether or not such Calculation Day is a Disrupted Day and generally will not revise such published Index Level once published. However, where the Index Level on subsequent Calculation Days depends on the Index Level on previous Calculation Days (*e.g.*, the Index Level on the previous Rebalancing Date), the Index Calculation Agent will apply an adjusted Index Level that is different from the published level. See Section 6 (*Market Disruption Events and the Calculation and Determination of the Index Level upon the Occurrence or Continuation of a Market Disruption Event*) to these Standard Terms.

The Index Level will be published on a Bloomberg page and the Bloomberg website at the pages indicated by the Index Ticker.

The Index Level shall be published to 4 decimal places.

Notwithstanding anything to the contrary, the Index Calculation Agent may calculate, but not publish the Index Level if the Index is used solely as a part of another Index or strategy, the index level or price of which is separately published by the Index Calculation Agent or one of its affiliates. For example, these Standard Terms and an accompanying Index Supplement will constitute the Index Rules for an Index, which may be used as a Component for another Index that incorporates these Standard Terms and has a separate Index Supplement.

For the avoidance of doubt, to the extent the Index is a stand-alone index, the Index Calculation Agent will publish such Index Level in accordance with the provisions herein.

6. *Market Disruption Events and the Calculation and Determination of the Index Level upon the Occurrence or Continuation of a Market Disruption Event*

6.1. Introduction

For any Index that is an excess return index, on each Calculation Day, if Calculation Day t is a Disrupted Day or if Rebalancing Day n-1 immediately preceding Calculation Day t was a Disrupted Day, the Index Calculation Agent will calculate the Index Level in accordance with this Section 6 (*Market Disruption Events and the Calculation and Determination of the Index Level upon the Occurrence or Continuation of a Market Disruption Event*).

For any Index that is a total return index, on each Calculation Day, if Calculation Day t (or any Calculation Days from and including Rebalancing Date n-1 to but excluding such Calculation Day t) is a Disrupted Day or if Rebalancing Day n-1 immediately preceding Calculation Day t was a Disrupted Day, the Index Calculation Agent will calculate the Adjusted Index Level in accordance with this Section 6 (*Market Disruption Events and the Calculation and Determination of the Index Level upon the Occurrence or Continuation of a Market Disruption Event*).

This Section 6 (*Market Disruption Events and the Calculation and Determination of the Index Level upon the Occurrence or Continuation of a Market Disruption Event*) of these Standard Terms sets forth alternative calculations for determining the Adjusted Index Level in the particular instances where a Market Disruption Event affects the Index Calculation Agent's determination of an Index Level.

The following section sets forth provisions relating to the calculation and publication of Adjusted Index Levels. In this description, the Index Calculation Agent ("we" or "us") endeavors to describe the manner in which we will calculate and/or publish the Adjusted Index Level on different dates. In order to best convey this information, the following description errs on the quantitative side, and before reading this description, we would like to highlight certain drafting points for you, the reader.

6.2 Use of Prepositions

References herein to levels calculated "with respect to a Calculation Day t" refer to levels that are calculated for such Calculation Day; however, such levels may not be calculated on that Calculation Day t. In order to denote that levels will be calculated on a day that may or may not be Calculation Day t, we refer to such levels as being calculated "as of" a Calculation Day. When we refer to the actual date on which we calculate levels, which is the "as of" date, we may refer to a Calculation Day s, where "s" is a notation that refers to any Calculation Day on or after Calculation Day t. In other words, if we refer to an "Adjusted Index Level with respect to Calculation Day t as of Calculation Day s" and Calculation Day t is Monday and Calculation Day s is Wednesday, then we are referring to the Adjusted Index Level for Monday that is calculated on Wednesday pursuant to this section 6. You should note that Calculation Day s is in most cases Calculation Day t; in other words, the Index Level (calculated pursuant to section 4) or Adjusted Index Level (calculated pursuant to this section 6) for Monday will be calculated on Monday if such day is not a Disrupted Day. The Adjusted Index Level with respect to Calculation Day t is only calculated on a Calculation Day s that is after Calculation Day t if Calculation Day t is a Disrupted Day.

6.3 Time Frame of Various Index Calculation Agent Determinations

The Index Calculation Agent will make determinations in three distinct time frames pursuant to this section 6.

First, the Index Calculation Agent will determine Adjusted U.S. Dollar Levels of Constituents, Adjusted Period-To-Date Component Performances and the Adjusted Index Level on the relevant Calculation Day  $t$  as of Calculation Day  $t$ . We refer to the Adjusted Index Level as of Calculation Day  $t$  as the “Initial Adjusted Level”. The Index Calculation Agent will publish such Initial Adjusted Level of the Index Level with respect to any Calculation Day  $t$  as of such Calculation Day  $t$ . An Initial Adjusted Level may or may not be a tradable price. An Initial Adjusted Level, even one with respect to a Calculation Day that is a Disrupted Day, may have an impact on tradable levels for future Calculation Days.

Second, the Index Calculation Agent will determine levels with respect to Calculation Day  $t$  as of each Calculation Day  $s$ , where Calculation Day  $t$  is a Disrupted Day and “ $s$ ” refers to each Calculation Day from and including Calculation Day  $t$ , *provided, however*, that Calculation Day  $s$  is a day that is no later than the earlier of (i) the first Calculation Day following Calculation Day  $t$  that is not a Disrupted Day or (ii) the sixth Calculation Day from and including Calculation Day  $t$ . We refer to levels determined in this manner as “Interim Adjusted Levels” because the Index Calculation Agent will determine such levels on Calculation Day  $s$ . Please note that the Initial Adjusted Level of the Index Level with respect to any Calculation Day  $t$  as of such Calculation Day  $t$  is the same as the Interim Adjusted Level with respect to Calculation Day  $t$  as of Calculation Day  $s$ , where Calculation Day  $s$  is a Disrupted Day and “ $s$ ” refers to Calculation Day  $t$ . Interim Adjusted Levels may have an impact on published prices for future Calculation Days. For example, if Calculation Day  $RD_{n-1}$  was a Disrupted Day (or, in the case of a total return index, for any Calculation Day from and including Calculation Day  $RD_{n-1}$  to but excluding Calculation Day  $t$  was a Disrupted Day), the Interim Adjusted Level of the Index will be used in the calculation of the Initial Adjusted Level on a subsequent Calculation Day  $t$  that is not a Disrupted Day (for an Index that is an excess return index, see the formula set forth in Step 3 herein under Section 6.6 (*Alternative Calculations upon a Market Disruption Event for Excess Return Indices*) where the Interim Adjusted Level of the Index with respect to Calculation Day  $RD_{n-1}$ , as of Calculation Day  $RD_{n-1}$ , is referred to as

$Index_{Adj, RD_{n-1}}(RD_{n-1})$  and for an Index that is a total return index see Section 6.7 (*Alternative Calculations upon a Market Disruption Events for Total Return Indices*).

Third, the Index Calculation Agent will determine levels with respect to Calculation Day  $t$  as of Calculation Day  $s$ , where Calculation Day  $s$  is the earlier of either (i) the first Calculation Day following Calculation Day  $t$  that is not a Disrupted Day and (ii) the sixth consecutive Calculation Day from and including Calculation Day  $t$  that is a Disrupted Day. We refer to this level as the “Final Adjusted Level”. In most cases, we would expect that Calculation Day  $t$  will not be a Disrupted Day and therefore the Initial Adjusted Level with respect to Calculation Day  $t$  and as of such Calculation Day  $t$  (which is the case when  $s$  equals  $t$ ) will be the Final Adjusted Level. Under these circumstances, the Initial Adjusted Level will be equal to the Final Adjusted Level, and there will be no other Interim Adjusted Level. Please note that if the immediately prior Rebalancing Day  $n-1$  was a Disrupted Day but Calculation Day  $t$  is not a Disrupted Day, the Initial Adjusted Level with respect to Calculation Day  $t$  will be equal to the Final Adjusted Level with respect to Calculation Day  $t$ . In other instances, where Calculation Day  $t$  is a Disrupted Day, the Index Calculation Agent will calculate the Interim Adjusted Level with respect to Calculation Day  $t$  for up to six consecutive Calculation Days. Where Calculation Day  $t$  is a Disrupted Day, the Final Adjusted Level will equal the Interim Adjusted Level with respect to Calculation Day  $t$  as of the last Calculation Day  $s$  used for determining such Interim Adjusted Level. Where Calculation Day  $t$  is a Disrupted Day, on the first Calculation Day  $s$  that is not a Disrupted Day following Calculation Day  $t$ , the Index Calculation Agent will determine the Final Adjusted Level with respect to Calculation Day  $t$  as of such Calculation Day  $s$  using the Final Adjusted U.S. Dollar Levels of each Constituent determined with respect to Calculation Day  $t$  as of the applicable Calculation Day  $s$  for each such Constituent; *provided, however*, that if each of the six consecutive Calculation Days from and including Calculation Day  $t$  is a Disrupted Day, the Index Calculation Agent will determine the Final Adjusted Level of the Index with respect to Calculation Day  $t$  as of such Calculation Day  $s$  using the Final Adjusted U.S. Dollar Level of that Constituent determined with respect to Calculation Day  $t$  as of the applicable Calculation Day  $s$  in good

faith and in a commercially reasonable manner on the sixth consecutive Disrupted Day from and including Calculation Day t. The Final Adjusted Level of the Index will be a tradable level because such level will generally be determined as of a Calculation Day that is not a Disrupted Day. Again, in most cases, the Final Adjusted Level will be the same as the Initial Adjusted Level with respect to any Calculation Day t because such Calculation Day t is not a Disrupted Day. For clarification, we used “Adjusted” in the term “Final Adjusted Level” because if Calculation Day RD n-1 is a Disrupted Day, such Final Adjusted Level may include an Interim Adjusted Level (see the immediately preceding paragraph and Step 3 of Section 6.6 (*Alternative Calculations upon a Market Disruption Event for Excess Return Indices*) to these Standard Terms for more information for an Index that is an excess return index and Section 6.7 (*Alternative Calculations upon a Market Disruption Event for Total Return Indices*) to these Standard Terms for more information for an Index that is a total return index).

#### 6.4 Adjusted U.S. Dollar Levels determined by the Index Calculation Agent

If Calculation Day t is a Disrupted Day, the Index Calculation Agent may adjust (a) the U.S. Dollar Level of a Constituent c of any Component i with respect to Calculation Day t as of Calculation Day s (an “Adjusted U.S. Dollar Level”), (b) the Period-To-Date Component Performance of any Component i with respect to Calculation Day t as of Calculation Day s (an “Adjusted Period-To-Date Component Performance”) and (c) the Index Level with respect to Calculation Day t as of Calculation Day s (an “Adjusted Index Level”). Determinations of these three items follow the formulas used to calculate the Index Level set forth in Section 4 (*Calculation and Determination of the Index Level*) of these Standard Terms; however, this Section supplements and modifies the formulas set forth in Section 4 (*Calculation and Determination of the Index Level*) of these Standard Terms (a) for any Calculation Day t that is a Disrupted Day (and, with respect to a total return index, for any Calculation Day from and including any Calculation Day RD n-1 to and including Calculation Day t that is a Disrupted Day) and (b) for any Calculation Day t if the immediately previous Calculation Day RDn-1 was a Disrupted Day. With respect to any Calculation Day t that is a Disrupted Day (and, with respect to a total return index, for any Calculation Day from and including any Calculation Day RD n-1 to and including Calculation Day t that is a Disrupted Day), the Index Calculation Agent will calculate Interim Adjusted Levels as of any Calculation Day s where “s” refers to any Calculation Day from and including Calculation Day t, *provided, however*, that Calculation Day s is a day that is not later than the earlier of (i) the first Calculation Day following Calculation Day t that is not a Disrupted Day and (ii) the sixth Calculation Day from and including Calculation Day t. As of each such Calculation Day s, the Index Calculation Agent will calculate the Adjusted U.S. Dollar Level, the Adjusted Period-To-Date Component Performance and the Adjusted Index Level. For the avoidance of doubt, such Calculation Day s refers to the Calculation Day s for each Component. For example, if our Index consisted of two Components (Component A and Component B) with two Constituents each (Constituent A1 and Constituent A2; and Constituent B1 and Constituent B2), (a) if Calculation Day t is not a Disrupted Day with respect to Component A, then Calculation Day t will be the same day as Calculation Day s for Component A and the Final Adjusted U.S. Dollar Level of Constituent A1 and Constituent A2 will be equal to the U.S. Dollar Level of Constituent A1 and Constituent A2 as of Calculation Day t, respectively, and (b) if Calculation Day t is a Disrupted Day with respect to Component B, the Adjusted U.S. Dollar Level of Constituent B1 and B2 will be determined as of Calculation Day t, the Index Calculation Agent will calculate Adjusted U.S. Dollar Levels as of consecutive Calculation Days from and including Calculation Day t, each of which will be a Calculation Day s, and then, on the first Calculation Day s that is the earlier of (a) the first Calculation Day following Calculation Day t that is not a Disrupted Day for Component B or (b) the sixth Calculation Day from and including Calculation Day t, the Index Calculation Agent will calculate (i) the Final Adjusted U.S. Dollar Levels of each Constituent within Component B with respect to Calculation Day t as of such Calculation Day s, (ii) the Adjusted Period-To-Date Component Performance of Component B with respect to Calculation Day t as of such Calculation Day s and (iii) the Adjusted Index Level with respect to Calculation Day t as of such Calculation Day s, which in each case will equal the Adjusted U.S. Dollar Level with respect to Calculation Day t as of the last Calculation Day s used for determining such Adjusted U.S. Dollar Level. The Calculation Day s on which the Final Adjusted U.S. Dollar Levels associated with Component A are calculated is not the same Calculation Day s on which the Final Adjusted U.S. Dollar Levels associated with Component B are calculated; however, all of such calculations are determined with respect to Calculation Day t.

#### 6.5 Disruption of Constituents with more than one Underlying Commodity

With respect to any Constituent *c* in which the Underlying Index consists of more than one commodity, if Calculation Day *t* is a Disrupted Day for any commodity represented in such Constituent *c*, the Index Calculation Agent may adjust (a) the U.S. Dollar Level of a Constituent *c* of any Component *i* with respect to Calculation Day *t* as of Calculation Day *s* (an “Adjusted U.S. Dollar Level”), (b) the Period-To-Date Component Performance of any Component *i* with respect to Calculation Day *t* as of Calculation Day *s* and (an “Adjusted Period-To-Date Component Performance”) (c) the Index Level with respect to Calculation Day *t* as of Calculation Day *s* (an “Adjusted Index Level”). With respect to any Calculation Day *t* that is a Disrupted Day, the Index Calculation Agent will calculate Adjusted U.S. Dollar Levels for such Constituent *c* as of any Calculation Day *s* where “*s*” refers to any Calculation Day from and including Calculation Day *t*, *provided, however*, that Calculation Day *s* is a day that falls on or before the earlier of (i) the first Calculation Day following Calculation Day *t* that is not a Disrupted Day and (ii) the sixth Calculation Day from and including Calculation Day *t*. As of each such Calculation Day *s*, the Index Calculation Agent will calculate the Adjusted U.S. Dollar Level of such Constituent *c* (as set forth below), the Adjusted Period-To-Date Component Performance for each Component *i* (applying such Adjusted U.S. Dollar Level for such Constituent *c*) and the Adjusted Index Level.

With respect to any Constituent *c* in which the Underlying Index consists of more than one commodity, if Calculation Day *t* is a Disrupted Day for any commodity represented in such Constituent *c*, the Index Calculation Agent will calculate the Adjusted U.S. Dollar Level of such Constituent *c* with respect to Calculation Day *t* as of Calculation Day *s* in a good faith and commercially reasonable manner and (a) if such Calculation Day *t* is not a Disrupted Day for the applicable commodity in such Constituent *c* (each, a “Non-Disrupted Commodity”), the Index Calculation Agent will use the official settlement price of the applicable futures contract(s) of each applicable Non-Disrupted Commodity on Calculation Day *t* as determined by the Index Calculation Agent in a good faith and commercially reasonable manner and (b) if such Calculation Day *t* is a Disrupted Day for the applicable commodity in such Constituent *c* (each, a “Disrupted Commodity”),

- if each Calculation Day from and including Calculation Day *t* to and including Calculation Day *s* is a Disrupted Day for such Disrupted Commodity, the Index Calculation Agent will use the official settlement price on Calculation Day *s*; *provided, however* that if the official settlement price for such Disrupted Commodity on Calculation Day *s* is unavailable, the Index Calculation Agent will determine such price in a good faith and commercially reasonable manner and
- otherwise, the Index Calculation Agent will use the official settlement price on the first Calculation Day from and including Calculation Day *t* to and including Calculation Day *s* that is not a Disrupted Day for such Disrupted Commodity; *provided, however* that if each Calculation Day *s* from and including Calculation Day *t* to and including Calculation Day *t*+5 is a Disrupted Day for such Disrupted Commodity, the Index Calculation Agent will determine such price in a good faith and commercially reasonable manner.

#### 6.6 Alternative Calculations upon a Market Disruption Event for Excess Return Indices

Alternative calculations upon a Market Disruption Event pursuant to this section 6 will be applied to the calculation of the Index Level (pursuant to Section 4) with respect to Calculation Day *t* in three different scenarios:

- (a) such Calculation Day *t* is a Disrupted Day and Calculation Day RD *n*-1 was not a Disrupted Day for at least one Constituent within the Index;
- (b) such Calculation Day *t* is a Disrupted Day and Calculation Day RD *n*-1 was a Disrupted Day for at least one Constituent within the Index; and
- (c) such Calculation Day *t* is not a Disrupted Day and Calculation Day RD *n*-1 was a Disrupted Day for at least one Constituent within the Index.

The Index Calculation Agent will apply the following alternative calculations of the Adjusted Index Level with respect to Calculation Day  $t$  if any of the scenarios set forth above have occurred. Additionally, if any preceding Rebalancing Date is a Disrupted Day, the Adjusted Index Level will be affected because the Adjusted Index Level with respect to any Calculation Day  $RD\ n-1$  will be determined with respect to Rebalancing Date  $n-2$ . In other words, the Adjusted Index Level with respect to any Calculation Day  $t$  is path dependent and will be impacted by the Adjusted Index Level with respect to every preceding Rebalancing Date.

*Application of Alternative Calculations and Calculation of the Adjusted Index Level*

If any of the three different scenarios above occur, the Index Calculation Agent will apply the following alternative calculations to the Adjusted Index Level with respect to Calculation Day  $t$ .

For the avoidance of doubt, if Calculation Day  $t$  is not a Disrupted Day and Calculation Day  $RD\ n-1$  is not a Disrupted Day, then the Index Level will be determined in accordance with the formulae set forth in Section 4 (Calculation and Determination of the Index Level) to these Standard Terms, and the formulae set forth in this Section 6 (*Market Disruption Events and the Calculation and Determination of the Index Level upon the Occurrence or Continuation of a Market Disruption Event*) to these Standard Terms shall not apply.

Step 1: Calculate the Adjusted U.S. Dollar Level of Constituent  $c$  with respect to Calculation Day  $t$  as of Calculation Day  $s$

If Calculation Day  $t$  is not a Disrupted Day with respect to a Component  $i$ , and a Constituent  $c$  is contained in Component  $i$ , then no alternative calculations are required for such Constituent and the Index Calculation Agent will apply the U.S. Dollar Level of such Constituent  $c$  with respect to Calculation Day  $t$  as of Calculation Day  $t$ . With respect to such Constituent  $c$ , the Adjusted U.S. Dollar Level will be equal to the U.S. Dollar Level for such Constituent  $c$ .

If Calculation Day  $t$  is a Disrupted Day with respect to a Component  $i$ , and a Constituent  $c$  is contained in Component  $i$ , the Index Calculation Agent will determine the Adjusted U.S. Dollar Level of Constituent  $c$ , which we refer to as  $Level_{Adj,s}^c(t)$ , with respect to Calculation Day  $t$  as of Calculation Day  $s$  (where Calculation Day  $s$  is not earlier than Calculation Day  $t$ ) as follows:

- if each Calculation Day from and including Calculation Day  $t$  to and including Calculation Day  $s$  is a Disrupted Day for Component  $i$  that contains Constituent  $c$ ,  $Level_{Adj,s}^c(t)$  is equal to the U.S. Dollar Level of Constituent  $c$  on Calculation Day  $s$ ; *provided, however* that if Calculation Day  $s$  is a Non-Publication Day for Constituent  $c$ , then such level will be equal to the U.S. Dollar Level of Constituent  $c$  on the latest Calculation Day preceding Calculation Day  $s$  that is not a Non-Publication Day for Constituent  $c$ ; and
- otherwise,  $Level_{Adj,s}^c(t)$  is equal to the U.S. Dollar Level of Constituent  $c$  on the first Calculation Day from and including Calculation Day  $t$  to and including Calculation Day  $s$  that is not a Disrupted Day for the Component  $i$  which contains Constituent  $c$ ;

*provided, however* that if each Calculation Day  $s$  from and including Calculation Day  $t$  to and including Calculation Day  $t+5$  is a Disrupted Day for the Component  $i$  which contains Constituent  $c$ , then the Index Calculation Agent will determine  $Level_{Adj,s}^c(t)$  for Calculation Day  $s$  occurring on Calculation Day  $t+5$  in good faith and in a commercially reasonable manner and such level determined by the Index Calculation Agent on Calculation Day  $t+5$  will be the Final Adjusted U.S. Dollar Level for Constituent  $c$  with respect to Calculation Day  $t$ , i.e.  $Level_{Adj,s}^c(t)$  will be equal to such value for each Calculation Day  $s$  occurring on or after  $t+5$ .

Step 1 will apply to the determination of the Adjusted Index Level with respect to any Calculation Day  $t$  that is a Disrupted Day or any Calculation Day  $t$  for which Calculation Day  $RD_{n-1}$  is a Disrupted Day. With respect to any Calculation Day that is a Calculation Day  $RD_{n-1}$ , the Adjusted U.S. Dollar Level for any Constituent  $c$  will be notated as  $Level_{Adj,s}^c(RD_{n-1})$  where such Adjusted U.S. Dollar Level is determined with respect to Calculation Day  $RD_{n-1}$  as of Calculation Day  $s$ .

To the extent that Component  $i$  consists of two Constituents, the Adjusted U.S. Dollar Level of the Constituent that is not affected by a Market Disrupted Event will be determined with respect to Calculation Day  $t$  as of Calculation Day  $s$ . In other words, if a Component  $i$  consists of two Constituents (for example, Constituent A1 and Constituent A2),  $Level_{Adj,s}^{A1}(t)$  and  $Level_{Adj,s}^{A2}(t)$  of Constituent A1 and Constituent A2, respectively, would be each determined as of Calculation Day  $s$  with respect to Calculation Day  $t$ , even if Constituent A2 considered separately was not disrupted on an earlier Calculation Day  $s$ .

For example, suppose that today (Monday) is Calculation Day  $t$ . The Index Calculation Agent would first seek to determine the Adjusted U.S. Dollar Level with respect to each Constituent, as of Calculation Day  $t$ . Suppose further that Monday is a Disrupted Day with respect to Constituent A1 which belongs to Component A (which also contains Constituent A2) but is not a Disrupted Day with respect to any other Constituent, including Constituent A2. To the extent that the Index contains Components other than Component A, the Index Calculation Agent would calculate the Adjusted U.S. Dollar Level for the Constituents of such Components as of such Calculation Day  $t$ , and the Adjusted U.S. Dollar Level for such Constituents would be the Final Adjusted U.S. Dollar Level. The Index Calculation Agent will also determine the Adjusted U.S. Dollar Levels for Constituent A1 and Constituent A2, and the Index Calculation Agent will calculate and publish an Index Level based on the Adjusted U.S. Dollar Level of all Constituents as of Calculation Day  $t$ . It should be noted that such Adjusted Index Level will not be tradable and that such level will not be adjusted after publication.

The Index Calculation Agent would then calculate the Adjusted U.S. Dollar Levels with respect to Constituent A1 and Constituent A2 on each subsequent Calculation Day  $s$ . These are the Adjusted U.S. Dollar Levels of Constituent A1 and Constituent A2 with respect to Calculation Day  $t$  as of Calculation Day  $s$ . On Tuesday, which is now Calculation Day  $s$ , the Index Calculation Agent would seek to determine the Final Adjusted U.S. Dollar Level of each such Constituent with respect to Calculation Day  $t$  (Monday); however, suppose Tuesday is a Disrupted Day with respect to Constituent A2. The level for the Constituents of Component A with respect to Calculation Day  $t$  (Monday) as of Calculation Day  $s$  (Tuesday) will be Adjusted U.S. Dollar Levels calculated as of Tuesday. On Wednesday, which is now Calculation Day  $s$ , the Index Calculation Agent will again seek to determine the Final Adjusted U.S. Dollar Level with respect to Calculation Day  $t$  (Monday). Wednesday is not a Disrupted Day for either Constituent A1 or Constituent A2, and therefore, the Adjusted U.S. Dollar Level of Constituent A1 and Constituent A2 will be determined as of such Calculation Day  $s$  (Wednesday) and such Final Adjusted U.S. Dollar Levels will be applied in determining the Final Adjusted Level of the Index with respect to Calculation Day  $t$ .

*Step 2: Calculation of the Adjusted Period-To-Date Component Performance with respect to Calculation Day  $t$  as of Calculation Day  $s$  for Component  $i$*

If neither Calculation Day  $t$  nor Calculation Day  $RD_{n-1}$  is a Disrupted Day with respect to any Constituent  $c$  of Component  $i$ , then no alternative calculations are required for calculating the Period-To-Date Component Performance and the Index Calculation Agent will calculate the Period-To-Date Component Performance in accordance with Section 4 (Calculation and Determination of the Index Level) to these Standard Terms using the U.S. Dollar Levels of each Constituent  $c$  with respect to Calculation Day  $t$  as of Calculation Day  $t$  and with respect to Calculation Day  $RD_{n-1}$  as of Calculation Day  $RD_{n-1}$  accordingly, and the formulae set forth in this Section 6 (*Market Disruption Events and the Calculation and Determination of the Index Level upon the Occurrence or Continuation of a Market Disruption Event*) to these Standard Terms shall not apply.



If Calculation Day  $t$  is a Disrupted Day with respect to any Constituent  $c$  of Component  $i$ , the Index Calculation Agent will determine the Adjusted Period-To-Date Component Performance, or  $PTDCP_{Adj,i,s}(t)$ , of Component  $i$  with respect to Calculation Day  $t$  as of Calculation Day  $s$ .

“ $PTDCP_{Adj,i,s}(t)$ ” means, with respect to Calculation Day  $t$  as of Calculation Day  $s$  for Component  $i$ , the Adjusted Period-To-Date Component Performance calculated in accordance with the formula set forth under Section 4.5 (Calculating the Period-To-Date Component Performance for each Component) to these Standard Terms *except* that:

- each reference to the U.S. Dollar Level of a Constituent  $c$  on Calculation Day  $t$  shall instead refer to  $Level_{Adj,s}^c(t)$ ;
- each reference to the U.S. Dollar Level of a Constituent  $c$  on Calculation Day  $RD_{n-1}$  shall instead refer to  $Level_{Adj,s}^c(RD_{n-1})$ .

Notwithstanding the foregoing, with respect to the calculation of the Short Constituent Leverage for any Component (if applicable) and the Index Leverage (if applicable) as determined in accordance with Section 4 (Calculation and Determination of the Index Level) to these Standard Terms, references to the U.S.

Dollar Level of Constituent  $c$  on Calculation Day  $t$  shall instead refer to  $Level_{Adj,t}^c(t)$ , which is equal to the U.S. Dollar Level of Constituent  $c$  on Calculation Day  $t$  except that if such day is a Non-Publication Day for Constituent  $c$ ,  $Level_{Adj,t}^c(t)$  will be equal to the U.S. Dollar Level of such Constituent on the latest Calculation Day preceding Calculation Day  $t$  for which a U.S. Dollar Level of such Constituent  $c$  is available.

Step 2 will apply to the determination of the Adjusted Period-To-Date Component Performance with respect to any Component  $i$  and any Calculation Day  $t$  that is a Disrupted Day for Component  $i$ , or any Calculation Day  $t$  for which Calculation Day  $RD_{n-1}$  is a Disrupted Day for Component  $i$ . With respect to any Calculation Day  $t$  that is a Calculation Day  $RD_{n-1}$ , the Adjusted Period-To-Date Component Performance for any Component  $i$  will be notated as  $PTDCP_{Adj,i,s}(RD_{n-1})$  where such Adjusted Period-To-Date Component Performance is determined with respect to Calculation Day  $RD_{n-1}$  as of Calculation Day  $s$ .

### Step 3: Calculation of the Adjusted Index Level with respect to Calculation Day $t$ as of Calculation Day $s$

If neither Calculation Day  $t$  nor Calculation Day  $RD_{n-1}$  is a Disrupted Day with respect to any Constituent, then no alternative calculations are required and the Index Calculation Agent will calculate the Index Level in accordance with Section 4 (Calculation and Determination of the Index Level) to these Standard Terms using the U.S. Dollar Levels of each Constituent with respect to Calculation Day  $t$  and/or Calculation Day  $RD_{n-1}$  as applicable, and the formulae set forth in this Section 6 (*Market Disruption Events and the Calculation and Determination of the Index Level upon the Occurrence or Continuation of a Market Disruption Event*) to these Standard Terms shall not apply. The Index Calculation Agent will calculate and publish the Index Level with respect to Calculation Day  $t$  as of Calculation Day  $s$ , and this will be a tradable level.

If Calculation Day  $t$  (or Rebalancing Date  $n-1$ ) is a Disrupted Day with respect to a Constituent  $c$  of Component  $i$ , the Index Calculation Agent will calculate the Adjusted Index Level with respect to such Calculation Day  $t$  as of each Calculation Day  $s$ , applying the alternative calculations set forth in Steps 1 and 2 above to the following formula:

$$Index_{Adj,s}(t) = \left[ Index_{Adj,s}(RD_{n-1}) + Index_{Adj, RD_{n-1}}(RD_{n-1}) \times IndexLeverage(RD_{n-1}) \times \sum_{i=1}^{NS} W_i \times PTDCP_{Adj,i,s}(t) \right] \times (1 - RAF_t)$$

where

“ $Index_{Adj,s}(t)$ ” means, with respect to Calculation Day t as of Calculation Day s, the “Adjusted Index Level” with respect to Calculation Day t as of Calculation Day s;

“ $Index_{Adj,s}(RD_{n-1})$ ” means, with respect to Calculation Day RD n-1 as of Calculation Day s, the Adjusted Index Level with respect to Calculation Day RD n-1 as of Calculation Day s. For the avoidance of doubt,  $Index_{Adj,s}(RD_{n-1})$  may continue to change for as many as 5 Calculation Days following the Rebalancing Date RD<sub>n-1</sub>, in the case that on Calculation Day s there is a Market Disruption Event that is relevant to a Constituent of the Index connected with the rebalancing of the Index on Calculation Day RD<sub>n-1</sub>;

“ $Index_{Adj,RD_{n-1}}(RD_{n-1})$ ” means, with respect to Calculation Day RD n-1, the Index Level (calculated pursuant to Section 4) or Adjusted Index Level (calculated pursuant to this Section 6) determined as of Calculation Day RD n-1. For the avoidance of doubt, such Index Level or Adjusted Index Level (as applicable) will not be adjusted subsequently on any Calculation Day s and will be calculated with unadjusted U.S. Dollar Levels for any Constituent c with respect to Calculation Day RD n-1 in the Index; *provided, however* that if such Rebalancing Date is a Non-Publication Day for any Constituent c, such level will be calculated using the  $Level^c_{Adj,RD_{n-1}}(RD_{n-1})$ , which is equal to the U.S. Dollar Level of Constituent c on the latest Calculation Day preceding Calculation Day RD n-1 for which a U.S. Dollar Level of such Constituent c is available;

“ $IndexLeverage(RD_{n-1})$ ” will be determined in accordance with the formula set forth in Section 4 (Calculation and Determination of the Index Level) to these Standard Terms; *provided, however* that references to the U.S. Dollar Level of Constituent c on Calculation Day t shall mean  $Level^c_{Adj,t}(t)$ , which is equal to the U.S. Dollar Level of Constituent c on Calculation Day t, except that if such day is a Non-Publication Day for Constituent c,  $Level^c_{Adj,t}(t)$  will be equal to the U.S. Dollar Level of such Constituent on the latest Calculation Day preceding Calculation Day t for which a U.S. Dollar Level of such Constituent c is available.

“ $PTDCP_{Adj,i,s}(t)$ ” will have the meaning set forth in Step 2 of this Section 6 (*Market Disruption Events and the Calculation and Determination of the Index Level upon the Occurrence or Continuation of a Market Disruption Event*) to these Standard Terms.

Upon request, the Index Calculation Agent will make available the Final Adjusted Level for such Index as such Final Adjusted Level is applicable to any Calculation Day t.

#### 6.7 Alternative Calculations upon a Market Disruption Events for Total Return Indices

For any Index that is a total return index, if a Market Disruption Event has occurred on any Calculation Day from and including Calculation Day RD<sub>n-1</sub> through and including Calculation Day t (the “Calculation Period”), the Index Level for such total return index will be calculated in accordance with this Section 6.7.

If any Calculation Day in the Calculation Period is a Disrupted Day, the Index Calculation Agent will determine the Adjusted U.S. Dollar Level of any Constituent c, which we refer to as  $Level^c_{Adj,t}(t)$ , with respect to such Calculation Day as of such Calculation Day. For example, if a Market Disruption Event has occurred or is continuing with respect to Constituent c, the Index Calculation Agent will use the disrupted level of such Constituent c on such Calculation Day without regard to any postponement. With respect to each Calculation Day in the Calculation Period that is a Disrupted Day, the Index Calculation Agent will apply that  $Level^c_{Adj,t}(t)$  in the calculation of the Adjusted Index Level as of Calculation Day t for each

Calculation Day in the Calculation Period that is a Disrupted Day. In other words, the Adjusted Index Level as of Calculation Day  $t$  is path dependent relative to each Calculation Day in the Calculation Period and the Index Calculation Agent will apply an Adjusted U.S. Dollar Level for any Constituent  $c$  (i.e.,  $Level_{Adj,t}^c(t)$ ) to determine an Adjusted Index Level on which to apply the T-Bill Return.

If Calculation Day  $t$  is a Disrupted Day with respect to a Component  $i$ , and a Constituent  $c$  is contained in Component  $i$ , the Index Calculation Agent will determine the Adjusted U.S. Dollar Level of Constituent  $c$ , which we refer to as  $Level_{Adj,s}^c(t)$ , with respect to Calculation Day  $t$  as of Calculation Day  $s$  (where Calculation Day  $s$  is not earlier than Calculation Day  $t$ ) as follows:

- if each Calculation Day from and including Calculation Day  $t$  to and including Calculation Day  $s$  is a Disrupted Day for Component  $i$  that contains Constituent  $c$ ,  $Level_{Adj,s}^c(t)$  is equal to the U.S. Dollar Level of Constituent  $c$  on Calculation Day  $s$ ; and
- otherwise,  $Level_{Adj,s}^c(t)$  is equal to the U.S. Dollar Level of Constituent  $c$  on the first Calculation Day from and including Calculation Day  $t$  to and including Calculation Day  $s$  that is not a Disrupted Day for the Component  $i$  which contains Constituent  $c$ ;

provided, however that if each Calculation Day  $s$  from and including Calculation Day  $t$  to and including Calculation Day  $t+5$  is a Disrupted Day for the Component  $i$  which contains Constituent  $c$ , then the Index Calculation Agent will determine  $Level_{Adj,s}^c(t)$  for Calculation Day  $s$  occurring on Calculation Day  $t+5$  in good faith and in a commercially reasonable manner and such level determined by the Index Calculation Agent on Calculation Day  $t+5$  will be the Final Adjusted U.S. Dollar Level for Constituent  $c$  with respect to Calculation Day  $t$ , i.e.  $Level_{Adj,s}^c(t)$  will be equal to such value for each Calculation Day  $s$  occurring on or after  $t+5$ .

Based on the calculations above, the Adjusted Index Level will be determined on each Calculation Day  $t$  as of Calculation Day  $s$  as follows:

$$IndexTR_{Adj,s}(t) = IndexTR_{Adj,t-1}(t-1) \times \left[ \frac{\left[ 1 + IndexLeverage(RD_{n-1}) \times \sum_{i=1}^{NS} (W_i \times PTDCP_{Adj,t,s}(t)) \right]}{\left[ 1 + IndexLeverage(RD_{n-1}) \times \sum_{i=1}^{NS} (W_i \times \delta(t-1) \times PTDCP_{Adj,t,s}(t-1)) \right]} + TBR_t \right] \times (1 + TBR_t)^{d(t)} \times (1 - RAF_t)$$

where

“ $IndexTR_{Adj,s}(t)$ ” means, with respect to Calculation Day  $t$ , the Adjusted Index Level with respect to Calculation Day  $t$  as determined by the Index Calculation Agent as of Calculation Day  $s$ ;

“ $IndexTR_{Adj,t-1}(t-1)$ ” means, with respect to Calculation Day  $t$ , the Index level (calculated pursuant to Section 4) or Adjusted Index Level (calculated pursuant to this Section 6) on Calculation Day  $t-1$ , as applicable, for such total return index determined by the Index Calculation Agent by applying  $Level_{Adj,t}^c(t)$  for each Constituent  $c$  as determined on Calculation Day  $t-1$  as of Calculation Day  $t-1$ , regardless of whether such Calculation Day  $t$  is a Disrupted Day;

“ $IndexLeverage(RD_{n-1})$ ” will be determined in accordance with the formula set forth in Section 4 (Calculation and Determination of the Index Level) to these Standard Terms; provided, however that references to the U.S. Dollar Level of Constituent  $c$  on Calculation Day  $t$  shall mean  $Level_{Adj,t}^c(t)$ , which is equal to the U.S. Dollar Level of Constituent  $c$  on Calculation Day  $t$ , except that if such day is a Non-Publication Day for Constituent  $c$ ,  $Level_{Adj,t}^c(t)$  will be equal to the U.S. Dollar Level of such Constituent

on the latest Calculation Day preceding Calculation Day  $t$  for which a U.S. Dollar Level of such Constituent  $c$  is available.

“ $PTDCP_{Adj,i,s}(t)$ ” means, with respect to Calculation Day  $t$ , the Adjusted Period-To-Date Component Performance for each Component  $i$  as determined with respect to Calculation Day  $t$  as of Calculation Day  $s$  as determined in accordance with Section 4.5 (*Calculating the Period-To-Date Component Performance for each Component*) to these Standard Terms, except that the Index Calculation Agent will determine such value by reference to  $Level_{Adj,s}^c(t)$  for each Constituent  $c$  as determined with respect to Calculation Day  $t$  as of Calculation Day  $s$ .

“ $PTDCP_{Adj,i,s}(t-1)$ ” means, with respect to Calculation Day  $t$ , the Adjusted Period-To-Date Component Performance for each Component  $i$  as determined with respect to Calculation Day  $t-1$  as of Calculation Day  $s$  as determined in accordance with Section 4.5 (*Calculating the Period-To-Date Component Performance for each Component*) to these Standard Terms, except that the Index Calculation Agent will determine such value by reference to  $Level_{Adj,s}^c(t-1)$  for each Constituent  $c$  as determined with respect to Calculation Day  $t-1$  as of Calculation Day  $s$ .

$\delta(t-1)$  is equal to 0 if Calculation Day  $t-1$  is a Rebalancing Date, otherwise 1

Upon Request, the Index Calculation Agent will make available the Final Adjusted Level for such Index as such Final Adjusted Level is applicable to any Calculation Day  $t$ .

#### 6.8 Publication

The level of the Index Level calculated and published by the Index Calculation Agent with respect to each Calculation Day  $t$  shall be  $Index_{Adj,t}(t)$  or  $IndexTR_{Adj,t}(t)$ , as applicable, that is the Initial Adjusted Level for the Index, which agrees with the calculation of  $Index(t)$  as defined in Section 4 (*Calculation and Determination of the Index Level*) to these Standard Terms in the circumstances described in the paragraph immediately above.

#### 6.9 Tradable Level

The tradable level of the Index Level with respect to each Calculation Day  $t$  shall be  $Index_{Adj,s}(t)$  or  $IndexTR_{Adj,s}(t)$  as of Calculation Day  $s$ ; *provided* that this level is the Final Adjusted Level of the Index Level with respect to Calculation Day  $t$  (where in any case Calculation Day  $s$  shall be no later than  $t+5$ ).

#### 6.10 T-Bill Rate

The following actions will be taken by the Index Calculation Agent following any abnormalities in the publication of the T-Bill Rate, only if a Total Return Index is defined and published by the Index Calculation Agent as specified in the Index Supplement.

If, with respect to a Calculation Day, such rate for such date does not appear on Bloomberg® ticker USB3MTA (or any official successor page thereto), the rate for that date will be the Bond Equivalent Yield of the rate displayed in H.15 Daily Update, currently <http://www.federalreserve.gov/releases/h15/update/>, (or any official successor page thereto), or such other recognized electronic source used for the purpose of displaying such 3-month T-bill rate for that day under the caption "U.S. Government Securities/Treasury bills/Auction high" converted by the Index Calculation Agent in a commercially reasonable manner to bank discount basis such that it is expressed in the same manner as the T-Bill Auction High Rate.

If such rate for such date does not appear on Bloomberg® ticker USB3MTA (or any official successor page thereto) and such 3-month rate is not displayed in the H.15 Daily Update under the caption "U.S. Government securities/Treasury bills/Auction high" or another recognized electronic source, the rate for that date will be the Bond Equivalent Yield of the auction rate for those Treasury Bills as announced by the United States Department of Treasury, converted by the Index Calculation Agent in a commercially reasonable manner to bank discount basis such that it is expressed in the same manner as the T-Bill Auction High Rate.

If the rate for United States 3-month Treasury Bills is still not available, the rate will be determined by Calculation Agent in good faith and in a commercially reasonable manner.

## 7. Extraordinary Events

### 7.1. Successor Constituent

If any Constituent is (a) not calculated and announced by the Index Sponsor but is calculated and announced by a successor sponsor acceptable to the Index Calculation Agent, or (b) replaced by a successor index using, in the determination of the Index Calculation Agent, the same or substantially similar formula for and method of calculation as used in the calculation of such Constituent, then such index will be deemed to be the index so calculated and announced by that successor index sponsor or that successor index, as the case may be.

### 7.2. Material Change in the Method or Formula of Calculating a Constituent

If on or prior to any Calculation Day on which the Index Calculation Agent is determining the Index Level of the Index, the Index Sponsor makes a material change in the formula for or the method of calculating a relevant Constituent (other than a modification prescribed in that formula or method to maintain such index in the Constituent or prescribed routine events) which affects the ability of the Index Calculation Agent to calculate the Index Level, then the Index Calculation Agent shall, in good faith, make such adjustment(s) that it determines to be appropriate to any variable, calculation, methodology or detail in the relevant Index Supplement or any other rule or input in relation to the Index to account for such modification.

### 7.3. Non-Publication of the Constituent as a result of Cancellation of a Constituent

On or prior to any Calculation Day on which the Index Calculation Agent is determining the Index Level of the Index, if an Index Sponsor permanently cancels the relevant Constituent, and no successor index exists, the Index Calculation Agent shall, in good faith, either:

- (a) continue to calculate the Index Level of the relevant Index using the latest terms specified in the Index Supplement at the time the Constituent was cancelled; or
- (b) make such adjustment(s) that it determines to be appropriate to any variable, calculation, methodology, valuation terms or any other rule in relation to the relevant Index to account for such cancellation, including but not limited to excluding or substituting a relevant Constituent.

### 7.4. Change in Law Event

Without prejudice to the ability of the Index Calculation Agent to amend the Index Rules (see Section 8 herein), the Index Calculation Agent may, acting in good faith and in a commercially reasonable manner:

- (a) exclude; or
- (b) substitute,

any Constituent following the occurrence (and/or continuation) of a Change in Law or in circumstances where it considers it reasonably necessary to do so to reflect the intention of the Index, including (without prejudice to the generality of the foregoing) any perception among market participants generally that the published price of the relevant Constituent is inaccurate (and the Relevant Exchange fails to correct such level of the underlying futures contract or Index Sponsor fails to correct such level of the Underlying Index), and if it so excludes or substitutes any Constituent, then the Index Calculation Agent may adjust the Index Rules as it determines in good faith to be appropriate to account for such exclusion or substitution on such date(s) selected by the Index Calculation Agent. The Index Calculation Agent is under no obligation to continue the calculation and publication of any Index upon the occurrence or existence of a Change in Law; and the Index Calculation Agent may decide to cancel any Index if it determines, acting in good faith, that the objective of the relevant Index can no longer be achieved.

#### 7.5. Cancellation of an Index License relating to a Constituent

With respect to any Index, if, at any time, the license granted to the Index Calculation Agent (or its affiliates) to use any Constituent for the purposes of the Index terminates, or the Index Calculation Agent's rights to use any Constituent for the purpose of the Index is otherwise disputed, impaired or ceases (for any reason), the Index Calculation Agent may (a) remove such Constituent from the Index or (b) replace such Constituent with a successor Constituent that is the same or substantially similar and may make such adjustments to these Standard Terms and the relevant Index Supplement, each as it determines in good faith to be appropriate to account for such event on such dates as selected by the Index Calculation Agent.

### 8. Additional Terms

#### 8.1. Amendments

These Standard Terms may be amended from time to time at the discretion of the Index Calculation Agent and will be re-published (in a manner determined by the Index Calculation Agent from time to time) no later than thirty (30) calendar days following such amendment.

The Standard Terms, when read together with the relevant Index Supplement, are intended to be comprehensive; however, ambiguities may arise. If an ambiguity does arise, the Index Calculation Agent will resolve such ambiguities and, if necessary, amend the Standard Terms or the Index Supplement, as applicable, to reflect such resolution.

#### 8.2. Not An Offer to Sell or Solicitation to Buy Securities

These Standard Terms, together with the relevant Index Supplement, do not constitute either an offer to sell or a solicitation to buy securities. Any such offer to sell or solicitation to buy securities in the relevant jurisdiction in which such securities are being offered or purchased will be accompanied by an offering document that is prepared with respect to that jurisdiction's laws and regulation.

#### 8.3. No Investment Advice and No Fiduciary Duty

The Index Calculation Agent and its affiliates, officers, agents or employees (a) have not rendered legal, regulatory, investment, tax, accounting or other advice to an investor in relation to any product that is linked to or references an Index and (b) are not fiduciaries under applicable law governing such product or in the jurisdiction in which any investor purchases a product that is linked to or references an Index. Each investor should make its own investment decision based on its own judgment and on its own examination of the relevant Index and the applicable product, and each investor should consult its own legal, regulatory, investment, tax, accounting and other professional advisers as it deems necessary in connection with the relevant transaction.

8.4. Index Calculation Agent; Index Calculation Standards and Index Calculation Determinations

Unless otherwise specified in the relevant Index Supplement, J.P. Morgan Securities Ltd. or any affiliate or subsidiary designated by it will act as calculation agent in connection with each Index.

The Index Calculation Agent shall act in good faith and in a commercially reasonable manner with respect to determinations made by it pursuant to the Index Rules for an Index.

All determinations of the Index Calculation Agent pursuant to these Standard Terms and the Index Supplement for an Index and interpretation of these Standard Terms and the Index Supplement will be final, conclusive and binding and no person shall be entitled to make any claim against the Index Calculation Agent or any of the Relevant Persons in respect thereof. Neither the Index Calculation Agent nor any Relevant Person shall:

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

8.5. Index Corrections

With respect to any Index,

- (a) if the level of a Constituent, variable or other input that is used for any calculation relevant to the Index Level for any Calculation Day is subsequently corrected and the correction is published by the relevant Index Sponsor or relevant publication source; or
- (b) if the Index Calculation Agent identifies an error or omission in any of its calculations or determinations with respect to the Index for any Calculation Day,

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

8.6. *Index Cancellation*

If the Index Calculation Agent determines that any adjustment that can be made with respect to any Extraordinary Event (see Section 7 herein) cannot or would not produce a commercially reasonable result, then the Index Calculation Agent may cease calculating and publishing the Index from the date of such determination by the Index Calculation Agent.

9. Disclaimer and Conflicts of Interest

The following disclaimer and disclosure relating to our conflicts of interests applies to each Index that reference these Standard Terms. References herein apply to each Index that is described in the relevant Index Supplement, which incorporates the terms set forth herein.

The information contained in these Standard Terms and the relevant Index Supplement (together, the “Index Rules”) is accurate as of the date specified in the relevant Index Supplement (and may change at any time without prior notice), and neither JPMSL nor any of its affiliates or subsidiaries or their respective directors, officers, employees, representatives, delegates or agents (each a “Relevant Person”) is under any obligation to update such information. These Index Rules have been prepared by JPMSL, and are not a

product of JPMorgan's research departments. Opinions expressed herein may differ from the opinions expressed by other areas of JPMorgan, including its research departments.

None of the Relevant Persons makes any representation or warranty, whatsoever, express or implied, as to the results that may be obtained through use of these Index Rules or through an investment linked to an Index described herein and in the relevant Index Supplement. Each Relevant Person hereby expressly disclaims, to the fullest extent permitted by law, all warranties of accuracy, completeness, merchantability, or fitness for a particular purpose with respect to any information contained in this document and no Relevant Person shall have any liability (direct or indirect, punitive consequential or otherwise) to any person even if notified of the possibility of any such damages.

During the course of their normal business, any Relevant Person may enter into or promote, offer or sell financial instruments or investments (structured or otherwise) linked to the Index, commodities generally or the commodity indices referenced in the Index. In addition, any Relevant Person may have, or may have had, interests or positions, or may buy, sell or otherwise trade positions in or relating to the Index, commodities generally or commodity indices referenced therein, or related derivatives, or may invest or engage in transactions with other persons, or on behalf of such persons, relating to the Index, commodities generally or commodity indices. Such activity may have an adverse impact on the liquidity of the commodity markets and on the spot prices, forward rates, futures prices and index values referenced by the Index. In some cases, these activities and transactions may have an adverse affect on the performance of the Index. None of the Relevant Persons have any duty to consider the circumstances of any person when participating in such transactions or to conduct themselves in a manner that is favourable to anyone with exposure to the Index.

The Index Rules have been developed with the possibility of the Index Calculation Agent or any of the Relevant Persons entering into or promoting, offering or selling transactions or investments (structured or otherwise) linked to the Indices, and hedging the obligations that might arise under any such transactions or investments. These Index Rules are not intended as a recommendation, offer or solicitation for (i) the purchase or sales of any security or financial instrument or (ii) participation in any transaction. These Index Rules should not be used to evaluate the advantages and disadvantages of any security or financial instrument linked to the Index or otherwise participating in any transaction referencing the Index. Such evaluation should be made solely on the basis of the information contained in the relevant terms supplement, product supplement, term sheet, offering memorandum, private placement memorandum or prospectus (collectively, each an "Offering Documents") when available. Those Offering Documents will contains the terms of any security 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, including this strategy guide. All persons should conduct their own investigations and consult with their own professional advisors when evaluating these Index Rules and the Index without reliance on any Relevant Person. None of the Relevant Persons is a fiduciary or advisor to any person interested in obtaining exposure to the Index.

The Index Calculation Agent or any of its affiliates or any of the Relevant Persons may publish research, express opinions or provide recommendations (for example, with respect to the commodities or indices that may be included in the Index) that are inconsistent with investing in instruments linked to the Index, and which may be revised at any time. Any such research, opinions or recommendations may or may not recommend that investors buy or hold the relevant commodities or indices and could affect the value and or performance of the Index or of instruments linked to the Index.

The Index represents a portfolio of various potential commodity indices or commodity exchange traded futures contracts, with each commodity index or commodity exchange traded futures contract providing exposure to a specific commodity. The Index has a limited operating history and any hypothetical performance history of the strategy merely identifies certain hypothetical trading positions, the performance of which do not provide a basis for evaluating or anticipating the future performance of the Index.



## **The Index Disclaimer**

Neither J.P. Morgan Securities Ltd. (“JPMSL” and, in its capacity as calculation agent for the Index, the “Index Calculation Agent”) nor any of its Relevant Persons make any representation or warranty, whatsoever, express or implied, as to the results that may be obtained through the use of these Index Rules or the relevant Index strategy. Each Relevant Person hereby expressly disclaims all warranties of accuracy, completeness, merchantability, or fitness for a particular purpose with respect to any information contained in these Index Rules and no Relevant Person shall have any liability (direct or indirect, special, punitive consequential or otherwise) to any person even if notified of the possibility of any such damages.

The Index Calculation Agent is under no obligation to continue the calculation, publication and dissemination of the Index, or of any indices or strategies that may be potential components of the Index. The Index Calculation Agent need not publish the index level(s), Index Level(s) or similar information related to the Index if the relevant Bloomberg ticker (as identified in the relevant Index Supplement) is subject to any delay in or interruptions of publication for any reason including the occurrence of an Extraordinary Event (as defined herein).

No one may reproduce or disseminate the information contained in these Index Rules without the prior written consent of the Index Calculation Agent. These Index Rules are not intended for distribution to, or use by, any person in a jurisdiction where such distribution is prohibited by law or regulation.

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