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To the prospectus dated April 13, 2023 and
the prospectus supplement dated April 13, 2023

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JPMORGAN CHASE & CO.

Notes Linked to the J.P. Morgan Efficiente® Plus Index Series

JPMORGAN CHASE FINANCIAL COMPANY LLC

Notes, Fully and Unconditionally Guaranteed by JPMorgan Chase & Co., Linked to the J.P. Morgan Efficiente® Plus Index Series

Each of JPMorgan Chase & Co. and JPMorgan Chase Financial Company LLC may, from time to time, offer and sell notes linked in whole or in part to an index in the J.P. Morgan Efficiente® Plus Index Series listed below (each, an “**Index**” and collectively the “**Indices**”):

- J.P. Morgan Efficiente® Plus 5 Index (Net ER)
- J.P. Morgan Efficiente® Plus DS 5 Index (Net ER)
- J.P. Morgan Efficiente® Plus DS 8 Index (Net ER)

The issuer of the notes, as specified in the relevant terms supplement, is referred to in this underlying supplement as the “**Issuer**.” The Issuer will be either JPMorgan Chase & Co. or JPMorgan Chase Financial Company LLC. For notes issued by JPMorgan Chase Financial Company LLC, JPMorgan Chase & Co., in its capacity as guarantor of those notes, is referred to in this product supplement as the “**Guarantor**.”

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

Each Index is subject to a 0.85% per annum deduction and a notional financing cost, in each case, deducted daily.

Investing in the notes involves a number of risks. See “Risk Factors” beginning on page S-2 of the prospectus supplement, “Risk Factors” in the accompanying product supplement and “Risk Factors” beginning on page US-7 of this underlying supplement.

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

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

J.P.Morgan

April 13, 2023

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

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

In this underlying supplement, “we,” “us” and “our” refer to the Issuer, unless the context requires otherwise, and “JPMorgan Financial” refers to JPMorgan Chase Financial Company LLC. To the extent applicable, each index described in this underlying supplement is deemed to be one of the “Indices” referred to in the accompanying product supplement.

SUMMARY

Each index in the J.P. Morgan Efficiente® Plus Index Series set forth in the table below (each, an “**Index**” and collectively the “**Indices**”) was developed and is maintained and calculated by J.P. Morgan Securities LLC (“**JPMS**”). The description of the Indices and their methodology included in this underlying supplement is based on rules formulated by JPMS (the “**Rules**”). The Rules, and not this description, will govern the calculation and constitution of the Indices and other decisions and actions related to their maintenance. The Rules in effect as of the date of this underlying supplement are attached as Annex A to this underlying supplement. Each Index is the intellectual property of JPMS, and JPMS reserves all rights with respect to its ownership of each Index. Each Index is reported by Bloomberg L.P. (“**Bloomberg**”) under the applicable ticker symbol set forth in the table below. Each Index for which the “Daily Series Applicability” in the table below is specified as “Applicable” is a “**Daily Series Index**.”

Index	Bloomberg Ticker	Volatility Threshold	Daily Series Applicability
J.P. Morgan Efficiente® Plus 5 Index (Net ER)	EFPLUS5E	5%	N/A
J.P. Morgan Efficiente® Plus DS 5 Index (Net ER)	EFPLUS5D	5%	Applicable
J.P. Morgan Efficiente® Plus DS 8 Index (Net ER)	EFPLUS8D	8%	Applicable

Each Index seeks to provide a dynamic and diversified asset allocation based on modern portfolio theory. Each Index tracks the return of (a) a notional dynamic portfolio consisting of up to 20 exchange-traded funds (each an “**ETF Constituent**,” and collectively the “**ETF Constituents**”), in each case with distributions, if any, notionally reinvested, and the J.P. Morgan Fallback Cash Index (including any successor or substitute cash index included in an Index, the “**Cash Constituent**”), less (b) the daily deduction of a notional financing cost and a daily deduction of 0.85% per annum. The ETF Constituents and the Cash Constituent are referred to together as the “**Basket Constituents**.” The ETF Constituents represent a diverse range of asset classes and geographic regions.

Each Index selects and rebalances into a new notional portfolio composed of the Basket Constituents each month using a methodology that is designed to:

- maintain a diversified allocation at all times;
- allocate dynamically based on the market cycle; and
- select allocations that attempt to deliver a stable volatility over time.

Maintaining a diversified allocation. A diversified portfolio’s return is the weighted average of its Basket Constituents’ returns, but its volatility is less than the weighted average of its Basket Constituents’ volatilities, because different assets don’t always move in the same direction — in this sense, a diversified portfolio can be said to deliver average returns with below-average volatility. In order to ensure diversification, each Index selects its monthly portfolio from a universe of 20 ETF Constituents and the Cash Constituent, and imposes caps and floors on the Basket Constituent weights at the individual and sector levels. Each Basket Constituent’s assigned weight must also be an increment of 5%, and the assigned weights must sum to 100%. The following table sets forth the current Basket Constituents, the Bloomberg ticker for each Basket Constituent, the maximum assigned weight for each Basket Constituent and the maximum and minimum aggregate assigned weight for each sector. For additional information about the Basket Constituents, see “Background on the ETF Constituents” and “Background on the Cash Constituent” below.

	Basket Constituent	Bloomberg Ticker	Maximum Assigned Weight ¹	Maximum Aggregate Assigned Weight ¹
1	Vanguard S&P 500 ETF	VOO	20%	Equities Sector: 50%
2	Vanguard Small-Cap ETF	VB	10%	
3	Vanguard FTSE Developed Markets ETF	VEA	20%	
4	iShares® MSCI EAFE Small-Cap ETF	SCZ	10%	
5	Vanguard FTSE Emerging Markets ETF	VWO	20%	
6	iShares® 20+ Year Treasury Bond ETF	TLT	20%	Investment Grade Fixed-Income Sector: 50% ²
7	iShares® 7-10 Year Treasury Bond ETF	IEF	20%	
8	iShares® iBoxx® \$ Investment Grade Corporate Bond ETF	LQD	20%	
9	iShares® TIPS Bond ETF	TIP	10%	
10	Vanguard Short-Term Corporate Bond ETF	VCSH	10%	
11	SPDR® Bloomberg High Yield Bond ETF	JNK	20%	Other Fixed-Income Sector: 50%
12	PIMCO 0-5 Year High Yield Corporate Bond Index ETF	HYS	10%	
13	Invesco Senior Loan ETF	BKLN	10%	
14	iShares® Preferred and Income Securities ETF	PFF	10%	
15	iShares® J.P. Morgan USD Emerging Markets Bond ETF	EMB	10%	
16	Vanguard Real Estate ETF	VNQ	10%	Alternatives Sector: 50%
17	VanEck® Gold Miners ETF	GDX	20%	
18	Alerian MLP ETF ³	AMPLP	10%	
19	Invesco DB Commodity Index Tracking Fund	DBC	10%	
20	iShares® Gold Trust	IAU	10%	
21	J.P. Morgan Fallback Cash Index ⁴	JPUSCAFB	50% ⁵	N/A ²

¹ The maximum assigned weights and maximum aggregate assigned weights apply only to the initial composition of each monthly notional portfolio. For each Daily Series Index, the maximum assigned weights and maximum aggregate assigned weights may be exceeded due to the daily exposure adjustments.

² In addition, the investment grade fixed-income sector and the Cash Constituent together are subject to a combined maximum aggregate assigned weight of 75%.

³ Effective February 25, 2020, the Alerian MLP ETF replaced the ETRACS Alerian MLP Infrastructure Index ETN as a Basket Constituent.

⁴ Effective January 3, 2022, the J.P. Morgan Fallback Cash Index replaced the J.P. Morgan Cash Index USD 3 Month as the Cash Constituent.

⁵ For the avoidance of doubt, as a result of the replacement of any Basket Constituent with the Cash Constituent due to the occurrence of an Extraordinary Event, the aggregate weight of the Cash Constituent would be allowed to exceed 50% because a portion of that aggregate weight would be subject to the maximum assigned weight of the replaced Basket Constituent and not the maximum assigned weight of the Cash Constituent.

Allocating dynamically based on the market cycle. Historical data and statistical analysis support the premise that assets tend to move in multi-year cycles. Depending on the asset class, these cycles can range from five to 30 years. The presence of these trends is one possible explanation for the academic research showing that, historically, asset classes exhibiting strong recent returns have been more likely to continue to exhibit positive returns. Each Index attempts to take advantage of this dynamic by selecting a monthly portfolio that reflects the strongest recent returns from among the possible portfolios that meet the weight constraints set forth above and the volatility threshold described below.

Targeting stable volatility. One measure of risk used by many investors is volatility, which reflects the degree of variation in the value of an asset or portfolio over a period of time. Unlike asset-allocation approaches that aim to maintain stable proportions of different assets throughout the market cycle, each Index attempts to maintain a stable level of volatility over time. In addition, as compared to an approach that maintains consistent weights through the market cycle, each Daily Series Index is designed to take on more volatility risk in calm markets and deliver lower volatility in choppy ones by adjusting its exposure to its notional portfolio on a daily basis. Each Index that is not a Daily Series Index maintains exposure of 100% to its notional portfolio on each day.

Selecting a monthly portfolio. Each month, each Index identifies every notional portfolio that meets the individual Basket Constituent and sector weight constraints set forth above with weights in increments of 5% and a total weight of 100% and that has a recent historical volatility at or below a volatility threshold of 5%. Each Index then selects and rebalances into the notional portfolio from that set with the strongest recent performance. If no such notional portfolio exists, then the volatility threshold is increased by 1% (e.g., from 5% to 6%), and the procedure described in this paragraph is repeated, including the increase to the volatility threshold, until a notional portfolio has been selected. Each monthly rebalancing is implemented incrementally over a five-day period.

Calculating the level of an Index. On any given day, the closing level of each Index (with respect to that Index, the “**Index Level**”) reflects (a) the performance of the relevant notional portfolio(s), as adjusted by the exposure of that Index to its notional portfolio(s), less (b) the 0.85% per annum daily deduction. The performance of a notional portfolio reflects the weighted performance of the Basket Constituents, in each case with distributions, if any, notionally reinvested, less the daily deduction of a notional financing cost. The Index Level of each Index was set equal to 100.00 on November 1, 2007, the base date of each Index. The Index Calculation Agent (as defined below) began calculating each Index on a live basis on December 31, 2014.

The notional financing cost is intended to approximate the cost of maintaining a position in the Basket Constituents using borrowed funds at the rate of interest underlying the Cash Constituent, which seeks to track a composite rate of interest that is intended to reflect the overnight rate of return of a notional position in a three-month time deposit in U.S. dollars, calculated by reference to spread-adjusted SOFR. SOFR, the Secured Overnight Financing Rate, is intended to be a broad measure of the cost of borrowing cash overnight collateralized by Treasury securities. The fixed spreads added to SOFR in calculating the J.P. Morgan Fallback Cash Index will increase the notional financing cost, which will negatively affect the performance of each Index. Each Index is an “excess return” index and not a “total return” index because, as part of the calculation of the Index Level, the performance of each Basket Constituent is reduced by the performance of the Cash Constituent.

JPMS is currently the sponsor of each Index (the “**Index Sponsor**”) and the calculation agent of each Index (the “**Index Calculation Agent**”).

See “The J.P. Morgan Efficiente® Plus Index Series” in this underlying supplement for additional information about the Indices.

No assurance can be given that the investment strategy used to construct each Index will be successful or that any Index will outperform any alternative portfolio or strategy that might be constructed from the Basket Constituents. There is no guarantee that past performance trends referenced in selecting a monthly portfolio for an Index will continue during the subsequent period when that Index provides exposure to that monthly portfolio. In addition, no assurance can be given that the actual realized volatility of any Index will approximate its volatility threshold. The actual realized volatility of each Index will depend on the performance of the Basket Constituents included in its monthly portfolio(s) from time to time, and, at any time or for extended periods, may be greater than its volatility threshold, perhaps significantly, or less than its volatility threshold. Furthermore, the volatility threshold is subject to upward adjustment and, thus, the realized volatility threshold used to determine any monthly portfolio may be greater than the stated volatility threshold for the relevant Index, perhaps significantly.

Each Index is described as a “notional” or “synthetic” portfolio of assets because there is no actual portfolio of assets to which any person is entitled or in which any person has any ownership interest. Each Index merely references certain assets, the performance of which will be used as a reference point for calculating the Index Level of that Index.

RISK FACTOR SUMMARY

*Your investment in the notes will involve certain risks. Set forth below is only a summary of the principal risks associated with an investment in notes linked to the Index. **You should consider carefully the following discussion of risks, as well as the discussion of risks included in the relevant terms supplement, the accompanying product supplement and any other accompanying underlying supplement, before you decide that an investment in the notes is appropriate for you.** Capitalized terms used in this section without definition are as defined in “Summary” above or “Risk Factors” below.*

Risks Relating to the Indices

- JPMS, the Index Sponsor and the Index Calculation Agent, may adjust an Index in a way that affects its level, and JPMS has no obligation to consider your interests.
- We are affiliated with the sponsor of the Cash Constituent and its constituent indices and with the sponsor of the underlying index of one of the ETF Constituents.
- JPMorgan Chase & Co., our parent company, is currently one of the companies that make up some of the Basket Constituents.
- Our affiliate, JPMorgan Chase Bank, N.A., London branch, participates in the London Bullion Market Association gold price auction.
- The level of each Index will reflect a 0.85% per annum daily deduction and the deduction of a notional financing cost.
- The Indices may not be successful or outperform any alternative strategy that might be employed in respect of the Basket Constituents.
- An investment in the notes carries the risks associated with the Indices’ momentum investment strategy.
- Each Index may perform poorly at times when the phase of the market cycle is changing or during periods characterized by short-term volatility.
- An Index may not approximate its initial volatility threshold.
- The daily adjustment of the exposure of a Daily Series Index to the monthly portfolio(s) of Basket Constituents may cause that Daily Series Index not to reflect fully any price appreciation or to magnify any price depreciation of the monthly portfolio(s).
- Notes linked in whole or in part to a Daily Series Index may provide exposure to any Basket Constituent in excess of the weight constraint specified for that Basket Constituent.
- A significant portion of an Index’s exposure may be allocated to the Bond Constituents and the Cash Constituent.
- Each Index may be partially uninvested.
- Each Index is subject to concentration risk in its allocation among the Basket Constituents.
- Correlation of performances between the Basket Constituents may reduce the performance of the notes.
- Changes in the values of the Basket Constituents may offset each other.
- Hypothetical back-tested data relating to an Index do not represent actual historical data and are subject to inherent limitations.
- Each Index comprises notional assets and liabilities.
- Each Index is subject to market risks.
- The investment strategy used to construct the Indices involves monthly rebalancing and weight constraints that are applied to the Basket Constituents and, for each Daily Series Index, daily adjustments to the exposure to the notional portfolio consisting of the Basket Constituents.
- A Basket Constituent may be replaced by a substitute index or exchange-traded fund (“ETF”) upon the occurrence of certain extraordinary events.

Risks Relating to Exchange-Traded Funds

- There are risks associated with ETFs, including management risks.
- The policies of the investment adviser or commodity pool operator, as applicable, for an ETF, and the sponsor of its underlying index, if any, could affect the value of, and any amount payable on, the notes.
- The performance and market value of an ETF that tracks an underlying index, particularly during periods of market volatility, may not correlate with the performance of its underlying index as well as the net asset value per share of that ETF, if applicable.

Risks Relating to the Equity Constituents and the Bond Constituents

- The notes are subject to significant risks associated with small-capitalization stocks, preferred stocks, hybrid securities, mortgage-backed securities, leveraged loans, real estate investments trusts, master limited partnerships, gold and silver mining industries and non-U.S. securities markets, including emerging markets.
- The notes are subject to significant risks associated with fixed-income securities, high-yield fixed income securities and loans, including interest rate-related risks and credit risk.
- The notes are subject to currency exchange risk.

Risks Relating to the Commodity Constituents

- The notes are not regulated by the Commodity Futures Trading Commission.
- Commodity futures contracts are subject to uncertain legal and regulatory regimes.
- Commodity futures prices may change unpredictably, and may be near zero, zero or negative, in each case affecting the price of shares of the Invesco DB Commodity Index Tracking Fund and the value of the notes in unforeseeable ways.
- Higher future prices of the commodity futures contracts constituting the Invesco DB Commodity Index Tracking Fund relative to their current prices may lead to a decrease in any payment on the notes.
- The prices of commodities and commodity futures contracts are volatile and are affected by numerous factors.

Risks Relating to the Notional Financing Cost

- JPMS, the sponsor and calculation agent of the J.P. Morgan Fallback Cash Index, the J.P. Morgan 2M Spread-Adjusted SOFR Index and the J.P. Morgan 3M Spread-Adjusted SOFR Index (each, a “**Cash Index**”), may adjust a Cash Index in a way that affects its level, and JPMS has no obligation to consider your interests.
- SOFR has a limited history and its future performance cannot be predicted based on historical performance.
- SOFR will be affected by a number of factors and may be volatile and may be more volatile than other benchmark or market interest rates.
- The fixed spreads added to SOFR in calculating the J.P. Morgan Fallback Cash Index will increase the notional financing cost, which will negatively affect the performance of an Index.
- The administrator of SOFR may make changes that could adversely affect the level of SOFR or discontinue SOFR and has no obligation to consider your interest in doing so.
- A constituent of a Cash Index may be replaced by a substitute upon the occurrence of certain extraordinary events.

RISK FACTORS

*Your investment in the notes will involve certain risks. Investing in the notes is not equivalent to investing directly in any Index, any Basket Constituent or any of the securities, commodities, commodity futures contracts, loans or other assets underlying any Basket Constituent, or any futures contracts or exchange-traded or over-the-counter instruments based on, or other instruments linked to, any of the foregoing. **You should consider carefully the following discussion of risks, as well as the discussion of risks included in the relevant terms supplement, the accompanying product supplement and any other accompanying underlying supplement, before you decide that an investment in the notes is appropriate for you.***

Capitalized terms used in this section without definition are as defined in “Summary” above.

Risks Relating to the Indices

JPMS, the Index Sponsor and the Index Calculation Agent, may adjust an Index in a way that affects its level, and JPMS has no obligation to consider your interests.

JPMS, one of our affiliates, currently acts as the Index Sponsor and the Index Calculation Agent and is responsible for calculating and maintaining the Indices and developing the guidelines and policies governing their composition and calculation. In performing these duties, JPMS may have interests adverse to the interests of the holders of the notes, which may affect your return on the notes, particularly where JPMS, as the Index Sponsor and the Index Calculation Agent, is entitled to exercise discretion. The rules governing the Indices may be amended at any time by the Index Sponsor, in its sole discretion. The rules also permit the use of discretion by the Index Sponsor and the Index Calculation Agent in relation to each Index in specific instances, including, but not limited to, the determination of whether to replace a Basket Constituent with a substitute or successor upon the occurrence of certain events affecting that Basket Constituent, the selection of any substitute or successor and the determination of the levels to be used in the event of market disruptions that affect the ability of the Index Calculation Agent to calculate and publish the levels of that Index and the interpretation of the rules governing the Indices. Although JPMS, acting as the Index Sponsor and the Index Calculation Agent, will make all determinations and take all action in relation to the Indices acting in good faith, it should be noted that JPMS may have interests adverse to the interests of the holders of the notes and the policies and judgments for which JPMS is responsible could have an impact, positive or negative, on the level of an Index and the value of your notes.

Although judgments, policies and determinations concerning the Indices are made by JPMS, JPMorgan Chase & Co. ultimately controls JPMS. JPMS has no obligation to consider your interests in taking any actions that might affect the value of your notes. Furthermore, the inclusion of any Basket Constituent in an Index is not an investment recommendation by us or JPMS of that Basket Constituent or any of the securities, commodities, commodity futures contracts, loans or other assets underlying that Basket Constituent. See “The J.P. Morgan Efficient[®] Plus Index Series.”

We are affiliated with the sponsor of the Cash Constituent and its constituent indices and with the sponsor of the underlying index of one of the ETF Constituents.

One of our affiliates developed and maintains and calculates the Cash Constituent and its constituent indices, and the J.P. Morgan Emerging Markets Bond Index Global CORE, which is the underlying index of the iShares[®] J.P. Morgan USD Emerging Markets Bond ETF, one of the Basket Constituents. Accordingly, conflicts of interest exist between our affiliate and you. Our affiliate will have no obligation to consider your interests as a holder of the notes in taking any actions that might affect the value of your notes.

In addition, the J.P. Morgan Emerging Markets Bond Index Global CORE makes use of certain weights, prices, values, levels or dates that are determined by PricingDirect Inc. (“**PricingDirect**”). PricingDirect is JPMorgan Chase & Co.’s wholly owned subsidiary and provides valuation and other metrics data for fixed-income securities and derivatives. PricingDirect determines these prices through a

proprietary evaluation process that takes into account market-based evaluations (such as market intelligence for traded, quoted securities). In addition, under some circumstances, the pricing information provided by PricingDirect on the bonds underlying the J.P. Morgan Emerging Markets Bond Index Global CORE may be derived solely from price quotations or internal valuations made by one or more of our affiliates. Accordingly, conflicts of interest exist between PricingDirect and you. PricingDirect will have no obligation to consider your interests as a holder of the notes in taking any actions that might affect the value of your notes.

JPMorgan Chase & Co., our parent company, is currently one of the companies that make up the Vanguard S&P 500 ETF, the iShares® iBoxx® \$ Investment Grade Corporate Bond ETF and the iShares® Preferred and Income Securities ETF, but, to our knowledge, our securities are not currently included in or held by any other Basket Constituent.

We will have no ability to control the actions of the issuers of those securities, including actions that could affect the value of the securities held by the Basket Constituents or your notes. None of JPMorgan Chase & Co. and those issuers will have any obligation to consider your interests as a holder of the notes in taking any actions that might affect the value of your notes.

In the event that our securities are included in or held by any Basket Constituent, we will have no obligation to consider your interests as a holder of the notes in taking any action that might affect the value of your notes.

Our affiliate, JPMorgan Chase Bank, N.A., London branch, participates in the London Bullion Market Association (the “LBMA”) gold price auction.

ICE Benchmark Administration Ltd. determines the LBMA gold price using an auction in which our affiliate, JPMorgan Chase Bank, N.A., London branch, participates. We and our affiliates will have no obligation to consider your interests as a holder of the notes in taking any actions in connection with acting as an LBMA gold price auction participant that might affect the LBMA gold price or the notes.

The level of each Index will reflect a 0.85% per annum daily deduction and the deduction of a notional financing cost.

One way in which each Index may differ from a typical index is that its level will include a 0.85% per annum daily deduction and the deduction from the total return of each Basket Constituent of the performance of the Cash Constituent, which represents a notional financing cost calculated by reference to spread-adjusted SOFR. The per annum deduction and the notional financing cost will be deducted daily. As a result of the per annum deduction and the deduction of the notional financing cost, the level of each Index will trail the value of a hypothetical identically constituted notional portfolio from which no such deductions are made, assuming that the rates underlying the notional financing cost remain positive.

SOFR, the Secured Overnight Financing Rate, is intended to be a broad measure of the cost of borrowing cash overnight collateralized by Treasury securities. SOFR will be affected by many factors, including, among others described under “— Risks Relating to the Notional Financing Cost” below, the monetary policy of the Federal Reserve. SOFR has fluctuated significantly over time. For example, on December 31, 2021, the SOFR rate was 0.05% and, on March 30, 2023, the SOFR rate was 4.82%. The Federal Reserve raised its federal funds target rate over periods in the past and may do so again in the future. Any increase in SOFR rates, whether due to the Federal Reserve decisions to raise interest rates (specifically, its federal funds target rate) or otherwise, will increase the adverse effect of the notional financing cost on performance of each Index. In addition, the fixed spreads added to SOFR in calculating the Cash Constituent will increase the notional financing cost, which will negatively affect the performance of each Index.

The per annum deduction and the notional financing cost will place a significant drag on the performance of each Index, assuming that the rates underlying the notional financing cost remain positive, potentially offsetting positive returns of the relevant Basket Constituents, exacerbating negative returns of the relevant Basket Constituents and causing the level of each Index to decline steadily if the

total returns of the relevant Basket Constituents are relatively flat. In particular, under market conditions where the yield curve is relatively flat (meaning that there is little difference between longer-term and shorter-term interest rates), the notional financing cost alone may be expected to largely or entirely offset the yields on the securities or loans held by the Bond Constituents (as defined below). Each Index will not appreciate unless the total returns of the relevant Basket Constituents are sufficient to offset the negative effects of the per annum deduction and the notional financing cost, and then only to the extent that the total returns of the relevant Basket Constituents are greater than the deducted amounts. As a result of these deductions, the level of each Index may decline even if the total returns of the relevant Basket Constituents are positive.

The Indices may not be successful or outperform any alternative strategy that might be employed in respect of the Basket Constituents.

Each Index follows a notional rules-based proprietary strategy that operates on the basis of pre-determined rules. No assurance can be given that the investment strategy on which any Index is based will be successful or that any Index will outperform any alternative strategy that might be employed in respect of the Basket Constituents.

An investment in the notes carries the risks associated with the Indices' momentum investment strategy.

The construction of each Index reflects a momentum investment strategy. Momentum investing generally seeks to capitalize on positive trends in the returns of financial instruments. As such, the weights of the Basket Constituents in each Index are based in part on the recent performance of the Basket Constituents. However, there is no guarantee that recent performance trends will continue in the future. In addition, the caps on the Basket Constituent weights applied at the individual and sector levels will result in lower weights for the Basket Constituents with the best recent performance than would be the case if those caps were not applied.

Furthermore, due to the "long-only" construction of the Indices, the weight of each Basket Constituent will not fall below zero at any time even if the relevant Basket Constituent has displayed a negative recent performance period. Each Index will maintain long exposure to the Basket Constituents at all times, even when most or all Basket Constituents are displaying negative performance. Moreover, subject to any exposure adjustment in the case of a Daily Series Index, once a monthly portfolio has been selected and implemented, each Index will track the performance of the relevant Basket Constituents until the next monthly re-weighting, even when the values of those Basket Constituents are trending downwards or when those Basket Constituents are otherwise performing significantly worse than their recent performance, or than the remaining Basket Constituents.

In addition, due to the Indices' momentum investment strategy, an Index may fail to realize gains that could occur as a result of obtaining exposures to financial instruments that have experienced negative returns, but which subsequently experience a sudden spike in positive returns. As a result, if market conditions do not represent a continuation of prior observed trends, the level of an Index, which is rebalanced based on prior trends, may decline.

Each Index may perform poorly at times when the phase of the market cycle is changing or during periods characterized by short-term volatility.

While historical data and statistical analysis support the premise that assets tend to move in multi-year cycles, performance of assets will be variable, even within a particular phase of a market cycle, and the nature of a market cycle is such that the performance of assets will shift from phases of positive performance to phases of negative performance over time. Because each Index's strategy is based on momentum investing, each Index may perform poorly during times when a Basket Constituent's performance is not consistent with the current phase of the market cycle or when the current phase of the market cycle for that Basket Constituent is changing. In non-trending, sideways markets, momentum investment strategies are subject to "whipsaws." A whipsaw occurs when the market reverses and does the opposite of what is indicated by the trend indicator, resulting in a trading loss during the particular

period. Consequently, each Index may perform poorly in non-trending, “choppy” markets characterized by short-term volatility.

An Index may not approximate its initial volatility threshold.

No assurance can be given that an Index will maintain an annualized realized volatility that approximates its initial volatility threshold. The actual realized volatility of an Index will depend on the performance of the Basket Constituents included in the monthly portfolio(s) from time to time, and, at any time or for extended periods, may be greater than the initial volatility threshold, perhaps significantly, or less than the initial volatility threshold. Furthermore, the volatility threshold of each Index is subject to upward adjustment and, thus, the realized volatility threshold used to determine any monthly portfolio may be greater than the initial volatility threshold, perhaps significantly. While the assigned weights of the notional portfolio(s) tracked by an Index are based in part on the recent historical volatility of the relevant notional portfolio, there is no guarantee that trends existing in the relevant measurement period will continue in the future. The volatility of the notional portfolio on any day may change quickly and unexpectedly. Accordingly, the actual realized annualized volatility of an Index (including a Daily Series Index) on a daily basis may be greater than or less than the volatility threshold used to select to the relevant monthly portfolio(s), which may adversely affect the level of that Index and the value of the notes.

In addition, during periods when equities are experiencing high volatility, the initial volatility threshold, and the actual realized volatility, may be significantly higher than the initial volatility threshold, even if other assets are not experiencing high volatility.

The daily adjustment of the exposure of a Daily Series Index to the monthly portfolio(s) of Basket Constituents may cause that Daily Series Index not to reflect fully any price appreciation or to magnify any price depreciation of the monthly portfolio(s).

In an effort to approximate its volatility threshold on a daily basis, each Daily Series Index adjusts its exposure to the monthly portfolio(s) of Basket Constituents daily based on the historical volatility of the notional portfolio over a specified measurement period, subject to maximum and minimum exposure limits. When the historical volatility is greater than the volatility threshold, a Daily Series Index will reduce its exposure to the notional portfolio. When the historical volatility is less than the volatility threshold, a Daily Series Index will increase its exposure to the notional portfolio. The exposure may vary between 0% and a variable maximum exposure, subject to a daily maximum exposure change of 50%. The maximum exposure to the notional portfolio of a Daily Series Index will not be greater than 200% and will vary so as to limit the aggregate weight of the ETF Constituents included in the monthly reference portfolio, as adjusted by the exposure, to 100%.

Due to the daily exposure adjustments, a Daily Series Index may fail to realize gains due to price appreciation of the monthly portfolio(s) at a time when the exposure is less than 100% or may suffer increased losses due to price depreciation of the monthly portfolio(s) when the exposure is above 100%. As a result, a Daily Series Index may underperform a similar index that does not include a daily exposure adjustment feature.

Notes linked in whole or in part to a Daily Series Index may provide exposure to any Basket Constituent in excess of the weight constraint specified for that Basket Constituent.

As explained above, the maximum exposure to the monthly reference portfolio of a Daily Series Index will not be greater than 200% and will vary so as to limit the aggregate weight of the ETF Constituents included in the relevant monthly portfolio(s), as adjusted by the exposure, to 100%. Accordingly, a Daily Series Index may provide exposure to an ETF Constituent equal to up to twice the weight constraint that applies to that ETF Constituent in the monthly portfolio selection process. Any movements in value of an ETF Constituent may result in greater changes in the value of that ETF Constituent than if its exposure were limited to its weight constraint. In particular, exposure to an ETF Constituent in excess of 100% of its weight constraint will magnify any negative performance of that ETF Constituent, which, in turn, could cause you to receive a lower return on the notes than you would have received if the weight of each ETF Constituent were limited to its weight constraint.

A significant portion of an Index's exposure may be allocated to the Bond Constituents and the Cash Constituent.

Under normal market conditions, the ETF Constituents in the equities sector, the VanEck® Gold Miners ETF and the Alerian MLP ETF (together, the **"Equity Constituents"**) and the Invesco DB Commodity Index Tracking Fund and the iShares® Gold Trust (together, the **"Commodity Constituents"**) have tended to exhibit realized volatilities that are higher than the realized volatilities of the ETF Constituents in the investment grade fixed-income sector and the other fixed-income sector (together, the **"Bond Constituents"**) and the Cash Constituent in general over time. As a result, an Index will generally need to reduce its exposure to the Equity Constituents and the Commodity Constituents in order to satisfy the volatility threshold. Therefore, an Index may have significant exposure for an extended period of time to the Bond Constituents and the Cash Constituent, and that exposure may be greater, perhaps significantly greater, than its exposure to the Equity Constituents and the Commodity Constituents. However, the returns of the Bond Constituents and the Cash Constituent may be significantly lower than the returns of the Equity Constituents and the Commodity Constituents, and possibly even negative while the returns of the Equity Constituents and the Commodity Constituents are positive, which will adversely affect the level of the relevant Index and any payment on, and the value of, the notes.

Each Index may be partially uninvested.

The aggregate weight of the Cash Constituent at any given time represents the portion of the monthly portfolio that is uninvested at that time. Each Index will reflect no return for any uninvested portion (including any portion represented by the Cash Constituent). While the weight of the Cash Constituent is normally limited by a weight constraint of 50%, if, as a result of an extraordinary event, any Basket Constituent is replaced with the Cash Constituent, the aggregate weight of the Cash Constituent would be allowed to exceed 50% because a portion of that aggregate weight would be subject to the weighting constraints specific to the replaced Basket Constituent and not the weighting constraints specific to the Cash Constituent. See "A Basket Constituent may be replaced by a substitute index or exchange-traded fund upon the occurrence of certain extraordinary events" below.

In addition, when the exposure of a Daily Series Index to the notional portfolio of Basket Constituents is less than 100% on any day, a portion of the notional portfolio will be uninvested. For example, if the daily exposure is set at 70%, and assuming the weight of the Cash Constituent is 0%, 30% of the notional portfolio would be uninvested. Each Index will reflect no return for any uninvested portion.

Each Index is subject to concentration risk in its allocation among the Basket Constituents.

The strategy employed by the Indices involves an asset allocation that imposes certain weight caps that may result in an Index being allocated to as few as four Basket Constituents, with up to 50% of an Index being allocated to the Cash Constituent. Under these circumstances, an Index may face more risks than if it were diversified broadly over numerous asset classes and geographical regions. Accordingly, an Index may be more adversely affected by negative economic, political or regulatory occurrences affecting its Basket Constituents and the relevant asset classes than a more broadly diversified allocation among its Basket Constituents. Additionally, an Index allocation will sometimes result in exposure to only two sectors or exposure to only one sector and the Cash Constituent.

Correlation of performances between the Basket Constituents may reduce the performance of the notes.

Performances of the Basket Constituents may become highly correlated from time to time during the term of the notes, including, but not limited to, a period in which there is a substantial decline in a particular equity, bond, loan and commodity exposures represented by the Basket Constituents. High correlation during periods of negative returns between Basket Constituents could have an adverse effect on any payment on, and the value of, your notes.

Changes in the values of the Basket Constituents may offset each other.

Price movements between the Basket Constituents may not correlate with each other. At a time when the value of one or more Basket Constituents increases, the values of other Basket Constituents may not increase as much or may decline. Therefore, in calculating the level of an Index, increases in the value of one or more Basket Constituents may be moderated, or more than offset, by lesser increases or declines in the value of other the Basket Constituents, which will adversely affect the level of that Index and any payment on, and the value of, the notes.

Hypothetical back-tested data relating to an Index do not represent actual historical data and are subject to inherent limitations.

Hypothetical back-tested performance measures of an Index are purely theoretical and do not represent the actual historical performance of that Index and have not been verified by an independent third party. Hypothetical back-tested performance measures have inherent limitations. Alternative modeling techniques might produce significantly different results and may prove to be more appropriate. The use of alternative “proxy” performance information in the calculation of hypothetical back-tested weights and levels may have resulted in different, perhaps significantly different, weights and higher levels than would have resulted from the use of actual performance information of the Basket Constituents. Past performance, and especially hypothetical back-tested performance, is not indicative of future results. This type of information has inherent limitations and you should carefully consider these limitations before placing reliance on such information. Hypothetical back-tested performance is derived by means of the retroactive application of a back-tested model that has been designed with the benefit of hindsight. See also “The J.P. Morgan Efficient[®] Plus Index Series — Additional Information about Hypothetical Back-tested Performance Data” below.

The historical performance of an Index is not an indication of its future performance.

The historical performance of an Index should not be taken as an indication of the future performance of that Index. It is impossible to predict whether the level of an Index will fall or rise during the term of the notes. Past fluctuations and trends in the level of an Index are not necessarily indicative of fluctuations or trends that may occur in the future.

In addition, since the inception of the Indices, some of the Basket Constituents have been replaced and additional replacements may be made in the future. See “A Basket Constituent may be replaced by a substitute index or exchange-traded fund upon the occurrence of certain extraordinary events” below. Effective February 25, 2020, the Alerian MLP ETF replaced the ETRACS Alerian MLP Infrastructure Index ETN as a Basket Constituent. Effective January 3, 2022, the J.P. Morgan Fallback Cash Index replaced the J.P. Morgan Cash Index USD 3 Month as the Cash Constituent. Each replacement Basket Constituent differs significantly from the original Basket Constituent it replaced. These replacements may adversely affect the performance of an Index and the value of the notes, as a replacement Basket Constituent may perform worse, perhaps significantly worse, than the original Basket Constituent it replaced. In addition, each replacement may affect the allocation of the weights of the Basket Constituents after the effective date of that replacement, which may adversely affect the performance of an Index and the value of the notes. Each Index lacked any operating history with each replacement Basket Constituent prior to the effective date of the replacement and may perform in unanticipated ways. Investors in the notes should bear this difference in mind when evaluating the historical data shown in the relevant terms supplement.

Although both the ETRACS Alerian MLP Infrastructure Index ETN and the Alerian MLP ETF track the same underlying index, the ETRACS Alerian MLP Infrastructure Index ETN is a debt security while the Alerian MLP ETF is an equity security and they have different investment strategies and risks. While, as of the date of replacement, the deductions associated with the ETRACS Alerian MLP Infrastructure Index ETN were similar to those associated with the Alerian MLP ETF, unlike the ETRACS Alerian MLP Infrastructure Index ETN, the Alerian MLP ETF is subject to advisory management fees and other fund expenses, which may vary or be subject to adjustment and which therefore may be greater in the future

than the fixed fees associated with the ETRACS Alerian MLP Infrastructure Index ETN. Furthermore, their historical performance and volatilities are different.

Although both the J.P. Morgan Fallback Cash Index and the J.P. Morgan Cash Index USD 3 Month seek to track a composite rate of interest that is intended to reflect the overnight rate of return of a notional position in a 3-month time deposit in U.S. dollars, the J.P. Morgan Fallback Cash Index is calculated by reference to spread-adjusted SOFR, while the J.P. Morgan Cash Index USD 3 Month was calculated by reference to 3-month U.S. dollar LIBOR. In June 2017, the Federal Reserve Bank of New York's Alternative Reference Rates Committee announced SOFR as its recommended alternative to U.S. dollar LIBOR. However, the composition and characteristics of SOFR are not the same as those of U.S. dollar LIBOR. SOFR is a broad Treasury repo financing rate that represents overnight secured funding transactions and is not the economic equivalent of U.S. dollar LIBOR. While SOFR is a secured rate, U.S. dollar LIBOR is an unsecured rate. In addition, while SOFR currently is an overnight rate only, U.S. dollar LIBOR is a forward-looking rate that represents interbank funding for a specified term. As a result, there can be no assurance that SOFR will perform in the same way as U.S. dollar LIBOR would have at any time, including, without limitation, as a result of changes in interest and yield rates in the market, bank credit risk, market volatility or global or regional economic, financial, political, regulatory, judicial or other events. For the same reasons, SOFR is not expected to be a comparable substitute, successor or replacement for U.S. dollar LIBOR. Furthermore, the fixed spreads added to SOFR in calculating the J.P. Morgan Fallback Cash Index are arbitrary and will increase the notional financing cost, which will negatively affect the performance of each Index.

Furthermore, since the inception of the Indices, several of the ETF Constituents have made material changes to their investment strategies, and additional material changes to those investment strategies may be made in the future. See "Risks Relating to Exchange-Traded Funds — The policies of the investment adviser or commodity pool operator, as applicable, for an ETF, and the sponsor of its underlying index, if any, could affect the value of, and any amount payable on, the notes" below. These changes may adversely affect the performance of an Index and the value of the notes, as the new investment strategy may perform worse, perhaps significantly worse, than the original investment strategy it replaced. Each such ETF Constituent lacked any operating history with its new investment strategy prior to the effective date of the change and may perform in unanticipated ways. Investors in the notes should bear this difference in mind when evaluating the historical data shown in the relevant terms supplement.

If the values of the Basket Constituents tracked by an Index change, the level of that Index and the market value of your notes may not change in the same manner.

Owning the notes is not the same as owning the Basket Constituents. Accordingly, changes in the values of the Basket Constituents tracked by an Index may not result in a comparable change in the level of that Index or the market value of your notes.

Each Index comprises notional assets and liabilities.

The exposure of each Index to its Basket Constituents is purely notional and will exist solely in the records maintained by or on behalf of the Index Calculation Agent. There is no actual portfolio of assets to which any person is entitled or in which any person has any ownership interest. Consequently, you will not have any claim against any of the reference assets that compose an Index.

Each Index is subject to market risks.

The performance of each Index is dependent in part on the total return performance of its Basket Constituents. As a consequence, your investment in the notes is exposed to the total return performance of the Basket Constituents.

The investment strategy used to construct the Indices involves monthly rebalancing and weight constraints that are applied to the Basket Constituents and, for each Daily Series Index, daily adjustments to the exposure to the notional portfolio consisting of the Basket Constituents.

The Basket Constituents are subject to monthly rebalancing and weight constraints by asset type and on subsets of assets and, for each Daily Series Index, daily adjustments to the exposure to the relevant monthly portfolio(s) consisting of the Basket Constituents. By contrast, a notional portfolio that does not rebalance monthly and is not subject to any weight constraints or daily exposure adjustments in this manner could see greater compounded gains over time through exposure to a consistently and rapidly appreciating portfolio consisting of the Basket Constituents. Therefore, your return on the notes may be less than the return you could realize on an alternative investment in the Basket Constituents that is not subject to monthly rebalancing, weight constraints or daily exposure adjustments. No assurance can be given that the investment strategy used to construct the Indices will outperform any alternative investment in the Basket Constituents.

A Basket Constituent may be replaced by a substitute index or exchange-traded fund (“ETF”) upon the occurrence of certain extraordinary events.

As described under “The J.P. Morgan Efficiente® Plus Index Series — Succession and Extraordinary Events” below, following the occurrence of certain extraordinary events with respect to a Basket Constituent, the affected Basket Constituent may be replaced by a substitute index or ETF or the Index Calculation Agent may cease calculation and publication of an Index on a date determined by the Index Calculation Agent. These extraordinary events generally include events that could materially interfere with the ability of market participants to transact in, or events that could materially change the underlying economic exposure of, positions with respect to an Index, any Basket Constituent or any underlying index or reference commodity, where that material interference or change is not acceptable to the Index Calculation Agent. See “The J.P. Morgan Efficiente® Plus Index Series — Succession and Extraordinary Events” below for a summary of events that could trigger an extraordinary event.

If the Index Calculation Agent determines in its discretion that no suitable substitute is available for an affected Basket Constituent (other than the Cash Constituent), then the Index Calculation Agent will replace that Basket Constituent with the Cash Constituent. Under such circumstances, the aggregate weight of the Cash Constituent in the relevant Index may be greater than the maximum 50% weight limit allocated for the Cash Constituent because a portion of such aggregate weight would be subject to the separate maximum weight limit specific to the affected Basket Constituent.

You should realize that the changing of a Basket Constituent may affect the performance of an Index, and therefore, the return on the notes, as the replacement Basket Constituent may perform significantly better or worse than the original Basket Constituent. For example, the substitute or successor Basket Constituent may have higher fees or worse performance than the original Basket Constituent. Moreover, the policies of the sponsor of the substitute index or ETF concerning the methodology and calculation of the substitute index or ETF, including decisions regarding additions, deletions or substitutions of the assets underlying the substitute index or ETF, could affect the level or price of the substitute index or ETF and therefore the value of the notes. The amount payable on the notes and their market value could also be affected if the sponsor of a substitute index or the sponsor of the underlying index of a substitute ETF discontinues or suspends calculation or dissemination of the relevant index, in which case it may become difficult to determine the market value of the notes. The sponsor of the substitute index or ETF will have no obligation to consider your interests in calculating or revising such substitute index or ETF.

Each Index should not be compared to any other index or strategy sponsored by any of our affiliates (each, a “J.P. Morgan Index”) and cannot necessarily be considered a revised, enhanced or modified version of any other J.P. Morgan Index.

Each Index follows a notional rules-based proprietary strategy that may have objectives, features and/or constituents that are similar to those of other J.P. Morgan Indices. No assurance can be given that these similarities will form a basis for comparison between any Index and any other J.P. Morgan Index, and no assurance can be given that any Index would be more successful than or outperform any

other J.P. Morgan Index. Each Index operates independently and does not necessarily revise, enhance, modify or seek to outperform any other J.P. Morgan Index.

Risks Relating to Exchange-Traded Funds

There are risks associated with ETFs.

An ETF may have a limited operating history. Although the shares of an ETF may be listed for trading on a securities exchange and a number of similar products have been traded on securities exchanges for varying periods of time, there is no assurance that an active trading market will continue for the shares of any ETF or that there will be liquidity in the trading market.

In addition, ETFs are subject to management risk, which is the risk that the investment strategy of the applicable investment adviser or commodity pool operator, as applicable, the implementation of which is subject to a number of constraints, may not produce the intended results. These constraints could affect the market prices of the shares of an ETF and, consequently, could adversely affect the value of the notes. See the description of the relevant ETF in this underlying supplement for additional information.

The policies of the investment adviser or commodity pool operator, as applicable, for an ETF, and the sponsor of its underlying index, if any, could affect the value of, and any amount payable on, the notes.

The policies of the investment adviser or commodity pool operator, as applicable, for an ETF concerning the calculation of that ETF's net asset value; additions, deletions or substitutions of securities, commodities, commodity futures contracts, loans or other assets underlying that ETF; substitutions of its underlying index, if applicable; and the manner in which changes affecting its underlying index, if any, are reflected in that ETF, could affect the market price of the shares of that ETF and, therefore, affect any payment on the notes and the value of the notes before maturity. Any amount payable on the notes and their value could also be affected if the investment adviser or commodity pool operator, as applicable, changes these policies, for example, by changing the manner in which it calculates that ETF's net asset value or by changing the advisory management fee or making other changes that increase the expenses of the ETF, or if the investment adviser or commodity pool operator, as applicable, discontinues or suspends calculation or publication of that ETF's net asset value, in which case it may become difficult to determine the value of the notes.

In addition, the sponsor of an underlying index, if any, of an ETF is responsible for the design and maintenance of that underlying index. The policies of the sponsor concerning the calculation of an underlying index, including decisions regarding the addition, deletion or substitution of the securities, commodities, commodity futures contracts, loans or other assets included in that underlying index, if any, could affect the value of that underlying index and, consequently, the market prices of the shares of the relevant ETF and, therefore, any payment on the notes and the value of the notes.

The performance and market value of an ETF that tracks an underlying index, particularly during periods of market volatility, may not correlate with the performance of its underlying index as well as the net asset value per share of that ETF, if applicable.

An ETF that tracks an underlying index uses a representative sampling strategy or a replication or indexing strategy to attempt to track the performance of its underlying index. Pursuant to a representative sampling strategy, an ETF invests in a representative sample of securities that collectively has an investment profile similar to its underlying index; however, an ETF may not hold all or substantially all of the securities, commodities, commodity futures contracts, loans or other assets included in its underlying index. Even if an ETF uses a replication or indexing strategy, that ETF may not hold all of the securities, commodities, commodity futures contracts, loans or other assets included in its underlying index. In certain cases, an ETF may invest a significant portion of its portfolio in cash or money market instruments. While an ETF will principally hold the securities, commodities, commodity futures contracts, loans or other assets included in its underlying index, its investment adviser or commodity pool operator, as applicable, generally may invest a portion of that ETF's assets in securities, commodities, commodity

futures contracts, loans or other assets not included in its underlying index and in other assets, including potentially shares of money market funds affiliated with or advised by its investment adviser or commodity pool operator, as applicable. Consequently, the performance of an ETF is generally linked in part to assets other than the securities, commodities, commodity futures contracts, loans or other assets included in its underlying index.

In addition, the performance of an ETF will reflect additional transaction costs and fees that are not included in the calculation of its underlying index. Also, the component securities, commodities, commodity futures contracts, loans or other assets of an ETF may be unavailable in the secondary market due to other extraordinary circumstances. Corporate actions with respect to any securities or loans (such as mergers and spin-offs) also may impact the variance between an ETF and its underlying index. Finally, because the shares of an ETF are traded on a securities exchange and are subject to market supply and investor demand, the market value of one share of that ETF may differ from the net asset value per share of that ETF.

During periods of market volatility, the securities, commodities, commodity futures contracts, loans or other assets held by an ETF may be unavailable in the secondary market, market participants may be unable to calculate accurately the net asset value per share of an ETF and the liquidity of an ETF may be adversely affected. This kind of market volatility may also disrupt the ability of market participants to create and redeem shares of an ETF. Further, market volatility may adversely affect, sometimes materially, the prices at which market participants are willing to buy and sell shares of an ETF. As a result, under these circumstances, the market value of shares of an ETF may vary substantially from the net asset value per share of that ETF.

For all of the foregoing reasons, the performance of an ETF that is designed to track an underlying index may not correlate with the performance of its underlying index as well as the net asset value per share of that ETF, which could materially and adversely affect the value of the notes in the secondary market and/or reduce any payments on the notes. Consequently, the return on the notes will not be the same as investing (or taking a short position) directly in any ETF or any relevant underlying index or in the securities, commodities, commodity futures contracts, loans or other assets held by any ETF or included in any relevant underlying index, and will not be the same as investing in a financial product linked to the performance of any relevant underlying index.

Additionally, if market volatility or these events were to occur on any of the Determination Date(s) (as defined in the accompanying product supplement), in some circumstances, the Index Calculation Agent and the calculation agent would each maintain discretion to determine whether these market volatility or events have caused a market disruption event to occur, and these determinations may affect payments on the notes. If the Index Calculation Agent and the calculation agent each determine that no market disruption event has occurred, payments on the notes would be based on the closing level of the relevant Index on the Determination Date(s), which will reflect the closing price of one share of the applicable ETF on the Determination Date(s), even if the relevant ETF is underperforming its underlying index or the component securities, commodities, commodity futures contracts, loans or other assets of its underlying index and/or trading below the net asset value per share of that ETF.

There can be no assurance that publicly available information provided about any ETF is accurate or complete.

All disclosures contained in this underlying supplement or the relevant terms supplement regarding any ETF have been derived from publicly available documents and other publicly available information, without independent verification. We have not participated, and will not participate, in the preparation of those documents, and we have not made, and will not make, any due diligence inquiry with respect to any ETF in connection with the offering of the notes. We do not make any representation that those publicly available documents or any other publicly available information regarding any ETF is accurate or complete, and we are not responsible for public disclosure of information by any ETF, whether contained in filings with the SEC or otherwise. We also cannot give any assurance that all events occurring prior to the date of this underlying supplement or the relevant terms supplement (including events that would

affect the accuracy or completeness of the publicly available documents of any ETF) that would affect the value of any ETF will have been publicly disclosed. Subsequent disclosure of any of these events or the disclosure of, or failure to disclose, material future events concerning any ETF could affect the market value of the notes or any payment on the notes. Any prospective purchaser of the notes should undertake an independent investigation of any ETF as in its judgment is appropriate to make an informed decision with respect to an investment in the notes.

Risks Relating to the Equity Constituents and the Bond Constituents

An investment in the notes will be subject to risks associated with small-capitalization stocks.

The securities held by the Vanguard Small-Cap ETF and the iShares® MSCI EAFE Small-Cap ETF and some of the securities held by the Vanguard FTSE Developed Markets ETF and Vanguard FTSE Emerging Markets ETF are issued by companies with relatively small market capitalization. The stock prices of smaller companies may be more volatile than stock prices of large-capitalization companies. Small-capitalization companies may be less able to withstand adverse economic, market, trade and competitive conditions relative to larger companies. These companies tend to be less well-established than large market capitalization companies. Small-capitalization companies are less likely to pay dividends on their stocks, and the presence of a dividend payment could be a factor that limits downward stock price pressure under adverse market conditions.

The notes will be subject to currency exchange risk.

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

Of particular importance to potential currency exchange risk are:

- existing and expected rates of inflation;
- existing and expected interest rate levels;
- the balance of payments in the countries issuing those currencies and in the United States and between each country and its major trading partners;
- political, civil or military unrest in the countries issuing those currencies and in the United States; and
- the extent of governmental surpluses or deficits in the component countries and the United States.

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

Changes in the volatility of exchange rates and the correlation between those rates and the values of some of the ETF Constituents are likely to affect the market value of the notes.

The exchange rate between the U.S. dollar and each of the currencies in which the non-U.S. securities held by some of the ETF Constituents are denominated refers to a foreign exchange spot rate that measures the relative values of two currencies — the particular currency in which one of those securities is denominated and the U.S. dollar. This exchange rate reflects the amount of the particular currency in which one of those securities is denominated that can be purchased for one U.S. dollar and thus increases when the U.S. dollar appreciates relative to the particular currency in which that security is

denominated. The volatility of the exchange rate between the U.S. dollar and each of the currencies in which the non-U.S. securities held by those ETF Constituents are denominated refers to the size and frequency of changes in that exchange rate.

Because the net asset values of the ETF Constituents are calculated, in part, by converting the closing prices of the non-U.S. securities they hold into U.S. dollars, and because the market value of an ETF Constituent is closely linked to its net asset value, the volatility of the exchange rate between the U.S. dollar and each of the currencies in which those non-U.S. securities are denominated could affect the market value of the notes.

The correlation of the exchange rate between the U.S. dollar and each of the currencies in which the non-U.S. securities held by those ETF Constituents are denominated and the value of those ETF Constituents refers to the relationship between the percentage changes in that exchange rate and the percentage changes in the value of those ETF Constituents. The direction of the correlation (whether positive or negative) and the extent of the correlation between the percentage changes in the exchange rate between the U.S. dollar and each of the currencies in which the non-U.S. securities held by those ETF Constituents are denominated and the percentage changes in the value of those ETF Constituents could affect the value of the notes.

We have no control over exchange rates.

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

We will not make any adjustment or change in the terms of the notes in the event that exchange rates should become fixed, or in the event of any devaluation or revaluation or imposition of exchange or other regulatory controls or taxes, or in the event of other developments affecting the U.S. dollar or any relevant foreign currency. You will bear those risks.

An investment in the notes is subject to risks associated with non-U.S. securities markets, including emerging markets, and loans of non-U.S. borrowers.

Some or all of the securities held by several of the ETF Constituents have been issued by non-U.S. companies and the loans held by the Invesco Senior Loan ETF may be to non-U.S. borrowers. An investment in the notes therefore involves risks associated with the securities markets in those countries where the relevant non-U.S. securities are traded, including risks of volatility in those markets, governmental intervention in those markets and cross shareholdings in companies in certain countries, and risks associated with loans originated in those countries. Also, there is generally less publicly available information about companies in some of these jurisdictions than about U.S. companies that are subject to the reporting requirements of the SEC, and generally non-U.S. companies are subject to accounting, auditing and financial reporting standards and requirements and securities trading rules different from those applicable to U.S. reporting companies. Moreover, the bonds held by the iShares® J.P. Morgan USD Emerging Markets Bond ETF have been issued by emerging-markets countries. Investments in the notes, which are linked in part to the economic stability and development of such countries, involve risks associated with investments in, or the securities markets in, those countries.

The prices of securities in non-U.S. markets and the value of loans to non-U.S. borrowers may be affected by political, economic, financial and social factors in those markets and the home countries of

those borrowers, including changes in a country's government, economic and fiscal policies, difficulties enforcing loan obligations, currency exchange laws or other laws or restrictions. Moreover, the economies of these countries may differ favorably or unfavorably from the economy of the United States in such respects as growth of gross national product, rate of inflation, capital reinvestment, resources and self-sufficiency. These countries may be subjected to different and, in some cases, more adverse economic environments.

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

Some or all of these factors may influence the value of the relevant Basket Constituents, and therefore, the relevant Index. The impact of any of the factors set forth above may enhance or offset some or all of any change resulting from another factor or factors. You cannot predict the future performance of any Basket Constituent based on its historical performance. The value of any Basket Constituent may, decrease, which may adversely affect any payment on the notes.

The notes are subject to significant risks associated with fixed-income securities and leveraged loans, including interest rate-related risks.

Several of the Bond Constituents attempt to track the performance of indices composed of fixed-income securities, and the Invesco Senior Loan ETF attempts to track the performance of an index composed of leveraged loans and fixed-income securities. Investing in the notes that provide exposure to those Bond Constituents differs significantly from investing directly in bonds or loans to be held to maturity, as the values of those Bond Constituents change, at times significantly, during each trading day based upon the current market prices of their underlying bonds or the values of their underlying loans. The market prices of these bonds and loans are volatile and significantly influenced by a number of factors, particularly the duration of the underlying bonds or loans, the yields on these bonds or loans as compared to current market interest rates and the actual or perceived credit quality of the issuer of these bonds or the borrowers of these loans.

The market prices of the bonds underlying each of the iShares® iBoxx® \$ Investment Grade Corporate Bond ETF are determined, in part, by reference to the bid and ask quotations provided by contributing banks, including us. In addition, one of our affiliates developed and maintains and calculates the J.P. Morgan Emerging Markets Bond Index Global CORE, which is the index underlying the iShares® J.P. Morgan USD Emerging Markets Bond ETF, one of the Bond Constituents. The J.P. Morgan Emerging Markets Bond Index Global CORE makes use of certain weights, prices, values, levels or dates that are determined by PricingDirect. PricingDirect is JPMorgan Chase & Co.'s wholly owned subsidiary and provides valuation and other metrics data for fixed income securities and derivatives. PricingDirect determines these prices through a proprietary evaluation process that takes into account market-based evaluations (such as market intelligence for traded, quoted securities). In addition, under some circumstances, the pricing information provided by PricingDirect on the bonds underlying the J.P. Morgan Emerging Markets Bond Index Global CORE may be derived solely from price quotations or internal valuations made by one or more of our affiliates.

In general, fixed-income instruments are significantly affected by changes in current market interest rates. As interest rates rise, the prices of fixed-income instruments are likely to decrease. Instruments with longer durations tend to be more sensitive to interest rate changes, usually making them more volatile than securities with shorter durations. As a result, rising interest rates may cause the value of the long-dated bonds underlying the relevant Bond Constituents to decline, possibly significantly, which would adversely affect the value of the notes. In addition, longer interest rate reset periods and interest rate

floors with respect to leveraged loans generally increase fluctuations in value as a result of changes in market interest rates. Moreover, during periods of declining interest rates, the borrower of a leveraged loan may exercise its option to prepay principal earlier than scheduled, potentially causing the Invesco Senior Loan ETF to reinvest the unanticipated proceeds at lower interest rates, resulting in a decline in the price of the notes.

Interest rates are subject to volatility due to a variety of factors, including:

- sentiment regarding underlying strength or weakness in the local economies of the issuers of the securities or borrowers of the loans underlying the relevant Bond Constituents and global economies;
- expectations regarding the level of price inflation;
- sentiment regarding credit quality in the markets of the issuers of the securities or borrowers of the loans underlying the relevant Bond Constituents and global credit markets;
- central bank policies regarding interest rates; and
- the performance of capital markets that include the issuers of the securities or borrowers of the loans underlying the relevant Bond Constituents and foreign capital markets.

Prices of U.S. treasury notes have recently fallen after trading near historic high prices for an extended period of time. If the price of the U.S. treasury notes reverts to its historic mean or otherwise continues to fall as a result of a general increase in interest rates, Federal Reserve policies or actions, or perceptions of reduced credit quality of the U.S. government or otherwise, the value of the bonds underlying Bond Constituents that include U.S. treasury notes will decline, which could have a negative impact on the performance of the notes.

In addition, inflation-protected bonds typically have lower yields than conventional fixed-rate bonds because of their inflation adjustment feature. For the iShares® TIPS Bond ETF, which tracks inflation-protected bonds, if inflation is low, the benefit received from the inflation-protected feature of the underlying bonds may not sufficiently compensate you for their reduced yield.

The notes are subject to significant risks associated with fixed-income securities and leveraged loans, including credit risk.

Several of the Bond Constituents attempt to track the performance of indices composed of fixed-income securities. The prices of the bonds underlying those Bond Constituents are significantly influenced by the creditworthiness of the issuers of those bonds. The bonds underlying those Bond Constituents may have their credit ratings downgraded, including, in the case of the investment-grade bonds, a downgrade from investment grade to non-investment grade status, or their credit spreads may widen significantly. Following a ratings downgrade or the widening of credit spreads, some or all of the bonds underlying those Bond Constituents may suffer significant and rapid price declines. These events may affect only a few or a large number of the bonds underlying those Bond Constituents. For example, during the most recent credit crisis in the United States, credit spreads widened significantly as the market demanded very high yields on corporate bonds, and as a result, the prices of the bonds in the United States dropped significantly. There can be no assurance that some or all of the factors that contributed to that credit crisis will not depress the price, perhaps significantly, of the bonds underlying those Bond Constituents, which would adversely affect the value of the notes.

Further, the Bond Constituents that provide exposure to the high yield corporate market are subject to high-yield securities risk. Securities that are rated below investment grade (commonly known as “junk bonds,” including those bonds rated at BB+ or lower by S&P or Fitch or Ba1 or lower by Moody’s) may be more volatile than higher-rated securities of similar maturity. High-yield securities may also be subject to greater levels of credit or default risk than higher-rated securities. The value of high-yield securities can be adversely affected by overall economic conditions, such as an economic downturn or a period of rising interest rates, and high-yield securities may be less liquid and more difficult to sell at an advantageous time or price or to value than higher-rated securities. In particular, high-yield securities are often issued

by smaller, less creditworthy companies or by highly leveraged (indebted) firms, which are generally less able than more financially stable firms to make scheduled payments of interest and principal.

Moreover, investments in leveraged loans are subject to credit risk. A leveraged loan is rated below investment grade quality or is unrated but deemed to be of comparable quality. Non-investment grade loans, and unrated loans of comparable credit quality, are subject to the increased risk of a borrower's inability to meet principal and interest payment obligations. Default in the payment of interest or principal on a loan held by the Invesco Senior Loan ETF will result in a reduction in the value of that loan and a potential decrease in the value of the Invesco Senior Loan ETF. Although the loans held by the Invesco Senior Loan ETF generally will be secured by specific collateral, there can be no assurance that such collateral would satisfy the borrower's obligation in the event of non-payment of scheduled interest or principal or that such collateral could be readily liquidated. In addition, if a borrower defaults on its payment obligations, the Invesco Senior Loan ETF may incur additional expenses to seek recovery. In the event of the bankruptcy of a borrower, the Invesco Senior Loan ETF's access to the collateral may be limited by bankruptcy or other insolvency bonds and, therefore, the Invesco Senior Loan ETF could experience costs, delays and limitations with respect to its ability to realize the benefits of the collateral securing a loan. Although a leveraged loan may be senior to equity and other debt securities in a borrower's capital structure, those obligations may be structurally subordinated to obligations of the borrower's subsidiaries, meaning that those obligations would be junior to the obligations of the borrower's subsidiaries. Any of the foregoing may adversely affect the price of the Invesco Senior Loan ETF and, accordingly, the value of the notes.

The value of the notes may be influenced by unpredictable changes in the markets and economies of the local governments of the issuers of the bonds underlying some of the Bond Constituents.

The values of the Bond Constituents that attempt to track the performance of indices composed of fixed-income securities may be influenced by unpredictable changes, or expectations of changes, in the local markets for the bonds underlying those Bond Constituents. Changes in the local governments of the issuers of the bonds underlying those Bond Constituents that may influence the value of the notes include:

- economic performance, including any financial or economic crises and changes in the gross domestic product, the principal sectors, inflation, employment and labor, and prevailing prices and wages;
- the monetary system, including the monetary policy, the exchange rate policy, the economic and tax policies, banking regulation, credit allocation and exchange controls;
- the external sector, including the amount and types of foreign trade, the geographic distribution of trade, the balance of payments, and reserves and exchange rates;
- public finance, including the budget process, any entry into or termination of any economic or monetary agreement or union, the prevailing accounting methodology, the measures of fiscal balance, revenues and expenditures, and any government enterprise or privatization program; and
- public debt, including external debt, debt service and the debt record.

These factors interrelate in complex ways, and the effect of one factor on the market value of the bonds underlying the relevant Bond Constituents may offset or enhance the effect of another factor. Changes in the values of the Bond Constituents may adversely affect any payment on the notes.

The notes are subject to significant risks associated with preferred stock.

The iShares® Preferred and Income Securities ETF holds preferred stock, and other ETF Constituents may hold preferred stock. Unlike interest payments on debt securities, dividend payments on a preferred stock typically must be declared by the issuer's board of directors. An issuer's board of directors is generally not under any obligation to pay a dividend (even if such dividends have accrued) and may suspend payment of dividends on a preferred stock at any time. In the event an issuer of

preferred stock experiences economic difficulties, the issuer's preferred stock may lose substantial value due to the reduced likelihood that the issuer's board of directors will declare a dividend and the fact that the preferred stock may be subordinated to other securities of the same issuer. Certain additional risks associated with preferred stock could adversely affect the value of an ETF Constituent that holds preferred stock.

Because many preferred stocks pay dividends at a fixed rate, their market price can be sensitive to changes in interest rates in a manner similar to bonds — that is, as interest rates rise, the value of any preferred stocks held by an ETF Constituent are likely to decline. To the extent that an ETF Constituent invests in fixed-rate preferred stocks, rising interest rates may cause the value of that ETF Constituent's investments to decline. In addition, because many preferred stocks allow holders to convert the preferred stock into common stock of the issuer, their market price can be sensitive to changes in the value of the issuer's common stock. To the extent that an ETF Constituent invests in convertible preferred stocks, declining common stock values may also cause the value of that ETF Constituent's investments to decline.

There is a chance that the issuer of any preferred stock held by an ETF Constituent will have its ability to pay dividends deteriorate or will default (*i.e.*, fail to make scheduled dividend payments on the preferred stock or scheduled interest payments on other obligations of the issuer not held by an ETF Constituent), which would negatively affect the value of any such holding.

Preferred stocks are subject to market volatility and the prices of preferred stocks will fluctuate based on market demand. Preferred stocks often have call features which allow the issuer to redeem the security at its discretion. If a preferred stock is redeemed by the issuer, it will be removed from the relevant underlying index. The redemption of preferred stocks having a higher than average yield may cause a decrease in the yield of the relevant ETF Constituent and its underlying index.

The notes are subject to significant risks associated with hybrid securities.

The iShares® Preferred and Income Securities ETF holds exchange-listed U.S. dollar-denominated hybrid securities. Hybrid securities are securities that contain characteristics of both a debt security and an equity security. Therefore, hybrid securities are subject to the risks of equity securities and risks of debt securities. The terms of hybrid instruments may vary substantially, and certain hybrid securities may be subject to similar risks as preferred stocks, such as interest rate risk, issuer risk, dividend risk, call risk and extension risk. The claims of holders of hybrid securities of an issuer are generally subordinated to those of holders of traditional debt securities in bankruptcy, and thus hybrid securities may be more volatile and subject to greater risk than traditional debt securities, and may in certain circumstances even be more volatile than traditional equity securities. At the same time, hybrid securities may not fully participate in gains of their issuer and thus potential returns of such securities are generally more limited than traditional equity securities, which would participate in such gains. Hybrid securities may also be more limited in their rights to participate in management decisions of an issuer (such as voting for the board of directors). Certain hybrid securities may be more thinly traded and less liquid than either publicly issued equity securities or debt securities, especially hybrid securities that are “customized” to meet the needs of particular investors, potentially making it difficult for the iShares® Preferred and Income Securities ETF to sell such securities at a favorable price or at all. Any of these features could cause a loss in market value of hybrid securities held by the iShares® Preferred and Income Securities ETF or otherwise adversely affect the iShares® Preferred and Income Securities ETF, and therefore, the Index and the notes.

The notes are subject to significant risks associated with mortgage-backed securities.

Several of the ETF Constituents may invest in mortgage-backed securities. Mortgage-backed securities are subject to prepayment risk, which is the risk that during periods of falling interest rates, an issuer of mortgages and other securities may be able to repay principal prior to the security's maturity causing the ETF Constituent holding that mortgage-backed security to have to reinvest in securities with a lower yield or a higher risk of default, resulting in a decline in the income or return potential of such ETF Constituent. Mortgage-backed securities are also subject to extension risk, which is the risk that when

interest rates rise, certain mortgage-backed securities will be paid off substantially more slowly than originally anticipated and the value of those securities may fall sharply, resulting in a decline in income and potentially in the value of the investment. Because of prepayment and extension risk, mortgage-backed securities react differently to changes in interest rates than other bonds. Small movements in interest rates (both increases and decreases) may quickly and significantly reduce the value of certain mortgage-backed securities. In recent years, the market for mortgage-backed securities experienced substantially lower valuations and reduced liquidity. Ongoing economic and market uncertainty suggests that mortgage-backed securities may continue to be more difficult to value and to dispose of than previously.

The leveraged loans held by the Invesco Senior Loan ETF may be illiquid and may not have reliable market quotations, which may adversely affect the value of the Invesco Senior Loan ETF.

A majority of the Invesco Senior Loan ETF's assets are likely to be invested in loans that are less liquid than securities traded on national exchanges, and reliable market quotations may not be readily available. Therefore, elements of judgment may play a greater role in valuation of the loans held by the Invesco Senior Loan ETF than for securities with a more developed secondary market, and the Invesco Senior Loan ETF may not realize full value in the event of the need to sell a loan. To the extent that a secondary market does exist for certain underlying loans, the market may be subject to volatility, irregular trading activity, wide bid/ask spreads, decreased liquidity and extended trade settlement periods. In addition, adverse market conditions may impair the liquidity of some actively traded loans held by the Invesco Senior Loan ETF. In the event that the Invesco Senior Loan ETF voluntarily or involuntarily liquidates portfolio assets during periods of infrequent trading, it may not receive full value for those assets.

The notes are subject to risks associated with assignments of and participations in loans held by the Invesco Senior Loan ETF.

The Invesco Senior Loan ETF may acquire leveraged loans for its portfolio through assignments or participations. As the assignee, the Invesco Senior Loan ETF typically succeeds to all the rights and obligations of the assigning institution and becomes a lender under the credit agreement with respect to the debt obligation; however, the Invesco Senior Loan ETF may not be able to unilaterally enforce all rights and remedies under the loan and with regard to any associated collateral. Because assignments may be arranged through private negotiations between potential assignees and potential assignors, the rights and obligations acquired by the Invesco Senior Loan ETF as the assignee may differ from, and be more limited than, those held by the assigning lender. In addition, if the loan is foreclosed, the Invesco Senior Loan ETF could become part owner of any collateral and could bear the costs and liabilities of owning and disposing of the collateral. In connection with purchasing participations, the Invesco Senior Loan ETF generally will have no right to enforce compliance by the borrower with the terms of the loan agreement relating to the loan, nor any rights of set-off against the borrower, and the Invesco Senior Loan ETF may not directly benefit from any collateral supporting the loan in which it has purchased the participation. As a result, the Invesco Senior Loan ETF will be subject to the credit risk of both the borrower and the lender that is selling the participation. In the event of the insolvency of the lender selling a participation, the Invesco Senior Loan ETF may be treated as a general creditor of the lender and may not benefit from any set-off between the lender and the borrower. In addition, the Invesco Senior Loan ETF may be required to pass along to a purchaser that buys a loan from the Invesco Senior Loan ETF by way of assignment, a portion of any fees to which the Invesco Senior Loan ETF is entitled under the loan.

Risks associated with the real estate industry will affect the value of the notes.

The real estate industry is cyclical and has from time to time experienced significant difficulties. The prices of the securities held by the Vanguard Real Estate ETF and, in turn, the value of the Vanguard Real Estate ETF will be affected by a number of factors that may either offset or magnify each other, including:

- employment levels and job growth;

- the availability of financing for real estate;
- interest rates;
- consumer confidence;
- the availability of suitable undeveloped land;
- federal, state and local laws and regulations concerning the development of land, construction, home and commercial real estate sales, financing and environmental protection; and
- competition among companies that engage in the real estate business.

The difficulties described above could cause a downturn in the real estate industry generally or regionally and could cause the value of the securities held by the Vanguard Real Estate ETF and the value of the Vanguard Real Estate ETF to decline or remain flat during the term of the notes. In addition, other ETF Constituents that hold securities related to the real estate industry may be subject to these risks.

Risks associated with Real Estate Investment Trusts will affect the value of the notes.

The Vanguard Real Estate ETF is composed of a variety of real-estate-related stocks including real estate investment trusts (“**REITs**”). REITs invest primarily in income-producing real estate or real-estate-related loans or interests. Investments in REITs, though not direct investments in real estate, are still subject to the risks associated with investing in real estate. The following are some of the conditions that might impact the structure of and cash flow generated by REITs and, consequently, the value of REITs and, in turn, the value of the Vanguard Real Estate ETF:

- a decline in the value of real estate properties;
- extended vacancies of properties;
- increases in property and operating taxes;
- increased competition or overbuilding;
- a lack of available mortgage funds or other limits on accessing capital;
- tenant bankruptcies and other credit problems;
- limitation on rents, including decreases in market rates for rents;
- changes in zoning laws and governmental regulations;
- costs resulting from the clean-up of, and legal liability to third parties for, damages resulting from environmental problems;
- investments in developments that are not completed or that are subject to delays in completion;
- risks associated with borrowing;
- changes in interest rates;
- casualty and condemnation losses; and
- uninsured damages from floods, earthquakes or other natural disasters.

The factors above may either offset or magnify each other. To the extent that any of these conditions occur, they may negatively impact a REIT’s cash flow and cause a decline in the share price of a REIT, and, consequently, the value of the Vanguard Real Estate ETF. In addition, some REITs have relatively small market capitalizations, which can increase the volatility of the market price of securities issued by those REITs. Furthermore, REITs are dependent upon specialized management skills, have limited diversification and are, as a result, subject to risks inherent in operating and financing a limited number of projects. To the extent that such risks increase the volatility of the market price of securities issued by REITs, they may also, consequently, increase the volatility of the Vanguard Real Estate ETF.

There will be no direct correlation between the value of the notes or the price of the Vanguard Real Estate ETF and residential housing prices.

There is no direct linkage between the value of the Vanguard Real Estate ETF and residential housing prices in specific regions or residential housing prices in general. While residential housing prices may be one factor that could affect the prices of the securities held by the Vanguard Real Estate ETF and consequently the value of the Vanguard Real Estate ETF, the value of the Vanguard Real Estate ETF and therefore the value of the notes are not directly linked to movements of residential housing prices and may be affected by factors unrelated to such movements.

Risks associated with the gold and silver mining industries will affect the value of the notes.

The securities held by the VanEck® Gold Miners ETF have been issued by companies primarily engaged in mining for gold and silver. The shares of the VanEck® Gold Miners ETF may be subject to increased price volatility as they are linked to a single industry and may be more susceptible to adverse economic, market, political or regulatory occurrences affecting that industry.

Because the VanEck® Gold Miners ETF invests primarily in securities of companies that are involved in the gold mining industries, the shares of the VanEck® Gold Miners ETF are subject to certain risks associated with such companies. Competitive pressures may have a significant effect on the financial condition of such companies in the gold mining industry. Also, gold mining companies are highly dependent on the price of gold. Gold prices are subject to volatile price movements over short periods of time and are affected by numerous factors, including macroeconomic factors, such as the structure of and confidence in the global monetary system, expectations regarding the future rate of inflation, the relative strength of, and confidence in, the U.S. dollar (the currency in which the price of gold is usually quoted), interest rates, gold borrowing and lending rates and global or regional economic, financial, political, regulatory, judicial or other events, especially those of unexpected nature. Gold prices may be affected by industry factors, such as industrial and jewelry demand as well as lending, sales and purchases of gold by the official sector, including central banks and other governmental agencies and multilateral institutions that hold gold. Additionally, gold prices may be affected by levels of gold production, production costs and short-term changes in supply and demand due to trading activities in the gold market. From time to time, above-ground inventories of gold may also influence the market. It is not possible to predict the aggregate effect of all or any combination of these factors. The price of gold has recently been, and may continue to be, extremely volatile.

The VanEck® Gold Miners ETF invests to a lesser extent in securities of companies involved in the silver mining industry. Silver mining companies are highly dependent on the price of silver. Silver prices can fluctuate widely and may be affected by numerous factors. These include general economic trends, technical developments, substitution issues and regulation, as well as specific factors including industrial and jewelry demand, expectations with respect to the rate of inflation, the relative strength of the U.S. dollar (the currency in which the price of silver is generally quoted) and other currencies, interest rates, central bank sales, forward sales by producers, global or regional political or economic events and production costs and disruptions in major silver-producing countries, such as Mexico, China and Peru. The demand for and supply of silver affect silver prices, but not necessarily in the same manner as supply and demand affect the prices of other commodities. The supply of silver consists of a combination of new mine production and existing stocks of bullion and fabricated silver held by governments, public and private financial institutions, industrial organizations and private individuals. In addition, the price of silver has on occasion been subject to very rapid short-term changes due to speculative activities. From time to time, above-ground inventories of silver may also influence the market. The major end uses for silver include industrial applications, jewelry and silverware. It is not possible to predict the aggregate effect of all or any combination of these factors.

The notes are subject to risks associated with the energy infrastructure sector and master limited partnerships with respect to the Alerian MLP ETF.

All or substantially all of the equity securities held by the Alerian MLP ETF are issued by master limited partnerships (“MLPs”) whose primary line of business is associated with the energy infrastructure

sector. As a result, the value of the notes may be subject to greater volatility and be more adversely affected by a single economic, political or regulatory occurrence affecting this sector than a different investment linked to securities of a more broadly diversified group of issuers. Energy infrastructure companies are subject to risks specific to the industry they serve including, but not limited to, the following: fluctuations in energy commodity prices, which may impact the volume of energy commodities transported, processed, stored or distributed; reduced volumes of natural gas or other energy commodities available for transporting, processing or storing; new construction risks and acquisition risk, which can limit growth potential; a sustained reduced demand for crude oil, natural gas and refined petroleum products resulting from a recession or an increase in market price or higher taxes; changes in the regulatory environment; extreme weather; rising interest rates, which could result in a higher cost of capital and drive investors into other investment opportunities; global, political and economic instability; and threats of attack by terrorists. In addition, investments in securities of MLPs involve risks that differ from investments in common stock, including risks related to limited control and limited rights to vote on matters affecting an MLP, risks related to potential conflicts of interest between an MLP and its general partner, dilution risks and risks related to the general partner's right to require unitholders to sell their common units at an undesirable time or price due to regulatory changes and cash flow risks. MLP common units can be affected by macroeconomic and other factors affecting the stock market in general, expectations of interest rates, investor sentiment towards MLPs or the energy sector, changes in a particular issuer's financial condition, or unfavorable or unanticipated poor performance of a particular issuer (in the case of MLPs, generally measured in terms of distributable cash flow). MLPs holding credit-related investments are subject to interest rate risk and the risk of default on payment obligations by debt issuers. Changes in the tax law affecting MLPs could adversely affect the price performance of securities of MLPs. These factors could affect the energy infrastructure sector and the MLPs operating in this sector and could affect the value of the equity securities held by Alerian MLP ETF and the price of the Alerian MLP ETF during the term of the notes, which may adversely affect the value of your notes.

Risks Relating to the Commodity Constituents

The notes are not regulated by the Commodity Futures Trading Commission (the "CFTC").

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

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

The commodity futures contracts underlying the Invesco DB Commodity Index Tracking Fund or related to gold underlying the iShares® Gold Trust are subject to legal and regulatory regimes that may change in ways that could affect our ability to hedge our obligations under the notes, may

have an adverse effect on the level of an Index and/or could lead to a commodity hedging disruption event and its attendant consequences.

Futures contracts and options on futures contracts markets, including the futures contracts underlying the Invesco DB Commodity Index Tracking Fund or related to gold underlying the iShares® Gold Trust, are subject to extensive regulation and margin requirements. The CFTC and the exchanges on which those futures contracts trade are authorized to take extraordinary actions in the event of a market emergency, including, for example, the retroactive implementation of speculative position limits or higher margin requirements, the establishment of daily limits and the suspension of trading. Furthermore, certain exchanges have regulations that limit the amount of fluctuation in futures contract prices that may occur. These limits could adversely affect the market prices of relevant futures contracts and forward contracts. The regulation of commodity transactions in the United States is subject to ongoing modification by governmental and judicial action. In addition, various non-U.S. governments have expressed concern regarding the disruptive effects of speculative trading in the commodity markets and the need to regulate the derivative markets in general. The effect on the value of the notes of any future regulatory change is impossible to predict but could be substantial and adverse to the interests of noteholders.

Notably, with respect to agricultural and exempt commodities as defined in the Commodity Exchange Act (generally, physical commodities such as agricultural commodities, energy commodities and metals), the CFTC has authority to establish limits on the number of positions, other than bona fide hedge positions, that may be held by any person in a commodity through futures contracts, options on futures contracts and other related derivatives, such as swaps, that are economically equivalent to those contracts. In addition, designated contract markets and swap execution facilities, as defined in the Commodity Exchange Act, are authorized to establish and enforce position limits or position accountability requirements on their own markets or facilities, which must be at least as stringent as the CFTC's where CFTC limits also apply.

In October 2020, the CFTC adopted rules to establish revised or new position limits on 25 agricultural, metals and energy commodity derivatives contracts. The limits apply to a number of futures contracts, such as CBOT Soybeans, Soybean Meal and Wheat futures; ICE Futures US Cotton No. 2, Sugar No. 11 and Sugar No. 16 futures; NYMEX Light Sweet Crude Oil, NYMEX NY Harbor USLD Heating Oil, NY Harbor Gasoline Blendstock and Henry Hub Natural Gas futures; and COMEX Gold, Silver and Copper futures and NYMEX Palladium futures. The limits apply to a person's combined position in the specified 25 futures contracts and options on futures ("**core referenced futures contracts**"), futures and options on futures directly or indirectly linked to the core referenced futures contracts, and economically equivalent swaps. These rules came into effect on January 1, 2022 for covered futures and options on futures contracts and on January 1, 2023 for covered swaps. The rules may reduce liquidity in the exchange-traded market for those commodity-based futures contracts, which may, in turn, have an adverse effect on any payment on the notes.

Upon the occurrence of legal or regulatory changes that the calculation agent determines have interfered with our or our affiliates' ability to hedge our obligations under the notes, including under the CFTC position limit rules mentioned above, or if for any other reason we or our affiliates are unable to enter into or maintain hedge positions the calculation agent deems necessary to hedge our obligations under the notes, a commodity hedging disruption event may occur. Please see the accompanying product supplement for more information about commodity hedging disruption events and their attendant consequences.

Commodity futures prices may change unpredictably, and may be near zero, zero or negative, in each case affecting the price of shares of the Invesco DB Commodity Index Tracking Fund and the value of the notes in unforeseeable ways.

Trading in commodity futures contracts underlying the Invesco DB Commodity Index Tracking Fund is speculative and can be extremely volatile. A decrease in the price of any of the commodities upon which the futures contracts that compose the Invesco DB Commodity Index Tracking Fund are based may have

a material adverse effect on the value of the notes and your return on an investment in the notes. Market prices of the commodities on which the futures contracts that compose the Invesco DB Commodity Index Tracking Fund are based may fluctuate rapidly based on numerous factors, including: changes in supply and demand relationships, governmental programs and policies, national and international monetary, trade, political, geopolitical and economic events, wars (e.g. Russia's invasion of Ukraine and resulting sanctions) and acts of terror, changes in interest and exchange rates, speculation and trading activities in commodities and related contracts, weather, agricultural, trade, fiscal and exchange control policies, and market confidence in relevant markets, exchanges and custodians. The price volatility of each commodity also affects the value of the futures and forward contracts related to that commodity and therefore its price at any such time. The price of any one commodity may be correlated to a greater or lesser degree with any other commodity and factors affecting the general supply and demand as well as the prices of other commodities may affect the particular commodity in question. The commodities markets are subject to temporary distortions or other disruptions due to various factors, including the lack of liquidity in the markets, the participation of speculators and government regulation and intervention. Many commodities are also highly cyclical. These factors, some of which are specific to the nature of each such commodity, may affect the value of the different commodities upon which the futures contracts that compose the Invesco DB Commodity Index Tracking Fund are based, and may cause the values of the futures contracts themselves, to move in inconsistent directions at inconsistent rates. This, in turn, will affect the value of shares of the Invesco DB Commodity Index Tracking Fund and the value of the notes. It is not possible to predict the aggregate effect of all or any combination of these factors.

In addition, prices of commodity futures contracts may be near zero, zero or negative, which can occur rapidly and unexpectedly. For example, in April 2020, the collapse of demand for fuel following government restrictions on travel contributed to an oversupply of crude oil that rapidly filled most available oil storage facilities. Storage shortages meant that market participants who had contracted to buy and take delivery of crude oil were therefore at risk of default under the terms of the May 2020 NYMEX West Texas Intermediate ("WTI") crude oil futures contract. The critical scarcity of storage forced some market participants to sell their futures contracts at a negative price (effectively paying another market participant to accept delivery of the crude oil referenced by the relevant contracts). As a result, for the first time in history, crude oil futures contracts traded below zero. On April 20, 2020, the last trading day before expiration of the May 2020 WTI crude oil futures contract, prices of that contract fell to negative \$37.63. If any commodity futures contract referenced in the Invesco DB Commodity Index Tracking Fund reaches a near-zero, zero or negative price, the market value of and return on the notes could be adversely affected, potentially severely and in unanticipated ways.

The Invesco DB Commodity Index Tracking Fund does not offer direct exposure to commodity spot prices.

The value of the Invesco DB Commodity Index Tracking Fund is intended to track generally the performance of commodity-futures contracts on physical commodities included in its underlying index, not physical commodities (or their spot prices). The price of a futures contract reflects the expected value of the commodity upon delivery in the future, whereas the spot price of a commodity reflects the immediate delivery value of the commodity. A variety of factors can lead to a disparity between the expected future price of a commodity and the spot price at a given point in time, such as the cost of storing the commodity for the term of the futures contract, interest charges incurred to finance the purchase of the commodity and expectations concerning supply and demand for the commodity. The price movements of a futures contract are typically correlated with the movements of the spot price of the reference commodity, but the correlation is generally imperfect and price movements in the spot market may not be reflected in the futures market (and vice versa). Accordingly, the notes may underperform a similar investment that reflects the return on physical commodities.

Suspension or disruptions of market trading in relevant commodity and related futures markets may adversely affect the value of the notes.

The commodity markets are subject to temporary distortions or other disruptions due to various factors, including the lack of liquidity in the markets, the participation of speculators and government

regulation and intervention. In addition, U.S. futures exchanges and some foreign exchanges have regulations that limit the amount of fluctuation in futures contract prices that may occur during a single day. These limits are generally referred to as “daily price fluctuation limits,” and the maximum or minimum price of a contract on any given day as a result of these limits is referred to as a “limit price.” Once the limit price has been reached for a particular contract, no trades may be made at a different price. Limit prices have the effect of precluding trading in a particular contract or forcing the liquidation of contracts at disadvantageous times or prices. These circumstances could affect the price of shares of the Invesco DB Commodity Index Tracking Fund and the iShares® Gold Trust and therefore, the level of an Index and the value of the notes.

An increase in the margin requirements for commodity futures contracts included in the Invesco DB Commodity Index Tracking Fund may adversely affect the level of an Index.

Futures exchanges require market participants to post collateral in order to open and keep open positions in futures contracts. If an exchange increases the amount of collateral required to be posted to hold positions in commodity futures contracts underlying the Invesco DB Commodity Index Tracking Fund, market participants who are unwilling or unable to post additional collateral may liquidate their positions, which may cause the price of the relevant commodity futures contracts to decline significantly. As a result, the level of an Index and the value of the notes may be adversely affected.

Some of the commodities underlying the Invesco DB Commodity Index Tracking Fund will be subject to pronounced risks of pricing volatility.

As a general matter, the risk of low liquidity or volatile pricing around the maturity date of a commodity futures contract is greater than in the case of other futures contracts because (among other factors) a number of market participants take physical delivery of the underlying commodities. Many commodities, like those in the energy and industrial metals sectors, have liquid futures contracts that expire every month. Therefore, in the calculation of the Invesco DB Commodity Index Tracking Fund, these contracts are rolled forward every month. Contracts based on certain other commodities, most notably agricultural and livestock products, tend to have only a few contract months each year that trade with substantial liquidity. Thus, these commodities, with related futures contracts that expire infrequently, roll forward less frequently than every month in the calculation of the Invesco DB Commodity Index Tracking Fund, and can have further pronounced pricing volatility during extended periods of low liquidity. The risk of irregular liquidity or pricing around the maturity date of a commodity futures contract is greater than in the case of other futures contracts because (among other factors) a number of market participants take delivery of the underlying commodities. Due to the significant level of continuous consumption, limited reserves and oil cartel controls, energy commodities are subject to rapid price increases in the event of perceived or actual shortages. These factors (when combined or in isolation) may affect the price of futures contracts and, as a consequence, the level of an Index and any payment on the notes.

Higher future prices of the commodity futures contracts constituting the Invesco DB Commodity Index Tracking Fund relative to their current prices may lead to a decrease in any payment on the notes.

The Invesco DB Commodity Index Tracking Fund is composed of futures contracts on physical commodities. Unlike equities, which typically entitle the holder to a continuing stake in a corporation, commodity futures contracts normally specify a certain date for delivery of the underlying physical commodity. As the exchange-traded futures contracts that compose the Invesco DB Commodity Index Tracking Fund approach expiration, they are replaced by contracts that have a later expiration. For example, a contract purchased and held in August may specify an October expiration. As time passes, the contract expiring in October is replaced by a contract for delivery in November. This is accomplished by selling the October contract and purchasing the November contract. This process is referred to as “rolling.” Excluding other considerations, if the market for the underlying futures contracts is in “contango,” where the prices are higher in the distant delivery months than in the nearer delivery months, the purchase of the November contract would take place at a price that is higher than the price of the October contract, thereby creating a *negative* “roll yield.” Moreover, many commodities have historically

exhibited contango markets. The presence of contango in the commodity markets could adversely affect the price of shares of the Invesco DB Commodity Index Tracking Fund and, therefore, the level of an Index and any payments on, and the value of, the notes.

The prices of commodities are volatile and are affected by numerous factors, some of which are specific to the commodity sector for each commodity futures contracts held by the Invesco DB Commodity Index Tracking Fund.

A change in the price of any of the commodity futures contracts underlying the Invesco DB Commodity Index Tracking Fund may have a material adverse effect on the value of the notes and your return on your investment in the notes. Commodities futures contracts are subject to the effect of numerous factors, certain of which are specific to the commodity sector for each commodity futures contract underlying the Invesco DB Commodity Index Tracking Fund, as discussed below.

Agricultural Sector

Global prices of agricultural commodities, including corn, soybeans, sugar and wheat, are primarily affected by the global demand for and supply of those commodities but are also significantly influenced by speculative actions and by currency exchange rates. In addition, prices for agricultural commodities are affected by governmental programs and policies regarding agriculture, as well as general trade, fiscal and exchange control policies. Extrinsic factors, such as drought, floods, general weather conditions, disease and natural disasters may also affect agricultural commodity prices. Demand for agricultural commodities, such as wheat, corn and soybeans, both for human consumption and as cattle feed, has generally increased with worldwide growth and prosperity.

Energy Sector

Global prices of energy commodities, including WTI crude oil, Brent crude oil, RBOB gasoline, heating oil and natural gas, are primarily affected by the global demand for and supply of these commodities, but they are also significantly influenced by speculative actions and by currency exchange rates. In addition, prices for energy commodities are affected by governmental programs and policies, national and international political and economic events, changes in interest and exchange rates, trading activities in commodities and related contracts, trade, fiscal, monetary and exchange control policies, and with respect to oil, drought, floods, weather, government intervention, environmental policies, embargoes and tariffs. Demand for refined petroleum products by consumers, as well as by the agricultural, manufacturing and transportation industries, affects the price of energy commodities. Sudden disruptions in the supplies of energy commodities, such as those caused by war, natural events, accidents or acts of terrorism, may cause prices of energy commodity futures contracts to become extremely volatile and unpredictable. Also, sudden and dramatic changes in the futures market may occur, for example, upon a cessation of hostilities that may exist in countries producing energy commodities, the introduction of new or previously withheld supplies into the market or the introduction of substitute products or commodities. In particular, supplies of crude oil may increase or decrease depending on, among other factors, production decisions by the Organization of the Oil and Petroleum Exporting Countries (“OPEC”) and other crude oil producers. Crude oil prices are determined with significant influence by OPEC, which has the capacity to influence oil prices worldwide because its members possess a significant portion of the world’s oil supply. Crude oil prices are generally more volatile and more subject to dislocation than are prices of other commodities. Demand for energy commodities such as oil and gasoline is generally linked to economic activity and will tend to reflect general economic conditions.

Industrial Metals Sector

Global prices of industrial metals commodities, including aluminum, copper and zinc, are primarily affected by the global demand for and supply of these commodities, but they are also significantly influenced by speculative actions and by currency exchange rates. Demand for industrial metals is significantly influenced by the level of global industrial economic activity. Prices for industrial metals commodities are affected by governmental programs and policies, national and international political and economic events, changes in interest and exchange rates, trading activities in commodities and related

contracts, trade, fiscal, monetary and exchange control policies, government intervention, embargoes and tariffs. An additional, but highly volatile, component of demand for industrial metals is adjustments to inventory in response to changes in economic activity and/or pricing levels, which will influence investment decisions in new mines and smelters. Sudden disruptions in the supplies of industrial metals, such as those caused by war, natural events, accidents, acts of terrorism, transportation problems, labor strikes and shortages of power, may cause prices of industrial metals futures contracts to become extremely volatile and unpredictable. The introduction of new or previously withheld supplies into the market or the introduction of substitute products or commodities will also affect the prices of industrial metals commodities.

Precious Metals Sector

Global prices of precious metals commodities, including gold and silver, are primarily affected by the global demand for and supply of those commodities, but they are also significantly influenced by speculative actions and by currency exchange rates. Demand for precious metals is significantly influenced by the level of global industrial economic activity. Prices for precious metals are affected by governmental programs and policies, national and international political and economic events, expectations with respect to the rate of inflation, changes in interest and exchange rates, trading activities in commodities and related contracts, trade, fiscal, monetary and exchange control policies, government intervention, embargoes and tariffs. Sudden disruptions in the supplies of precious metals, such as those caused by war, natural events, accidents, acts of terrorism, transportation problems, labor strikes and shortages of power, may cause prices of precious metals futures contracts to become extremely volatile and unpredictable. In addition, prices for precious metals can be affected by numerous other factors, including jewelry demand and production levels.

The price of gold is volatile and is affected by numerous factors.

The value of the iShares® Gold Trust is closely related to the price of gold. A decrease in the price of gold may have a material adverse effect on the value of the notes and any payment on the notes. Gold is subject to the effect of numerous factors. The following describes some of the factors affecting gold.

The price of gold is primarily affected by the global demand for and supply of gold. The market for gold bullion is global, and gold prices are subject to volatile price movements over short periods of time and are affected by numerous factors, including macroeconomic factors, such as the structure of and confidence in the global monetary system, expectations regarding the future rate of inflation, the relative strength of, and confidence in, the U.S. dollar (the currency in which the price of gold is usually quoted), interest rates, gold borrowing and lending rates and global or regional economic, financial, political, regulatory, judicial or other events. Gold prices may be affected by industry factors, such as industrial and jewelry demand as well as lending, sales and purchases of gold by the official sector, including central banks and other governmental agencies and multilateral institutions that hold gold. Additionally, gold prices may be affected by levels of gold production, production costs and short-term changes in supply and demand due to trading activities in the gold market. From time to time, above-ground inventories of gold may also influence the market. It is not possible to predict the aggregate effect of all or any combination of these factors. The price of gold has recently been, and may continue to be, extremely volatile.

Economic or political events or crises, especially those of unexpected nature, could result in large-scale purchases or sales of gold, which could affect the price of gold and may adversely affect the value of the notes.

Many investors, institutions, governments and others purchase and sell gold as a hedge against inflation, market turmoil or uncertainty or political events. Under such circumstances, significant large-scale purchases or sales of gold by market participants may affect the price of gold, which could adversely affect the value of the notes. Crises in the future may impair gold's price performance which would, in turn, adversely affect the shares of the iShares® Gold Trust and any payment on the notes.

Substantial sales of gold by governments or public sector entities could result in price decreases, which would adversely affect the value of the notes.

Governments and other public sector entities, such as agencies of governments and multi-national institutions, regularly buy, sell and hold gold as part of the management of their reserves. In the event that economic, political or social conditions or pressures require or motivate public sector entities to sell gold, in a coordinated or uncoordinated manner, the resulting purchases could cause the price of gold to decrease substantially, which could adversely affect any payment on the notes.

An investment in the notes may be subject to risks associated with the London Bullion Market Association and ICE Benchmark Administration.

One of the ETF Constituents, the iShares® Gold Trust, is closely related to its underlying commodity, which is gold. The price of gold is determined by an independent service provider appointed by the LBMA, which is currently ICE Benchmark Administration. The net asset value of the iShares® Gold Trust is determined by reference to the LBMA gold prices reported by ICE Benchmark Administration. If bullion trading should become subject to a value added tax or other tax or any other form of regulation currently not in place, the role of the LBMA gold price as a global benchmark for the value of gold may be adversely affected. The LBMA gold price reflects a principals' market that operates in a manner more closely analogous to an over-the-counter physical commodity market than regulated futures markets, and certain features of U.S. futures contracts are not present in the context of the LBMA gold price. For example, there are no daily price limits on the LBMA gold price that would otherwise restrict fluctuations in the LBMA gold price. In a declining market, it is possible that prices would continue to decline without limitation within a trading day or over a period of trading days.

The relevant exchange for gold has no obligation to consider your interests.

The price of the iShares® Gold Trust is closely related to the price of gold. The relevant exchange may alter, discontinue or suspend calculation or dissemination of the LBMA gold price. Any of these actions could adversely affect the value of the notes. The relevant exchange has no obligation to consider your interests in calculating or revising the LBMA gold price.

Termination of the iShares® Gold Trust could adversely affect the value of the notes.

The iShares® Gold Trust may be required to terminate and liquidate at a time that is disadvantageous to you. If the iShares® Gold Trust is required to terminate and liquidate, such termination and liquidation could occur at a time that is disadvantageous to you, such as when the price of gold is higher than the price of gold at the time when you purchased your notes.

The performance of the iShares® Gold Trust may not correlate with the price of gold.

The performance of iShares® Gold Trust may not fully replicate the performance of the price of gold due to the fees and expenses charged by the iShares® Gold Trust or by restrictions on access to gold due to other circumstances. The iShares® Gold Trust does not generate any income and as the iShares® Gold Trust regularly sells gold to pay for its ongoing expenses, the amount of gold represented by each share gradually declines over time. The iShares® Gold Trust sells gold to pay expenses on an ongoing basis irrespective of whether the trading price of the shares rises or falls in response to changes in the price of gold. The sale of iShares® Gold Trust's gold to pay expenses at a time of low gold prices could adversely affect the level of an Index and the value of the notes. Additionally, there is a risk that part or all of the iShares® Gold Trust's gold could be lost, damaged or stolen due to war, terrorism, theft, natural disaster or otherwise.

The net asset value of the iShares® Gold Trust will reflect the performance of gold. However, because the shares of the iShares® Gold Trust are traded on a securities exchange and are subject to market supply and investor demand, the market value of one share of the iShares® Gold Trust may differ from the net asset value per share of the iShares® Gold Trust.

For all of the foregoing reasons, the performance of the iShares® Gold Trust over the term of the notes may not correlate with the performance of the return on gold over the same period. Consequently, the return on the notes will not be the same as investing directly in the iShares® Gold Trust, gold or other exchange-traded or over-the-counter instruments based on gold, and will not be the same as investing in a note or another financial product with payments linked in part to the performance of the iShares® Gold Trust.

Risks Relating to the Notional Financing Cost

J.P. Morgan Securities LLC (“JPMS”), the sponsor (the “Cash Index Sponsor”) and calculation agent (the “Cash Index Calculation Agent”) of the J.P. Morgan Fallback Cash Index, the J.P. Morgan 2M Spread-Adjusted SOFR Index and the J.P. Morgan 3M Spread-Adjusted SOFR Index (each, a “Cash Index”), may adjust a Cash Index in a way that affects its level, and JPMS has no obligation to consider your interests.

JPMS, one of our affiliates, currently acts as the Cash Index Sponsor and the Cash Index Calculation Agent and is responsible for calculating and maintaining the Cash Indices and developing the guidelines and policies governing their composition and calculation. In performing these duties, JPMS may have interests adverse to the interests of the holders of the notes, which may affect your return on the notes, particularly where JPMS, as the Cash Index Sponsor and the Cash Index Calculation Agent, is entitled to exercise discretion. The rules governing the Cash Indices may be amended at any time by the Cash Index Sponsor, in its sole discretion. The rules also permit the use of discretion by the Cash Index Sponsor and the Cash Index Calculation Agent in relation to each Cash Index in specific instances, including, but not limited to, the determination of whether to replace a constituent with a substitute or successor upon the occurrence of certain events affecting that constituent, the selection of any substitute or successor and the determination of the levels to be used in the certain events that affect the ability of the Cash Index Calculation Agent to calculate and publish the levels of the Cash Index and the interpretation of the rules governing the Cash Index. Although JPMS, acting as the Cash Index Sponsor and the Cash Index Calculation Agent, will make all determinations and take all action in relation to each Cash Index acting in good faith, it should be noted that JPMS may have interests adverse to the interests of the holders of the notes and the policies and judgments for which JPMS is responsible could have an impact, positive or negative, on the level of a Cash Index and the value of your notes.

Although judgments, policies and determinations concerning each Cash Index are made by JPMS, JPMorgan Chase & Co., as the ultimate parent company of JPMS, ultimately controls JPMS. JPMS has no obligation to consider your interests in taking any actions that might affect the value of your notes. Furthermore, the inclusion of any constituent in a Cash Index is not an investment recommendation by us or JPMS of that constituent.

SOFR has a limited history and its future performance cannot be predicted based on historical performance.

The publication of SOFR began in April 2018, and, therefore, it has a limited history. In addition, the future performance of SOFR cannot be predicted based on the limited historical performance. The level of SOFR during the term of the notes may bear little or no relation to historical actual or historical indicative SOFR data. Prior observed patterns, if any, in the behavior of market variables and their relation to SOFR, such as correlations, may change in the future. While some pre-publication historical data has been released by the Federal Reserve Bank of New York (“FRBNY”), production of such historical indicative SOFR data inherently involves assumptions, estimates and approximations. No future performance of SOFR may be inferred from any of historical actual or historical indicative SOFR data. Hypothetical or historical performance data are not indicative of, and have no bearing on, the potential performance of SOFR. Changes in the levels of SOFR will affect the notional financing cost and, therefore, the performance of each Index and the return on the notes and the trading price of the notes, but it is impossible to predict whether such levels will rise or fall.

SOFR will be affected by a number of factors.

The notional financing cost will depend on SOFR. SOFR will depend on a number of factors, including, but not limited to:

- supply and demand for overnight U.S. Treasury repurchase agreements;
- sentiment regarding underlying strength in the U.S. and global economies;
- expectations regarding the level of price inflation;
- sentiment regarding credit quality in the U.S. and global credit markets;
- central bank policy regarding interest rates;
- inflation and expectations concerning inflation;
- performance of capital markets; and
- any statements from public government officials regarding the cessation of SOFR.

These and other factors may have a material effect on the performance of SOFR, on the notional financing cost, on the performance of each Index and on the value of the notes in the secondary market.

SOFR may be volatile and may be more volatile than other benchmark or market interest rates.

SOFR is subject to volatility due to a variety of factors affecting interest rates generally, including, but not limited to:

- sentiment regarding underlying strength in the U.S. and global economies;
- expectations regarding the level of price inflation;
- sentiment regarding credit quality in U.S. and global credit markets;
- central bank policy regarding interest rates; and
- performance of capital markets.

Since the initial publication of SOFR, daily changes in the rate have, on occasion, been more volatile than daily changes in other benchmark or market rates, such as U.S. dollar LIBOR, during corresponding periods.

The composition and characteristics of SOFR are not the same as those of LIBOR and there is no guarantee that SOFR is a comparable substitute for LIBOR.

In June 2017, the Federal Reserve Bank of New York's Alternative Reference Rates Committee (the "ARRC") announced SOFR as its recommended alternative to U.S. dollar LIBOR. However, the composition and characteristics of SOFR are not the same as those of U.S. dollar LIBOR. SOFR is a broad Treasury repo financing rate that represents overnight secured funding transactions and is not the economic equivalent of U.S. dollar LIBOR. While SOFR is a secured rate, U.S. dollar LIBOR is an unsecured rate. In addition, while SOFR currently is an overnight rate only, U.S. dollar LIBOR is a forward-looking rate that represents interbank funding for a specified term. As a result, there can be no assurance that SOFR will perform in the same way as U.S. dollar LIBOR would have at any time, including, without limitation, as a result of changes in interest and yield rates in the market, bank credit risk, market volatility or global or regional economic, financial, political, regulatory, judicial or other events. For the same reasons, SOFR is not expected to be a comparable substitute, successor or replacement for U.S. dollar LIBOR.

The fixed spreads added to SOFR in calculating the J.P. Morgan Fallback Cash Index will increase the notional financing cost, which will negatively affect the performance of an Index.

The notional financing cost is intended to approximate the cost of maintaining a position in the Basket Constituents using borrowed funds at the rate of interest underlying the Cash Constituent, which seeks to track a composite rate of interest that is intended to reflect the overnight rate of return of a notional position in a three-month time deposit in U.S. dollars, calculated by reference to spread-adjusted SOFR. The fixed spreads added to SOFR in calculating the J.P. Morgan Fallback Cash Index are arbitrary and will increase the notional financing cost, which will negatively affect the performance of each Index.

The J.P. Morgan Fallback Cash Index is calculated by reference to daily SOFR rates, not compounded SOFR rates.

The J.P. Morgan Fallback Cash Index is calculated by reference to daily SOFR rates, plus fixed spreads, not to SOFR compounded over any period. Accordingly, the J.P. Morgan Fallback Cash Index is expected to be more representative of current overnight rates than of the overnight rate of return of a notional position in a three-month time deposit in U.S. dollars. The notional financing cost may in some circumstances be higher than if compounded SOFR were used to calculate the J.P. Morgan Fallback Cash Index.

The administrator of SOFR may make changes that could adversely affect the level of SOFR or discontinue SOFR and has no obligation to consider your interest in doing so.

SOFR is a relatively new rate, and FRBNY (or a successor), as administrator of SOFR, may make methodological or other changes that could change the value of SOFR, including changes related to the method by which SOFR is calculated, eligibility criteria applicable to the transactions used to calculate SOFR, or timing related to the publication of SOFR. If the manner in which SOFR is calculated is changed, that change may result in an increase to the notional financing cost, which would adversely affect the performance of the Indices and the notes. The administrator of SOFR may withdraw, modify, amend, suspend or discontinue the calculation or dissemination of SOFR in its sole discretion and without notice and has no obligation to consider the interests of holders of the notes in calculating, withdrawing, modifying, amending, suspending or discontinuing SOFR. The level of the J.P. Morgan Fallback Cash Index in respect of a particular date will not be adjusted for any new or amended SOFR data that the administrator of SOFR may publish after the level of the J.P. Morgan Fallback Cash Index has been determined unless the Cash Index Calculation Agent determines that the new or amended SOFR data is material.

A constituent of a Cash Index may be replaced by a substitute upon the occurrence of certain extraordinary events.

Following the occurrence of certain extraordinary events with respect to a constituent, the affected constituent may be replaced by a substitute or the Cash Index Calculation Agent may cease calculation and publication of the relevant Cash Index on a date determined by the Cash Index Calculation Agent. You should realize that the changing of a constituent may affect the performance of the relevant Cash Index, and therefore, the notional financing cost, each Index and the return on the notes, as the replacement constituent may have performance that differs significantly from that of the original constituent.

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

THE J.P. MORGAN EFFICIENTE® PLUS INDEX SERIES

Each index in the J.P. Morgan Efficiente® Plus Index Series set forth in the table below (each, an “**Index**” and collectively the “**Indices**”) was developed and is maintained and calculated by J.P. Morgan Securities LLC (“**JPMS**”). The description of the Indices and their methodology included in this underlying supplement is based on rules formulated by JPMS (the “**Rules**”). The Rules, and not this description, will govern the calculation and constitution of the Indices and other decisions and actions related to their maintenance. The Rules in effect as of the date of this underlying supplement are attached as Annex A to this underlying supplement. Each Index is the intellectual property of JPMS, and JPMS reserves all rights with respect to its ownership of each Index. Each Index is reported by Bloomberg L.P. (“**Bloomberg**”) under the applicable ticker symbol set forth in the table below. Each Index for which the “Daily Series Applicability” in the table below is specified as “Applicable” is a “**Daily Series Index**.”

Index	Bloomberg Ticker	Volatility Threshold	Daily Series Applicability
J.P. Morgan Efficiente® Plus 5 Index (Net ER)	EFPLUS5E	5%	N/A
J.P. Morgan Efficiente® Plus DS 5 Index (Net ER)	EFPLUS5D	5%	Applicable
J.P. Morgan Efficiente® Plus DS 8 Index (Net ER)	EFPLUS8D	8%	Applicable

Each Index seeks to provide a dynamic and diversified asset allocation based on modern portfolio theory. Each Index tracks the return of (a) a notional dynamic portfolio consisting of up to 20 exchange-traded funds (each an “**ETF Constituent**,” and collectively the “**ETF Constituents**”), in each case with distributions, if any, notionally reinvested, and the J.P. Morgan Fallback Cash Index (including any successor or substitute cash index included in an Index, the “**Cash Constituent**”), less (b) the daily deduction of a notional financing cost and a daily deduction of 0.85% per annum. The ETF Constituents and the Cash Constituent are referred to together as the “**Basket Constituents**.” The ETF Constituents represent a diverse range of asset classes and geographic regions.

Each Index selects and rebalances into a new notional portfolio composed of the Basket Constituents each month using a methodology that is designed to:

- maintain a diversified allocation at all times;
- allocate dynamically based on the market cycle; and
- select allocations that attempt to deliver a stable volatility over time.

Maintaining a diversified allocation. A diversified portfolio’s return is the weighted average of its Basket Constituents’ returns, but its volatility is less than the weighted average of its Basket Constituents’ volatilities, because different assets don’t always move in the same direction — in this sense, a diversified portfolio can be said to deliver average returns with below-average volatility. In order to ensure diversification, each Index selects its monthly portfolio from a universe of 20 ETF Constituents and the Cash Constituent, and imposes caps and floors on the Basket Constituent weights at the individual and sector levels. Each Basket Constituent’s assigned weight must also be an increment of 5%, and the assigned weights must sum to 100%. The following table sets forth the current Basket Constituents, the Bloomberg ticker for each Basket Constituent, the maximum assigned weight for each Basket Constituent and the maximum and minimum aggregate assigned weight for each sector. For additional information about the Basket Constituents, see “Background on the ETF Constituents” and “Background on the Cash Constituent” below.

	Basket Constituent	Bloomberg Ticker	Maximum Assigned Weight¹	Maximum Aggregate Assigned Weight¹
1	Vanguard S&P 500 ETF	VOO	20%	Equities Sector: 50%
2	Vanguard Small-Cap ETF	VB	10%	
3	Vanguard FTSE Developed Markets ETF	VEA	20%	
4	iShares® MSCI EAFE Small-Cap ETF	SCZ	10%	
5	Vanguard FTSE Emerging Markets ETF	VWO	20%	
6	iShares® 20+ Year Treasury Bond ETF	TLT	20%	Investment Grade Fixed-Income Sector: 50% ²
7	iShares® 7-10 Year Treasury Bond ETF	IEF	20%	
8	iShares® iBoxx® \$ Investment Grade Corporate Bond ETF	LQD	20%	
9	iShares® TIPS Bond ETF	TIP	10%	
10	Vanguard Short-Term Corporate Bond ETF	VCSH	10%	
11	SPDR® Bloomberg High Yield Bond ETF	JNK	20%	Other Fixed-Income Sector: 50%
12	PIMCO 0-5 Year High Yield Corporate Bond Index ETF	HYS	10%	
13	Invesco Senior Loan ETF	BKLN	10%	
14	iShares® Preferred and Income Securities ETF	PFF	10%	
15	iShares® J.P. Morgan USD Emerging Markets Bond ETF	EMB	10%	
16	Vanguard Real Estate ETF	VNQ	10%	Alternatives Sector: 50%
17	VanEck® Gold Miners ETF	GDX	20%	
18	Alerian MLP ETF ³	AMPLP	10%	
19	Invesco DB Commodity Index Tracking Fund	DBC	10%	
20	iShares® Gold Trust	IAU	10%	
21	J.P. Morgan Fallback Cash Index ⁴	JPUSCAFB	50% ⁵	N/A ²

¹ The maximum assigned weights and maximum aggregate assigned weights apply only to the initial composition of each monthly notional portfolio. For each Daily Series Index, the maximum assigned weights and maximum aggregate assigned weights may be exceeded due to the daily exposure adjustments.

² In addition, the investment grade fixed-income sector and the Cash Constituent together are subject to a combined maximum aggregate assigned weight of 75%. See “— Identifying the Monthly Portfolio — Step 1: Identify All Possible Eligible Portfolios” below.

³ Effective February 25, 2020, the Alerian MLP ETF replaced the ETRACS Alerian MLP Infrastructure Index ETN as a Basket Constituent.

⁴ Effective January 3, 2022, the J.P. Morgan Fallback Cash Index replaced the J.P. Morgan Cash Index USD 3 Month as the Cash Constituent.

⁵ For the avoidance of doubt, as a result of the replacement of any Basket Constituent with the Cash Constituent due to the occurrence of an Extraordinary Event, the aggregate weight of the Cash Constituent would be allowed to exceed 50% because a portion of that aggregate weight would be subject to the maximum assigned weight of the replaced Basket Constituent and not the maximum assigned weight of the Cash Constituent.

Allocating dynamically based on the market cycle. Historical data and statistical analysis support the premise that assets tend to move in multi-year cycles. Depending on the asset class, these cycles can range from five to 30 years. The presence of these trends is one possible explanation for the academic research showing that, historically, asset classes exhibiting strong recent returns have been more likely to continue to exhibit positive returns. Each Index attempts to take advantage of this dynamic by selecting a monthly portfolio that reflects the strongest recent returns from among the possible portfolios that meet the weight constraints set forth above and the volatility threshold described below.

Targeting stable volatility. One measure of risk used by many investors is volatility, which reflects the degree of variation in the value of an asset or portfolio over a period of time. Unlike asset-allocation approaches that aim to maintain stable proportions of different assets throughout the market cycle, each Index attempts to maintain a stable level of volatility over time. In addition, as compared to an approach that maintains consistent weights through the market cycle, each Daily Series Index is designed to take on more volatility risk in calm markets and deliver lower volatility in choppy ones by adjusting its exposure to its notional portfolio on a daily basis. Each Index that is not a Daily Series Index maintains exposure of 100% to its notional portfolio on each day.

Selecting a monthly portfolio. Each month, each Index identifies every notional portfolio that meets the individual Basket Constituent and sector weight constraints set forth above with weights in increments of 5% and a total weight of 100% and that has a recent historical volatility at or below a volatility threshold of 5%. Each Index then selects and rebalances into the notional portfolio from that set with the strongest recent performance. If no such notional portfolio exists, then the volatility threshold is increased by 1% (e.g., from 5% to 6%), and the procedure described in this paragraph is repeated, including the increase to the volatility threshold, until a notional portfolio has been selected. Each monthly rebalancing is implemented incrementally over a five-day period.

Calculating the level of an Index. On any given day, the closing level of each Index (with respect to that Index, the “**Index Level**”) reflects (a) the performance of the relevant notional portfolio(s), as adjusted by the exposure of that Index to its notional portfolio(s), less (b) the 0.85% per annum daily deduction. The performance of a notional portfolio reflects the weighted performance of the Basket Constituents, in each case with distributions, if any, notionally reinvested, less the daily deduction of a notional financing cost. The Index Level of each Index was set equal to 100.00 on November 1, 2007, the base date of each Index. The Index Calculation Agent (as defined below) began calculating each Index on a live basis on December 31, 2014.

The notional financing cost is intended to approximate the cost of maintaining a position in the Basket Constituents using borrowed funds at the rate of interest underlying the Cash Constituent, which seeks to track a composite rate of interest that is intended to reflect the overnight rate of return of a notional position in a three-month time deposit in U.S. dollars, calculated by reference to spread-adjusted SOFR. SOFR, the Secured Overnight Financing Rate, is intended to be a broad measure of the cost of borrowing cash overnight collateralized by Treasury securities. The fixed spreads added to SOFR in calculating the J.P. Morgan Fallback Cash Index will increase the notional financing cost, which will negatively affect the performance of each Index. Each Index is an “excess return” index and not a “total return” index because, as part of the calculation of the Index Level, the performance of each Basket Constituent is reduced by the performance of the Cash Constituent.

No assurance can be given that the investment strategy used to construct each Index will be successful or that any Index will outperform any alternative portfolio or strategy that might be

constructed from the Basket Constituents. There is no guarantee that past performance trends referenced in selecting a monthly portfolio for an Index will continue during the subsequent period when that Index provides exposure to that monthly portfolio. In addition, no assurance can be given that the actual realized volatility of any Index will approximate its volatility threshold. The actual realized volatility of each Index will depend on the performance of the Basket Constituents included in its monthly portfolio(s) from time to time, and, at any time or for extended periods, may be greater than its volatility threshold, perhaps significantly, or less than its volatility threshold. Furthermore, the volatility threshold is subject to upward adjustment and, thus, the realized volatility threshold used to determine any monthly portfolio may be greater than the stated volatility threshold for the relevant Index, perhaps significantly.

Each Index is described as a “notional” or “synthetic” portfolio of assets because there is no actual portfolio of assets to which any person is entitled or in which any person has any ownership interest. Each Index merely references certain assets, the performance of which will be used as a reference point for calculating the Index Level of that Index.

Identifying the Monthly Portfolio

Each calendar month, on the second Index Business Day immediately preceding the commencement of a Monthly Rebalancing Period (as defined below), the Index Calculation Agent identifies for each Index a single portfolio composed of the Basket Constituents (with respect to that Index, the “**Monthly Portfolio**”) from among the set of hypothetical portfolios that meet the weight constraints, based on an evaluation of the historical performance and volatility of each of those hypothetical portfolios. The day each month on which the Monthly Portfolio is selected is referred to as the “**selection date**.”

“**Index Business Day**” is defined in the Rules and means generally a day on which each of NYSE Arca, Inc. and the primary listing exchange for each ETF Constituent is scheduled to open for trading for its regular trading session and the Cash Constituent is scheduled to be published.

Step 1: Identify All Eligible Portfolios

On each monthly selection date, the Index Calculation Agent identifies for each Index all possible portfolios composed of Basket Constituents that satisfy the following weight constraints (each, an “**Eligible Portfolio**”):

- the sum of the assigned weights for all the Basket Constituents is equal to 100%;
- the assigned weight for each Basket Constituent is a non-negative integral multiple of 5% (e.g., 0%, 5%, 10%, 15%, etc.);
- the assigned weight for each Basket Constituent is less than or equal to the maximum assigned weight for that Basket Constituent set forth in the table of Basket Constituents provided above;
- the sum of the assigned weights for the Basket Constituents in any sector is less than or equal to any maximum aggregate assigned weight for that sector, in each case, as set forth in the table of Basket Constituents provided above; and
- the sum of the assigned weights for the Basket Constituents in the “investment grade fixed-income sector” and the Cash Constituent is less than or equal to 75%.

Step 2: Select the Eligible Portfolio with the Highest Performance, Subject to a Volatility Threshold

On each monthly selection date, the Index Calculation Agent selects for each Index the Eligible Portfolio with the highest performance that has a volatility less than or equal to the volatility threshold for that Index as set forth in the table of Basket Constituents provided above; *provided* that, if there is more than one Eligible Portfolio with the same highest performance, the Eligible Portfolio that has the lowest

volatility will be selected. If none of the Eligible Portfolios for an Index has a volatility equal to or less than the relevant volatility threshold, the Index Calculation Agent will increase the volatility threshold by 1% and will repeat the procedure described in this paragraph, including the increase to the volatility threshold, until a portfolio has been selected.

For purposes of selecting a Monthly Portfolio:

- the performance of an Eligible Portfolio is the return of that Eligible Portfolio over the immediately preceding six months; and
- the volatility of an Eligible Portfolio is the annualized realized volatility of that Eligible Portfolio over the immediately preceding six months.

See the Rules for additional information about how the Index Calculation Agent calculates the returns and annualized realized volatility of each Eligible Portfolio.

Monthly Rebalancing of each Index

Each calendar month, each Index exits its notional position in the Monthly Portfolio for that Index associated with the prior month's selection date and enters a notional position in the Monthly Portfolio for that Index associated with the current month's selection date. The rebalancing of each Index is effected in equal increments over five rebalancing days, occurring over the last five consecutive Index Business Days of that calendar month (the "**Monthly Rebalancing Period**"). Rebalancing days are subject to postponement or adjustment if a market disruption affecting an incoming or outgoing Basket Constituent has occurred or is continuing, as described under "Index Market Disruption Events" below.

Calculation and Publication of the Index Level

The Index Calculation Agent will calculate the Index Level of each Index with respect to each Index Trading Day and will publish the Index Level to an accuracy of two decimal places.

The Index Level of each Index on each Index Trading Day is generally calculated by adjusting the Index Level of that Index as of the immediately preceding Index Trading Day to reflect (a) the performance of the Monthly Portfolio of that Index since the immediately preceding Index Trading Day, *multiplied by* the exposure of that Index to its Monthly Portfolio (as determined under "Calculating the Exposure to the Monthly Portfolio(s)" below), and (b) the 0.85% per annum deduction that has accrued since the immediately preceding Index Trading Day. However, the Index Level of each Index on the final four rebalancing days of each Monthly Rebalancing Period is calculated by adjusting the Index Level of that Index as of the immediately preceding rebalancing day to reflect (a) the weighted performances of the incoming and outgoing Monthly Portfolios since the immediately preceding rebalancing day, using the assigned weights set out in the following table, in each case *multiplied by* the exposure of that Index to its Monthly Portfolios (as determined under "Calculating the Exposure to the Monthly Portfolio(s)" below), and (b) the 0.85% per annum deduction that has accrued since the immediately preceding rebalancing day.

Rebalancing Day	Assigned Weight of Outgoing Monthly Portfolio	Assigned Weight of Incoming Monthly Portfolio
Second	80%	20%
Third	60%	40%
Fourth	40%	60%
Final	20%	80%

The performance of a Monthly Portfolio from one Index Trading Day to the next reflects the change in the value of that Monthly Portfolio over that period, where the value of a Monthly Portfolio on each Index Trading Day is generally calculated by adjusting the value of that Monthly Portfolio as of the final day of

the immediately preceding Monthly Rebalancing Period to reflect (a) the weighted average performance of its Basket Constituents based on the changes in their closing total return levels since the final day of the immediately preceding Monthly Rebalancing Period *minus* (b) a notional financing cost equal to the performance of the Cash Constituent since the final day of the immediately preceding Monthly Rebalancing Period. The notional financing cost is intended to approximate the cost of maintaining a position in the Basket Constituents using borrowed funds at the rate of interest underlying the Cash Constituent, which seeks to track a composite rate of interest that is intended to reflect the overnight rate of return of a notional position in a three-month time deposit in U.S. dollars, calculated by reference to spread-adjusted SOFR. SOFR, the Secured Overnight Financing Rate, is intended to be a broad measure of the cost of borrowing cash overnight collateralized by Treasury securities. The fixed spreads added to SOFR in calculating the J.P. Morgan Fallback Cash Index will increase the notional financing cost, which will negatively affect the performance of each Index. Each Index is an “excess return” index and not a “total return” index because, as part of the calculation of the Index Level, the performance of each Basket Constituent is reduced by the performance of the Cash Constituent.

The closing total return level of each Basket Constituent (other than the Cash Constituent) is generally calculated by adjusting the closing total return level of that Basket Constituent as of the immediately preceding Index Trading Day to reflect (a) the change in the closing price of that Basket Constituent since the immediately preceding Index Trading Day and (b) the notional reinvestment of any dividends or other distributions with an ex-date that has occurred since the immediately preceding Index Trading Day. The Index Calculation Agent will make anti-dilution adjustments to a Basket Constituent only upon a share split or reverse share split, an issuance of additional shares of that Basket Constituent that is given ratably to all or substantially all holders of shares of that Basket Constituent or a distribution of securities of that Basket Constituent as a result of the triggering of any provision of the corporate charter of that Basket Constituent.

The Index Calculation Agent will publish the Index Level with respect to each Index Trading Day to an accuracy of two decimal places.

“**Index Trading Day**” is defined in the Rules as “Trading Day” and means generally an Index Business Day for which all of the Basket Constituents tracked by the relevant Index are not subject to any market disruption or on which that Index rebalances a portion of its exposure from one Monthly Portfolio to the next.

See the Rules for additional information about the calculation of the Index Level.

Calculating the Exposure to the Monthly Portfolio(s)

Each Index that is not a Daily Series Index will provide 100% exposure to the relevant Monthly Portfolios on each Index Trading Day.

Each Daily Series Index aims to approximate its volatility threshold on a daily basis by dynamically adjusting its exposure to the relevant Monthly Portfolio(s) on each Index Trading Day, based on the volatility of the relevant Monthly Portfolio(s), calculated for this purpose as the annualized realized volatility of the relevant Monthly Portfolio (or, in the event that the relevant Index is providing exposure to two Monthly Portfolios, the annual realized volatility of a blended portfolio derived from those Monthly Portfolios) over a one-month period ending on the second immediately preceding Index Trading Day. See the Rules for additional information about how the Index Calculation Agent calculates the annualized realized volatility for this purpose.

Subject to the occurrence of a disruption, the exposure of a Daily Series Index to the Monthly Portfolio(s) as of any Index Trading Day, which is effective as of the close on that Index Trading Day, will be a non-negative number equal to (a) the volatility threshold *divided* by (b) the volatility of the relevant Monthly Portfolio(s) with respect to that Index Trading Day, *provided* that the exposure of that Daily Series Index as of the close of that Index Trading Day will not be:

- greater than the variable maximum exposure;

- greater than the exposure of that Daily Series Index at the close on the immediately preceding Index Trading Day by more than 50%;
- less than the exposure of that Daily Series Index at the close on the immediately preceding Index Trading Day by more than 50%; or
- less than 0%.

With respect to each Index Trading Day, the “**maximum exposure**” is equal to one divided by the aggregate weight of the ETF Constituents in the Monthly Portfolio (or in the blended portfolio derived from two Monthly Portfolios, if applicable). The resulting percentage is a percentage that, if multiplied by that aggregate weight will result in 100%. For example, if the aggregate weight of the ETF Constituents were 80%, the maximum exposure would be 125% (because 80% multiplied by 125% equals 100%). The maximum exposure will not be greater than 200%. See the Rules for additional information about how the maximum exposure is calculated.

To and including December 20, 2017, the exposure of a Daily Series Index as of any Index Trading Day was calculated without applying the daily maximum exposure change of 50%. This change may adversely affect the performance of a Daily Series Index, and this change should be borne in mind when evaluating the hypothetical back-tested and actual historical performance of a Daily Series Index to and including December 20, 2017.

Index Market Disruption Events

The calculation and publication of the Index Level and the rebalancing of each Index will be affected by the occurrence of certain market disruptions relating to the Basket Constituents. These events are set out in full in the Rules and include, without limitation, suspensions or disruptions of trading or data unavailability relating to the Basket Constituents, their reference indices, commodities or components or related futures or option contracts that the Index Calculation Agent determines in its sole discretion could materially interfere with the ability of market participants to transact in positions with respect to an Index, the Basket Constituents, their reference indices, commodities or components or related futures or option contracts.

If a market disruption affecting an incoming or outgoing Basket Constituent has occurred or is continuing on a scheduled rebalancing day, that rebalancing day will generally be postponed until no such market disruption is occurring. However, if that market disruption continues for a sustained period, the Index Calculation Agent may nevertheless rebalance an Index using good faith estimates, and those estimates may be subject to later correction. The Index Level will not be calculated and published on any day on which a Basket Constituent included in a relevant Monthly Portfolio is affected by a market disruption, except for a rebalancing day on which the Index Calculation Agent rebalances the relevant Index notwithstanding the occurrence of a market disruption.

The five rebalancing days in each Monthly Rebalancing Period will occur on five separate calendar days, notwithstanding the postponement of one or more days due to a market disruption. If a rebalancing day is postponed, any subsequent rebalancing days in the same rebalancing period will also be postponed so as to prevent multiple rebalancing days from occurring on the same day.

See the Rules for additional information about market disruptions and their effects on the Indices.

Succession and Extraordinary Events

Upon the occurrence of certain succession events set out in the Rules that affect a Basket Constituent, the Index Calculation Agent will replace the affected Basket Constituent with a successor to that Basket Constituent.

In addition, upon the occurrence of certain events set out in the Rules that are referred to as extraordinary events, and if Index Calculation Agent determines that the applicable event materially

interferes with the ability of market participants to transact in positions with respect to an Index, then the Index Calculation Agent will replace the affected Basket Constituent with a successor to that Basket Constituent or with a substitute that the Index Calculation Agent determines, in its sole discretion, possesses substantially similar characteristics or provides substantially similar exposure as compared to the original Basket Constituent. If no such substitute is available, the Index Calculation Agent will replace the affected Basket Constituent with a substitute that the Index Calculation Agent determines to be an appropriate substitute, considering the context of the relevant Index and the weight constraints. If no such substitute is available, the Index Calculation Agent may freeze the closing price or closing level of that Basket Constituent at a level it determines until the conclusion of the next Monthly Rebalancing Period, and then replace that Basket Constituent with the Cash Constituent (or, if that Basket Constituent is the Cash Constituent, the Index Calculation Agent will calculate the level of the Cash Constituent in its sole discretion). In any such case, the Index Calculation Agent will, in good faith, make related adjustments to the Rules that it determines to be appropriate.

The extraordinary events are set out in full in the Rules and include, without limitation, (a) the delisting, termination, liquidation, bankruptcy, insolvency, dissolution or winding-up of a Basket Constituent, (b) nationalization or expropriation of a Basket Constituent or its securities or all or substantially all of its assets, (c) the occurrence of a market disruption affecting a Basket Constituent that continues for a sustained period, (d) the termination or impairment of any relevant license or other right relied upon by the Index Calculation Agent in administering the relevant Index, (e) the occurrence of certain changes in law and (f) certain other events affecting the trading, value, redeemability, liquidity, market capitalization or listing of a Basket Constituent or affecting data relating to a Basket Constituent.

The Index Sponsor may, in its discretion, at any time and without notice, terminate the calculation or publication of any Index, including, without limitation, subsequent to the occurrence of an extraordinary event. The Index Sponsor is under no obligation to continue the calculation and publication of any Index.

Corrections

If the closing price or closing level of any Basket Constituent is publicly corrected after its initial dissemination or if the Index Calculation Agent identifies an error or omission in respect of an Index, and if the Index Calculation Agent determines that the correction, error or omission is material, then the Index Calculation Agent may make an adjustment or correction to the Index Level.

The Index Sponsor and the Index Calculation Agent

JPMS is currently the sponsor of each Index (together with any successor sponsor or assign, the “**Index Sponsor**”). The Index Sponsor may appoint a successor sponsor or assign, delegate or transfer any or all of its rights, obligations or responsibilities in its capacity as Index Sponsor in connection with an Index to one or more entities (including an unrelated third party) that the Index Sponsor determines is appropriate.

The Index Sponsor is also responsible for the appointment of the calculation agent of each Index (the “**Index Calculation Agent**”), which may be the Index Sponsor, an unrelated third party or an affiliate or subsidiary of the Index Sponsor. JPMS is currently the Index Calculation Agent. The Index Sponsor may at any time and for any reason (i) appoint a successor Index Calculation Agent if the Index Sponsor is at that time the Index Calculation Agent or (ii) terminate the appointment of the Index Calculation Agent and appoint an alternative entity as a replacement Index Calculation Agent if the Index Sponsor is not at that time the Index Calculation Agent. The Index Calculation Agent (unless the Index Calculation Agent is the same entity as the Index Sponsor) must obtain written permission from the Index Sponsor prior to any delegation or transfer of the Index Calculation Agent’s responsibilities or obligations in connection with the Indices. The Index Calculation Agent is responsible for making calculations and determinations as described above and in the Rules.

Index Sponsor and Index Calculation Agent Determinations

The Index Calculation Agent will act in good faith and in a commercially reasonable manner in making determinations, interpretations and calculations pursuant to the Rules. Subject to the prior agreement of the Index Sponsor, the Index Calculation Agent's determinations, and all calculations related to each Index and the Index Calculation Agent's interpretations of the Rules, will be final.

None of the Index Sponsor, the Index Calculation Agent and any of their respective affiliates and subsidiaries and any of their respective directors, officers, employees, representatives, delegates and agents (each, a **"Relevant Person"**) will have any responsibility to any person (whether as a result of negligence or otherwise) for any determinations, interpretations or calculations made or anything done (or omitted to be determined or done) in connection with any Index or any use to which any person may put any Index or the Index Levels of any Index.

Subject to the prior agreement of the Index Sponsor, the Index Calculation Agent may make certain determinations, adjustments, amendments and interpretations related to an Index. All such determinations, adjustments, amendments and interpretations (in each case, subject to such prior agreement on the part of the Index Sponsor) of the Index Calculation Agent related to an Index and all calculations performed by the Index Calculation Agent related to an Index will be final, conclusive and binding and no person will be entitled to make any claim against the Index Sponsor, the Index Calculation Agent, or any of the Relevant Persons in respect thereof. Once a determination, adjustment, amendment or interpretation is made or action is taken by the Index Calculation Agent (in each case, as agreed in advance by the Index Sponsor) in relation to an Index, or a calculation is performed by the Index Calculation Agent in relation to an Index, none of the Index Sponsor, the Index Calculation Agent or any Relevant Person will be under any obligation to revise any such determination, adjustment, amendment, interpretation or calculation made or anything done (or omitted to be determined, adjusted, amended, interpreted, calculated or done) for any reason.

The Index Calculation Agent's exercise of discretion or failure to exercise discretion in relation to an Index may have a detrimental effect on the Index Level of that Index and the volatility of that Index. The Index Sponsor or the Index Calculation Agent may make certain determinations or calculations based on information obtained from publicly available sources without independently verifying such information.

Amendment of the Rules; Termination of an Index

The Rules may be supplemented, amended or restated from time to time in the sole discretion of the Index Sponsor. The Rules will be made available (in a manner determined by the Index Sponsor from time to time) following any supplementation, amendment or restatement. Following any amendment, the Index Sponsor will make available (as soon as practicable) the amended version of the Rules and will include the effective date of such amendment in the new version of the Rules. However, the Index Sponsor is under no obligation to inform any person about any amendments to an Index (except as required by law or regulation).

Although the Rules are intended to be comprehensive and accurate, ambiguities may arise and errors or omissions may have been made. In those circumstances, the Index Sponsor will resolve those ambiguities and, if necessary, amend the Rules to reflect their resolution. In the case of any inaccuracy, the Index Sponsor may amend the Rules to address errors or omissions. The Index Sponsor is under no obligation to inform any person of any amendments to an Index (except as may be required by law).

The Index Sponsor may, in its discretion, at any time and without notice, terminate the calculation or publication of an Index, including, without limitation, subsequent to the occurrence of one of the events described under "— Succession and Extraordinary Events" above.

Additional Information about Hypothetical Back-tested Performance Data

For time periods prior to the launch of each of the Basket Constituents, and prior to that Basket Constituent's satisfaction of a minimum liquidity standard, any hypothetical back-tested performance of

any Index set forth in any terms supplement will reflect alternative performance derived from the underlying index tracked by that Basket Constituent as of the live date of that Index, after deducting hypothetical fund expenses equal to that Basket Constituent's expense ratio as of the live date of that Index, rather than actual performance of that Basket Constituent for that period. See the following table for more information.

Basket Constituent	Proxy	Expenses Subtracted from Proxy's Returns	Last Date Proxy Used
Vanguard S&P 500 ETF	S&P 500® Total Return Index	0.05%	3/30/2011
Vanguard Small-Cap ETF	MSCI US Small Cap 1750 Gross Return USD Index	0.09%	4/27/2007
Vanguard FTSE Developed Markets ETF	FTSE Developed ex North America Net Tax (US RIC) Index	0.09%	11/28/2007
iShares® MSCI EAFE Small-Cap ETF	MSCI EAFE Small Cap Net Total Return USD Index	0.40%	10/8/2009
Vanguard Short-Term Corporate Bond ETF	Bloomberg Barclays US Corporate 1-5 years Total Return Index Value Unhedged USD	0.12%	9/14/2010
SPDR® Bloomberg High Yield Bond ETF	High Yield Total Return Index Value Unhedged USD	0.40%	9/4/2008
PIMCO 0-5 Year High Yield Corporate Bond Index ETF	ICE BofA Merrill Lynch 0-5 Year US High Yield Constrained Index	0.55%	1/18/2013
Invesco Senior Loan ETF	S&P/LSTA U.S. Leveraged Loan 100 Index	0.65%	5/11/2012
iShares® Preferred and Income Securities ETF	S&P U.S. Preferred Stock Index	0.47%	10/20/2008
iShares® J.P. Morgan USD Emerging Markets Bond ETF	J.P. Morgan EMBI® Global Core Index	0.60%	11/17/2009
Alerian MLP ETF*	Alerian MLP Infrastructure Total Return Index	0.85%	1/2/2013

* Effective February 25, 2020, the Alerian MLP ETF replaced the ETRACS Alerian MLP Infrastructure Index ETN as a Basket Constituent.

BACKGROUND ON THE ETF CONSTITUENTS

Background on the Alerian MLP ETF

All information contained in this underlying supplement regarding the Alerian MLP ETF (the “**AMLP Fund**”) has been derived from publicly available information, without independent verification. This information reflects the policies of, and is subject to change by ALPS ETF Trust (the “**ALPS Trust**”) and ALPS Advisors, Inc. (“**ALPS**”). ALPS is currently the investment adviser to the AMLP Fund. The AMLP Fund is an exchange-traded fund that trades on the NYSE Arca, Inc. under the ticker symbol “AMLP.”

The AMLP Fund seeks investment results that correspond (before fees and expenses) generally to the price and yield performance of the Alerian MLP Infrastructure Index (the “**AMLP Index**”). The AMLP Index is a price-return index designed to be a composite of energy infrastructure master limited partnerships and is calculated using a capped, float-adjusted, capitalization-weighted methodology. The components of the AMLP Index earn the majority of their cash flow from midstream activities involving energy commodities.

The AMLP Fund employs a “passive management” or indexing investment approach designed to track the investment performance of the AMLP Index. The AMLP Fund will generally invest in all of the securities that compose the AMLP Index in proportion to their weightings in the AMLP Index; however, under various circumstances, it may not be possible or practicable to purchase all of the securities in the AMLP Index in those weightings. In those circumstances, the AMLP Fund may purchase a sample of the securities in the AMLP Index or utilize various combinations of other available investment techniques in seeking performance which corresponds to the performance of the AMLP Index.

The AMLP Fund is taxed as a regular corporation for federal income tax purposes and, as a result, the AMLP Fund will be obligated to pay federal and applicable state and foreign corporate taxes on its taxable income. The net asset value of shares of the AMLP Fund will also be reduced by the accrual of any current and deferred tax liabilities. The AMLP Index, however, is calculated without any deductions for taxes. As a result, the AMLP Fund’s after-tax performance could differ significantly from the AMLP Index even if the pretax performance of the AMLP Fund and the performance of the AMLP Index are closely correlated.

In addition to the risk of tracking error due to the effect of taxes, the AMLP Fund’s return may not match the return of the AMLP Index for other reasons. For example, the AMLP Fund incurs a number of operating expenses not applicable to the AMLP Index, and incurs costs in buying and selling securities, especially when rebalancing the AMLP Fund’s securities holdings to reflect changes in the composition of the AMLP Index. In addition, the performance of the AMLP Fund and the AMLP Index may vary due to asset valuation differences and differences between the AMLP Fund’s portfolio and the AMLP Index resulting from legal restrictions, cash flows or operational inefficiencies.

The ALPS Trust is a registered investment company that consists of numerous separate investment portfolios, including the AMLP Fund. Information provided to or filed with the SEC by the ALPS Trust pursuant to the Securities Act of 1933, as amended, and the Investment Company Act of 1940, as amended, can be located by reference to SEC file numbers 333-148826 and 811-22175, respectively, through the SEC’s website at <http://www.sec.gov>.

Background on the Invesco DB Commodity Index Tracking Fund

All information contained in this underlying supplement regarding the Invesco DB Commodity Index Tracking Fund (the “**DBC Fund**”) has been derived from publicly available information, without independent verification. This information reflects the policies of, and is subject to change by, Invesco Capital Management LLC (“**Invesco**”) and Invesco Ltd. The DBC Fund is a Delaware statutory trust that issues common units of beneficial interest representing units of fractional undivided beneficial interests in and ownership of the DBC Fund. Invesco is currently the managing owner, commodity pool operator and commodity trading advisor to the DBC Fund. The trustee of the DBC Fund, Wilmington Trust Company

has only nominal duties and liabilities to the DBC Fund. The DBC Fund is an exchange-traded fund that trades on the NYSE Arca, Inc. under the ticker symbol “DBC.”

The DBC Fund’s investment objective is to track changes, whether positive or negative, in the level of the DBIQ Optimum Yield Diversified Commodity Index Excess Return™ (the “**DBIQ Commodity Index**”) over time, plus the excess, if any, of the sum of income from its holdings in U.S. Treasury securities, money market mutual funds, and exchange-traded funds that track indices that measure the performance of U.S. Treasury Obligations with a maximum remaining maturity of up to 12 months (“**T-Bill ETFs**”), over the expenses of the DBC Fund. DBC Fund holds U.S. Treasury securities, money market mutual funds and T-Bill ETFs only for margin and/or cash management purposes. While DBC Fund’s performance will reflect the appreciation or depreciation of these holdings, its performance, whether positive or negative, will be driven primarily by its strategy of trading futures contracts with the aim of seeking to track the DBIQ Commodity Index.

The DBC Fund pursues its investment objective by investing in a portfolio of exchange-traded futures contracts on Light Sweet Crude Oil (WTI), Heating Oil, RBOB Gasoline, Natural Gas, Brent Crude, Gold, Silver, Aluminum, Zinc, Copper Grade A, Corn, Wheat, Soybeans and Sugar. The DBIQ Commodity Index is composed of notional amounts of each of these commodities (the “**Index Commodities**”). The notional amounts of the Index Commodities included in the DBIQ Commodity Index are broadly in proportion to historical levels of the world’s production and supplies of the Index Commodities.

The DBC Fund is a commodity pool as defined in the Commodity Exchange Act and the regulations of the Commodity Futures Trading Commission (the “**CFTC**”). The DBC Fund is not an investment company registered under the Investment Company Act. Information provided to or filed with the SEC by the DBC Fund pursuant to the Securities Exchange Act of 1934, as amended, can be located by reference to SEC file number 001-32726 through the SEC’s website at <http://www.sec.gov>.

Background on the Invesco Senior Loan ETF

All information contained in this underlying supplement regarding the Invesco Senior Loan ETF (the “**BKLN Fund**”) has been derived from publicly available information, without independent verification. This information reflects the policies of, and is subject to change by, Invesco Exchange-Traded Fund Trust II (the “**Invesco Trust**”), Invesco Capital Management LLC (“**Invesco**”) and Invesco Senior Secured Management, Inc. (“**Invesco Inc.**”). The BKLN Fund is an investment portfolio of the Invesco Trust. Invesco is currently the investment adviser to the BKLN Fund. Invesco Inc. is the sub-adviser to the BKLN Fund. The BKLN Fund is an exchange-traded fund that trades on the NYSE Arca, Inc. under the ticker symbol “BKLN.”

The BKLN Fund seeks to provide investment results that generally correspond to the price and yield performance, before fees and expenses, of the Morningstar LSTA U.S. Leveraged Loan 100 Index (the “**Leveraged Loan 100 Index**”). The Leveraged Loan 100 Index is designed to measure the performance of 100 largest loan facilities in the U.S. leveraged loan market.

The BKLN Fund utilizes a “sampling” methodology to seek to achieve its investment objective. Sampling means that Invesco and Invesco Inc. use a quantitative analysis to select loans from the Leveraged Loan 100 Index universe to obtain a representative sample of loans that have, in the aggregate, investment characteristics similar to the underlying Index in terms of key risk factors, performance attributes and other characteristics. Invesco and Invesco Inc. generally expect the BKLN Fund to hold less than the total number of loans in the Leveraged Loan 100 Index, but reserves the right to hold as many loans or securities as it believes necessary to achieve the BKLN Fund’s investment objective. The BKLN Fund’s use of a representative sampling approach may cause the BKLN Fund to not be as well correlated with the return of the Leveraged Loan 100 Index as would be the case if the BKLN Fund purchased all of the loans in the Leveraged Loan 100 Index in the proportions represented in the Leveraged Loan 100 Index.

Invesco and Invesco Inc. seek a correlation over time of 0.95 or better between the BKLN Fund's performance and the performance of the Leveraged Loan 100 Index; a figure of 1.00 would represent perfect correlation. Another means of evaluating the relationship between the returns of the BKLN Fund and the Leveraged Loan 100 Index is to assess the tracking error between the two. "Tracking error" means the variation between the BKLN Fund's annual return and the return of the Leveraged Loan 100 Index, expressed in terms of standard deviation. The BKLN Fund seeks to have a tracking error of less than 5%, measured on a monthly basis over a one-year period by taking the standard deviation of the difference in the BKLN Fund's returns versus the Leveraged Loan 100 Index's returns.

The Invesco Trust is a registered investment company that consists of numerous separate investment portfolios, including the BKLN Fund. Information provided to or filed with the SEC by the Invesco Trust pursuant to the Securities Act of 1933, as amended, and the Investment Company Act of 1940, as amended, can be located by reference to SEC file numbers 333-138490 and 811-21977, respectively, through the SEC's website at <http://www.sec.gov>.

Background on the iShares® ETFs

All information contained in this underlying supplement regarding the iShares® 20+ Year Treasury Bond ETF, the iShares® 7-10 Year Treasury Bond ETF, the iShares® iBoxx® \$ Investment Grade Corporate Bond ETF, the iShares® J.P. Morgan USD Emerging Markets Bond ETF, the iShares® MSCI EAFE Small-Cap ETF, the iShares® Preferred and Income Securities ETF and the iShares® TIPS Bond ETF (each, an "iShares® ETF" and collectively, the "iShares® ETFs") has been derived from publicly available information, without independent verification. This information reflects the policies of, and is subject to change by, the fund manager of each iShares® ETF and BlackRock Fund Advisors ("BFA"). The iShares® ETFs are investment portfolios of iShares® Trust and are maintained and managed by their respective fund managers. BFA is currently the investment adviser to the iShares® ETFs.

BFA uses a representative sampling indexing strategy to manage each iShares® ETF. "Representative sampling" is an indexing strategy that involves investing in a representative sample of securities that collectively has an investment profile similar to that of an applicable underlying index. The securities selected are expected to have, in the aggregate, investment characteristics (based on factors such as market capitalization and industry weightings), fundamental characteristics (such as return variability, duration, maturity, credit rating and yield) and liquidity measures similar to those of an applicable underlying index. Each iShares® ETF may or may not hold all of the securities in its underlying index.

Each iShares® ETF's underlying index is a financial calculation, based on a grouping of financial instruments, and is not an investment product, while each iShares® ETF is an actual investment portfolio. The performance of each iShares® ETF and its underlying index may vary for a number of reasons, including transaction costs, non-U.S. currency valuations, asset valuations, corporate actions (such as mergers and spin-offs), timing variances and differences between that iShares® ETF's portfolio and its underlying index resulting from that iShares® ETF's use of representative sampling or from legal restrictions (such as diversification requirements) that apply to that iShares® ETF but not to its underlying index. "Tracking error" is the divergence of the performance (return) of an iShares® ETF's portfolio from that of its underlying index. Because each iShares® ETF uses a representative sampling indexing strategy, it can be expected to have a larger tracking error than if it used a replication indexing strategy. "Replication" is an indexing strategy in which a fund invests in substantially all of the securities in its underlying index in approximately the same proportions as in the underlying index.

iShares® Trust is a registered investment company that consists of numerous separate investment portfolios, including the iShares® ETFs. Information provided to or filed with the SEC by iShares® Trust pursuant to the Securities Act of 1933, as amended, and the Investment Company Act of 1940, as amended, can be located by reference to SEC file numbers 333-92935 and 811-09729, respectively, through the SEC's website at <http://www.sec.gov>.

The iShares® 20+ Year Treasury Bond ETF

The iShares® 20+ Year Treasury Bond ETF seeks to track the investment results, before fees and expenses, of an index composed of U.S. Treasury bonds with remaining maturities greater than twenty years. On March 31, 2016, the 20+ Treasury Fund ceased tracking the Barclays U.S. 20+ Year Treasury Bond Index and began tracking the ICE® U.S. Treasury 20+ Year Bond Index. The ICE® U.S. Treasury 20+ Year Bond Index measures the performance of the U.S. dollar-denominated fixed-rate U.S. Treasury public obligations that have a remaining maturity of greater than or equal to twenty years. The iShares® 20+ Year Treasury Bond ETF trades on The Nasdaq Stock Market under the ticker symbol “TLT.”

The iShares® 7-10 Year Treasury Bond ETF

The iShares® 7-10 Year Treasury Bond ETF seeks to track the investment results, before fees and expenses, of an index composed of U.S. Treasury bonds with remaining maturities between seven and ten years, which is currently the ICE® U.S. Treasury 7-10 Year Bond Index. The ICE® U.S. Treasury 7-10 Year Bond Index measures the performance of the U.S. dollar-denominated fixed-rate U.S. Treasury public obligations that have a remaining maturity of greater than or equal to seven years and less than ten years. The iShares® 7-10 Year Treasury Bond ETF trades on The Nasdaq Stock Market under the ticker symbol “IEF.”

The iShares® iBoxx® \$ Investment Grade Corporate Bond ETF

The iShares® iBoxx® \$ Investment Grade Corporate Bond ETF seeks to track the investment results, before fees and expenses, of an index composed of U.S. dollar-denominated, investment-grade corporate bonds, which is currently the Markit iBoxx® USD Liquid Investment Grade Index. The Markit iBoxx® USD Liquid Investment Grade Index is a market-value weighted index that is designed to reflect the performance of the U.S. dollar-denominated investment-grade corporate debt for sale in the U.S. The iShares® iBoxx® \$ Investment Grade Corporate Bond ETF trades on NYSE Arca, Inc. under the ticker symbol “LQD.”

The iShares® J.P. Morgan USD Emerging Markets Bond ETF

The iShares® J.P. Morgan USD Emerging Markets Bond ETF seeks to track the investment results, before fees and expenses, of an index composed of U.S. dollar-denominated, emerging market bonds, which is currently the J.P. Morgan EMBI® Global Core Index. The J.P. Morgan EMBI® Global Core Index is a broad, diverse U.S. dollar-denominated emerging markets debt benchmark that tracks the total return of actively traded external debt instruments in emerging markets. The J.P. Morgan EMBI® Global Core Index was developed and is maintained by one of our affiliates. The iShares® J.P. Morgan USD Emerging Markets Bond ETF trades on The Nasdaq Stock Market under the ticker symbol “EMB.”

The iShares® MSCI EAFE Small-Cap ETF

The iShares® MSCI EAFE Small-Cap ETF seeks to track the investment results, before fees and expenses, of an index composed of small-capitalization developed market equities, excluding the U.S. and Canada, which is currently the MSCI EAFE® Small Cap Index. The MSCI EAFE® Small Cap Index is an equity index that captures small-capitalization representation across developed markets countries around the world, excluding the United States and Canada. The iShares® MSCI EAFE Small-Cap ETF trades on The Nasdaq Stock Market under the ticker symbol “SCZ.”

The iShares® Preferred and Income Securities ETF

The iShares® Preferred and Income Securities ETF seeks to track the investment results, before fees and expenses, of an index composed of U.S. dollar-denominated preferred and hybrid securities, which is currently the ICE Exchange-Listed Preferred & Hybrid Securities Index. The ICE Exchange-Listed Preferred & Hybrid Securities Index is designed to measure the performance of a select group of exchange-listed U.S. dollar-denominated preferred securities, hybrid securities and convertible preferred

securities listed on the New York Stock Exchange ("**NYSE**") or the Nasdaq Capital Market. The iShares® Preferred and Income Securities ETF trades on The Nasdaq Stock Market under the ticker symbol "PFF."

The iShares® TIPS Bond ETF

The iShares® TIPS Bond ETF seeks to track investment results, before fees and expenses, of an index composed of inflation-protected U.S. Treasury bonds, which is currently the ICE U.S. Treasury Inflation Linked Bond Index. The ICE U.S. Treasury Inflation Linked Bond Index tracks the performance of inflation-protected securities issued by the U.S. Treasury known as "TIPS." The iShares® TIPS Bond ETF trades on NYSE Arca, Inc. under the ticker symbol "TIP."

Background on the iShares® Gold Trust

All information contained in this underlying supplement regarding the iShares® Gold Trust (the "**Gold Trust**"), including, without limitation, its structure, the creation and redemption of its shares and their valuation, has been derived from publicly available information, without independent verification. This information reflects the policies of, and is subject to change by, the Gold Trust and iShares® Delaware Trust Sponsor LLC, the sponsor of the Gold Trust (the "**Gold Trust Sponsor**"). The Bank of New York Mellon is the trustee of the Gold Trust (the "**Gold Trust Trustee**"), and JPMorgan Chase Bank N.A., London branch is the custodian of the Gold Trust (the "**Gold Trust Custodian**"). The Gold Trust is an investment trust, formed on January 21, 2005. Shares of the Gold Trust trade under the ticker symbol "IAU" on the NYSE Arca, Inc.

The Gold Trust seeks to reflect generally the performance of the price of gold before payment of the Gold Trust's expenses and liabilities. Shares of the Gold Trust are intended to constitute a simple and cost-effective means of making an investment similar to an investment in gold. Shares of the Gold Trust have been designed to remove the obstacles represented by the expense and complications involved in an investment in physical gold, while at the same time having an intrinsic value that reflects, at any given time, the price of the gold owned by the Gold Trust at such time, less the Gold Trust's expenses and liabilities. Although shares of the Gold Trust are not the exact equivalent of an investment in gold, they provide investors with an alternative that allows a level of participation in the gold market through the securities market.

The shares of the Gold Trust represent units of fractional undivided beneficial interest in the net assets of the Gold Trust. The Trustee does not actively manage the gold held by the Trust. This means that the Trustee does not sell gold at times when its price is high, or acquire gold at low prices in the expectation of future price increases. It also means that the Trustee does not make use of any of the hedging techniques available to professional gold investors to attempt to reduce the risks of losses resulting from price decreases. Any losses sustained by the Trust will adversely affect the value of your shares of the Gold Trust. Proceeds received by the Gold Trust from the issuance and sale of shares of the Gold Trust consist of gold deposits. Such deposits are held by the Gold Trust Custodian on behalf of the Gold Trust until (i) delivered to authorized participants in connection with a redemption of shares of the Gold Trust or (ii) sold to pay the fee due to the Gold Trust Sponsor and Gold Trust expenses or liabilities not assumed by the Gold Trust Sponsor.

Information provided to or filed with the SEC by the Gold Trust pursuant to the Securities Act of 1933, as amended, and the Securities Exchange Act of 1934, as amended, can be located by reference to SEC file numbers 333-268746 and 001-32418, respectively, through the SEC's website at <http://www.sec.gov>. The Gold Trust is not a mutual fund or any other type of investment company within the meaning of the Investment Company Act of 1940, as amended, and is not subject to regulation thereunder.

Gold

The price of gold is primarily affected by the global demand for and supply of gold. The market for gold bullion is global, and gold prices are subject to volatile price movements over short periods of time and are affected by numerous factors, including macroeconomic factors such as the structure of and confidence in the global monetary system, expectations regarding the future rate of inflation, the relative

strength of, and confidence in, the U.S. dollar (the currency in which the price of gold is usually quoted), interest rates, gold borrowing and lending rates and global or regional economic, financial, political, regulatory, judicial or other events. Gold prices may be affected by industry factors such as industrial and jewelry demand as well as lending, sales and purchases of gold by the official sector, including central banks and other governmental agencies and multilateral institutions that hold gold. Additionally, gold prices may be affected by levels of gold production, production costs and short-term changes in supply and demand due to trading activities in the gold market. From time to time, above-ground inventories of gold may also influence the market. It is not possible to predict the aggregate effect of all or any combination of these factors. The price of gold has recently been, and may continue to be, extremely volatile.

Background on the PIMCO 0-5 Year High Yield Corporate Bond Index ETF

All information contained in this underlying supplement regarding the PIMCO 0-5 Year High Yield Corporate Bond Index ETF (the “**HYS Fund**”) has been derived from publicly available information, without independent verification. This information reflects the policies of, and is subject to change by, the PIMCO ETF Trust and Pacific Investment Management Company LLC (“**PIMCO**”). PIMCO is currently the investment adviser to the HYS Fund. The HYS Fund is an exchange-traded fund that trades on the NYSE Arca, Inc. under the ticker symbol “HYS.”

The HYS Fund seeks to provide total return that corresponds, before fees and expenses, to the total return of the ICE BofA 0-5 Year US High Yield Constrained Index (the “**HY Index**”). The HY Index tracks the performance of short-term U.S. dollar denominated below investment grade corporate debt publicly issued in the U.S. domestic market with less than five years remaining term to final maturity.

PIMCO uses an indexing approach in managing the HYS Fund’s investments. The HYS Fund employs a representative sampling strategy in seeking to achieve its investment objective. Representative sampling involves investing in a combination of securities included in the HY Index and other instruments, or in securities included in the HY Index but in different proportions as compared to the weighting of the HY Index, such that the portfolio effectively provides exposure to the HY Index. In using a representative strategy, the HYS Fund may not track the HY Index with the same degree of accuracy as a fund that replicates the composition and weighting of its underlying index. The HYS Fund does not attempt to outperform the HY Index.

The HY Index is a theoretical financial calculation while the HYS Fund is an actual investment portfolio. The performance of the HYS Fund and the HY Index may vary due to the operating expenses incurred by the fund, the cost of buying and selling securities, asset valuation differences and differences between the HYS Fund’s portfolio and the HY Index due to legal restrictions, cost or liquidity restraints. “Tracking error” is the difference between the performance (return) of the HYS Fund’s portfolio and that of the HY Index. Because the HYS Fund uses a representative sampling indexing strategy, it can be expected to have a larger tracking error than if it held all of the securities in the HY index.

The PIMCO ETF Trust is a registered investment company that consists of numerous separate investment portfolios, including the HYS Fund. Information provided to or filed with the SEC by PIMCO ETF Trust pursuant to the Securities Act of 1933, as amended, and the Investment Company Act of 1940, as amended, can be located by reference to SEC file numbers 333-155395 and 811-22250, respectively, through the SEC’s website at <http://www.sec.gov>.

Background on the SPDR® Bloomberg High Yield Bond ETF

All information contained in this underlying supplement regarding the SPDR® Bloomberg High Yield Bond ETF (the “**JNK Fund**”) has been derived from publicly available information, without independent verification. This information reflects the policies of, and is subject to change by, the SPDR® Series Trust and SSGA Funds Management Inc. (“**SSGA**”). The JNK Fund is an investment portfolio managed by SSGA, the investment adviser to the JNK Fund. The JNK Fund trades on the NYSE Arca, Inc. under the ticker symbol “JNK.”

The JNK Fund seeks to provide investment results that, before fees and expenses, correspond generally to the price and yield performance of an index that tracks the U.S. high yield corporate bond market, which is currently the Bloomberg High Yield Very Liquid Index. The Bloomberg High Yield Very Liquid Index (the “**Bloomberg High Yield Index**”) is designed to measure the performance of publicly issued, U.S. dollar-denominated high yield corporate bonds with above-average liquidity.

In seeking to track the performance of the Bloomberg High Yield Index, the JNK Fund employs a sampling strategy, which means that the JNK Fund is not required to purchase all of the securities represented in the Bloomberg High Yield Index. Instead, the JNK Fund may purchase a subset of the securities in the Bloomberg High Yield Index in an effort to hold a portfolio of securities with generally the same risk and return characteristics of the Bloomberg High Yield Index. The quantity of holdings in the JNK Fund will be based on a number of factors, including asset size of the JNK Fund. Based on its analysis of these factors, SSGA may invest the JNK Fund’s assets in a subset of securities in the Bloomberg High Yield Index or may invest the JNK Fund’s assets in substantially all of the securities represented in the Bloomberg High Yield Index in approximately the same proportions as the Bloomberg High Yield Index.

While SSGA seeks to track the performance of the Bloomberg High Yield Index as closely as possible (*i.e.*, achieve a high degree of correlation with the Bloomberg High Yield Index), the return of the JNK Fund may not match or achieve a high degree of correlation with the return of the Bloomberg High Yield Index due to operating expenses, transaction costs, cash flows, regulatory requirements and operational inefficiencies.

The SPDR® Series Trust is a registered investment company that consists of numerous separate investment portfolios, including the JNK Fund. Information provided to or filed with the SEC by the SPDR® Series Trust pursuant to the Securities Act of 1933, as amended, and the Investment Company Act of 1940, as amended, can be located by reference to SEC file numbers 333-57793 and 811-08839, respectively, through the SEC’s website at <http://www.sec.gov>.

Background on the VanEck® Gold Miners ETF

All information contained in this underlying supplement regarding the VanEck® Gold Miners ETF (the “**GDX Fund**”) has been derived from publicly available information, without independent verification. This information reflects the policies of, and is subject to change by, VanEck® ETF Trust (the “**VanEck Trust**”) and Van Eck Associates Corporation (“**Van Eck**”). The GDX Fund is an investment portfolio of the VanEck Trust. Van Eck is currently the investment adviser to the GDX Fund. Prior to September 2021, VanEck® was branded as VanEck Vectors®. The GDX Fund trades on NYSE Arca, Inc. under the ticker symbol “GDX.”

The GDX Fund seeks to replicate as closely as possible, before fees and expenses, the price and yield performance of the NYSE Arca Gold Miners Index (the “**Gold Miners Index**”). The Gold Miners Index is a modified market capitalization-weighted index composed of publicly traded companies involved primarily in the mining of gold or silver.

The GDX Fund uses a “passive” or indexing investment approach to attempt to approximate the investment performance of the Gold Miners Index by investing in a portfolio of securities that generally replicates Gold Miners Index. The GDX Fund will normally invest at least 80% of its total assets in companies that are involved in the gold mining industry. These companies may include small- and medium-capitalization companies and foreign issuers. The GDX Fund normally invests at least 80% of its total assets in securities that comprise the Gold Miners Index. The GDX Fund may or may not hold all of the securities that are included in the Gold Miners Index.

The Gold Miners Index is a theoretical financial calculation, while the GDX Fund is an actual investment portfolio. The performance of the GDX Fund and the Gold Miners Index may vary somewhat due to operating expenses, transaction costs, and differences between the GDX Fund’s portfolio and the Gold Miners Index resulting from legal restrictions that apply to the GDX Fund but not to the Gold Miners Index or lack of liquidity.

The VanEck Trust is a registered investment company that consists of numerous separate investment portfolios, including the GDX Fund. Information provided to or filed with the SEC by the VanEck Trust pursuant to the Securities Act of 1933, as amended, and the Investment Company Act of 1940, as amended, can be located by reference to SEC file numbers 333-123257 and 811-10325, respectively, through the SEC's website at <http://www.sec.gov>.

Background on the Vanguard Equity ETFs

All information contained in this underlying supplement regarding the Vanguard S&P 500® ETF, the Vanguard FTSE Developed Markets ETF, the Vanguard FTSE Emerging Markets ETF, the Vanguard Real Estate ETF and the Vanguard Small-Cap ETF (each, a **"Vanguard Equity ETF"** and collectively, the **"Vanguard Equity ETFs"**) has been derived from publicly available information, without independent verification. This information reflects the policies of, and is subject to change by, Vanguard Index Funds (the **"Vanguard Trust"**), Vanguard Tax-Managed Funds (the **"Vanguard Tax-Managed Trust"**), Vanguard International Equity Index Funds (the **"Vanguard International Trust"**), Vanguard Specialized Funds (the **"Vanguard Specialized Trust"**) and Vanguard Group, Inc. (**"Vanguard"**). The Vanguard Equity ETFs are investment portfolios of the Vanguard Trust, the Vanguard Tax-Managed Trust, the Vanguard International Trust or the Vanguard Specialized Trust. Vanguard is the investment adviser to the Vanguard Equity ETFs.

Each Vanguard Equity ETF employs an indexing investment approach designed to track the performance of its underlying index. Generally, a Vanguard Equity ETF uses the replication method of indexing, meaning that it invests all, or substantially all, of its assets in the securities that make up its underlying index, holding each security in approximately the same proportion as its weighting in its underlying index. In the alternative, a Vanguard Equity ETF may use a sampling method of indexing, meaning that it holds a broadly diversified collection of securities that, in the aggregate, approximates its underlying index in terms of key characteristics, such as industry weightings and market capitalization, as well as certain financial measures, such as price/earnings ratio and dividend yield. However, an index fund, including a Vanguard Equity ETF, generally does not perform exactly like its underlying index. For example, index funds have operating expenses and transaction costs, while indices do not. The ability of an index fund to match its performance to that of its underlying index can also be impacted by, among other things, the timing and size of cash flows, asset valuation differences and the size of that index fund. Market disruptions and regulatory or policy restrictions could also have an adverse effect on an index fund's ability to adjust its exposure to the required levels in order to track its underlying index.

The Vanguard Trust, the Vanguard Tax-Managed Trust, the Vanguard International Trust and the Vanguard Specialized Trust are registered investment companies that consist of numerous separate investment portfolios, including the Vanguard Equity ETFs. Information provided to or filed with the SEC by Vanguard Trust, the Vanguard Tax-Managed Trust, the Vanguard International Trust and the Vanguard Specialized Trust pursuant to the Securities Act of 1933, as amended, and the Investment Company Act of 1940, as amended, can be located by reference to SEC file numbers 002-56846 and 811-02652, respectively, for the Vanguard Trust; SEC filing numbers 033-53683 and 811-07175, respectively, for the Vanguard Tax-Managed Trust; SEC filing numbers 033-32548 and 811-05972, respectively, for the Vanguard International Trust; and SEC filing numbers 002-88116 and 811-03916, respectively, for the Vanguard Specialized Trust, all through the SEC's website at <http://www.sec.gov>.

The Vanguard S&P 500® ETF

The Vanguard S&P 500® ETF seeks to track, before fees and expenses, the performance of a benchmark index that measures the investment return of U.S. large-capitalization stocks, which is currently the S&P 500® Index. The S&P 500® Index consists of stocks of 500 companies selected to provide a performance benchmark for the U.S. equity markets. The Vanguard S&P 500® ETF trades on NYSE Arca, Inc. under the ticker symbol "VOO."

The Vanguard FTSE Developed Markets ETF

The Vanguard FTSE Developed Markets ETF seeks to track, before fees and expenses, the performance of a benchmark index that measures the investment return of stocks issued by companies located in Canada and the major markets of Europe and the Pacific region, which is currently the FTSE Developed All Cap ex US Index. The FTSE Developed All Cap ex US Index is a market-capitalization weighted index representing the performance of large-, mid- and small-capitalization companies in Canada and the major markets of Europe and the Pacific region. The Vanguard FTSE Developed Markets ETF trades on NYSE Arca, Inc. under the ticker symbol “VEA.”

The Vanguard FTSE Emerging Markets ETF

The Vanguard FTSE Emerging Markets ETF seeks to track, before fees and expenses, the performance of a benchmark index that measures the investment return of stocks issued by companies located in emerging market countries, which is currently the FTSE Emerging Markets All Cap China A Inclusion Index. The FTSE Emerging Markets All Cap China A Inclusion Index is a market-capitalization weighted index representing the performance of large-, mid- and small-capitalization companies in emerging markets. The Vanguard FTSE Emerging Markets ETF trades on NYSE Arca, Inc. under the ticker symbol “VWO.”

The Vanguard Real Estate ETF

The Vanguard Real Estate ETF seeks to provide a high level of income and moderate long-term capital appreciation by tracking, before fees and expenses, the performance of a benchmark index that measures the performance of publicly traded equity real estate investment trusts (REITs), which is currently the MSCI US Investable Market Real Estate 25/50 Index. The MSCI US Investable Market Real Estate 25/50 Index is designed to measure the performance of the large-, mid- and small-capitalization segments of the real estate sector of the U.S. equities market, as classified under the Global Industry Classification Standard (GICS). The GICS real estate sector is composed of REITs and real estate management and development companies. The Vanguard Real Estate ETF trades on NYSE Arca, Inc. under the ticker symbol “VNQ.”

The Vanguard Small-Cap ETF

The Vanguard Small-Cap ETF seeks to track the performance of a benchmark index that measures the investment return of U.S. small-capitalization stocks, which is currently the CRSP U.S. Small Cap Index. The CRSP U.S. Small Cap Index is designed to represent small-capitalization investable U.S. equity securities. The Vanguard Small-Cap ETF trades on NYSE Arca, Inc. under the ticker symbol “VB.”

Background on the Vanguard Short-Term Corporate Bond ETF

All information contained in this underlying supplement regarding the Vanguard Short-Term Corporate Bond ETF (the “**VCSH Fund**”) has been derived from publicly available information, without independent verification. This information reflects the policies of, and is subject to change by, Vanguard Scottsdale Funds and Vanguard Group, Inc. (“**Vanguard**”). The VCSH Fund is an investment portfolio of Vanguard Scottsdale Funds. Vanguard is the investment adviser to the VCSH Fund. The VCSH Fund trades on The Nasdaq Stock Market under the ticker symbol “VCSH.”

The VCSH Fund seeks to track the performance of a market-weighted corporate bond index with a short-term dollar-weighted average maturity, which is currently the Bloomberg U.S. 1-5 Year Corporate Bond Index (the “**Bloomberg Bond Index**”). The Bloomberg Bond Index includes U.S. dollar-denominated, investment-grade, fixed-rate, taxable securities issued by U.S. and non-U.S. industrial, utility and financial companies, with maturities between one and five years.

The VCSH Fund employs an indexing investment approach designed to track the performance of the Bloomberg Bond Index. The VCSH Fund uses the sampling method of indexing, meaning that it holds a range of securities that, in the aggregate, approximates the full Bloomberg Bond Index in terms of key risk

factors and other characteristics. The VCSH Fund is subject to index sampling risk, which is the chance that the securities selected for the VCSH Fund, in the aggregate, will not provide investment performance matching that of the Bloomberg Bond Index. An index fund, including the VCSH Fund, generally does not perform exactly like its underlying index. For example, index funds have operating expenses and transaction costs, while indices do not. The ability of an index fund to match its performance to that of its underlying index can also be impacted by, among other things, the timing and size of cash flows, asset valuation differences and the size of that index fund. Market disruptions and regulatory or policy restrictions could also have an adverse effect on an index fund's ability to adjust its exposure to the required levels in order to track its underlying index.

Vanguard Scottsdale Funds is a registered investment company that consists of numerous separate investment portfolios, including the VCSH Fund. Information provided to or filed with the SEC by Vanguard pursuant to the Securities Act of 1933, as amended, and the Investment Company Act of 1940, as amended, can be located by reference to SEC file numbers 333-11763 and 811-07803, respectively, through the SEC's website at <http://www.sec.gov>.

BACKGROUND ON THE CASH CONSTITUENT

The J.P. Morgan Fallback Cash Index

The J.P. Morgan Fallback Cash Index (the “**Fallback Cash Index**”) was developed and is maintained and calculated by JPMS. The description of the Fallback Cash Index and methodology included in this underlying supplement is based on rules formulated by JPMS (the “**Fallback Cash Index Rules**”). The Fallback Cash Index Rules, and not this description, will govern the calculation and constitution of the Fallback Cash Index and other decisions and actions related to its maintenance. The Fallback Cash Index Rules in effect as of the date of this underlying supplement are attached as Annex B to this underlying supplement. The Fallback Cash Index is the intellectual property of JPMS, and JPMS reserves all rights with respect to its ownership of the Fallback Cash Index. The Fallback Cash Index is reported by Bloomberg L.P. under the ticker symbol “JPUSCAFB Index.”

The Fallback Cash Index seeks to track a composite rate of interest that is intended to reflect the overnight rate of return of a notional position in a three-month time deposit in U.S. dollars, which is currently calculated in the manner set forth in the Fallback Cash Index Rules by referencing the J.P. Morgan 2M Spread-Adjusted SOFR Index and the J.P. Morgan 3M Spread-Adjusted SOFR Index (each, a “**SOFR Index**”). The level of the J.P. Morgan 2M Spread-Adjusted SOFR Index on each day reflects a single non-compounded SOFR rate, as adjusted by a two-month spread, and the level of the J.P. Morgan 3M Spread-Adjusted SOFR Index on each day reflects a single non-compounded SOFR rate, as adjusted by a three-month spread. For more information about the SOFR Indices, see “— The J.P. Morgan 2M Spread-Adjusted SOFR Index or the J.P. Morgan 3M Spread-Adjusted SOFR Index” below.

The Fallback Cash Index is designed as a replacement for an index that is intended to reflect the overnight rate of return of a notional position in a three-month time deposit in U.S. dollars, as calculated by referencing U.S. dollar LIBOR. However, the composition and characteristics of SOFR are not the same as those of U.S. dollar LIBOR. SOFR is a broad Treasury repo financing rate that represents overnight secured funding transactions and is not the economic equivalent of U.S. dollar LIBOR. While SOFR is a secured rate, U.S. dollar LIBOR is an unsecured rate. In addition, while SOFR currently is an overnight rate only, U.S. dollar LIBOR is a forward-looking rate that represents interbank funding for a specified term. As a result, there can be no assurance that SOFR will perform in the same way as U.S. dollar LIBOR would have at any time, including, without limitation, as a result of changes in interest and yield rates in the market, bank credit risk, market volatility or global or regional economic, financial, political, regulatory, judicial or other events. For the same reasons, SOFR, as adjusted by a spread, is not expected to be a comparable substitute, successor or replacement for U.S. dollar LIBOR.

The level of the Fallback Cash Index (the “**Fallback Cash Index Level**”) was set equal to 100.00 on April 3, 2018, the base date of the Fallback Cash Index. The Fallback Cash Index Calculation Agent (as defined below) began calculating the Fallback Cash Index on a live basis on November 23, 2021. The Fallback Cash Index Calculation Agent calculates the Fallback Cash Index Level with respect to each weekday and will publish the Fallback Cash Index Level to an accuracy of four decimal places. The Fallback Cash Index Calculation Agent may calculate the Fallback Cash Index to a greater degree of accuracy or specificity and may use any rounding convention it considers appropriate for any data used or calculations performed (which may include using data with a higher level of specificity than that which is published on any particular data source) to determine the Fallback Cash Index Level. See the Fallback Cash Index Rules for additional information about the calculation of the Fallback Cash Index Level.

No assurance can be given that the methodology used to construct the Fallback Cash Index will achieve its intended results or that the Fallback Cash Index will be successful. The performance of the Fallback Cash Index may differ, perhaps significantly, from the performance of a similar index that is calculated by reference to U.S. dollar LIBOR.

The Fallback Cash Index is described as a notional cash position because there is no actual portfolio of financial instruments to which any person is entitled or in which any person has any ownership interest. The Fallback Cash Index merely references certain financial instruments, the

performance of which will be used as a reference point for calculating the Fallback Cash Index Level.

Succession and Extraordinary Events

If a SOFR Index is not calculated and announced by the relevant sponsor or publisher, but is calculated and announced by a successor sponsor or publisher acceptable to the Fallback Cash Index Calculation Agent, or if a SOFR Index is replaced by a successor index that, in the determination of the Fallback Cash Index Calculation Agent, is the same or substantially similar to that SOFR Index, then that SOFR Index will be deemed to be the successor SOFR Index, with effect from a date determined by the Fallback Cash Index Calculation Agent.

If a SOFR Index materially changes, is cancelled or becomes non-representative or is not published for a sustained period, then the Fallback Cash Index Calculation Agent may determine to select a replacement SOFR Index that possesses substantially similar characteristics to the SOFR Index that is being replaced or, if the Fallback Cash Index Calculation Agent determines that there is no replacement SOFR Index that possesses substantially similar characteristics to the original SOFR Index, then the Fallback Cash Index Calculation Agent may select a replacement SOFR Index that it determines will be an appropriate replacement SOFR Index or, if not canceled, continue to reference the original SOFR Index.

In addition, the Fallback Cash Index Sponsor may, in its discretion, at any time and without notice, terminate the calculation or publication of the Fallback Cash Index, including, without limitation, subsequent to the occurrence of an event described above affecting a SOFR Index. The Fallback Cash Index Sponsor is under no obligation to continue the calculation and publication of the Fallback Cash Index.

In connection with any of the changes described above, the Fallback Cash Index Calculation Agent may make any adjustments to the Fallback Cash Index Rules that it determines are appropriate to account for that change. These adjustments to the Fallback Cash Index Rules may include, without limitation, the addition or subtraction of a spread adjustment to that successor or replacement index, giving due consideration to any industry-accepted spread adjustment or method for calculating or determining a spread adjustment for that successor or replacement index. The inclusion of a spread adjustment could adversely affect the Fallback Cash Index and therefore the return on and market value of the notes.

Corrections

If the level of any SOFR Index is publicly corrected after its initial dissemination or if the Fallback Cash Index Calculation Agent identifies an error or omission in respect of the Fallback Cash Index, and if the Fallback Cash Index Calculation Agent determines that the correction, error or omission is material, then the Fallback Cash Index Calculation Agent may make an adjustment or correction to the Fallback Cash Index Level.

The Fallback Cash Index Sponsor and the Fallback Cash Index Calculation Agent

JPMS is currently the sponsor of the Fallback Cash Index (together with any successor sponsor or assign, the **"Fallback Cash Index Sponsor"**). The Fallback Cash Index Sponsor may appoint a successor sponsor or assign, delegate or transfer any or all of its rights, obligations or responsibilities in its capacity as Fallback Cash Index Sponsor in connection with the Fallback Cash Index to one or more entities (including an unrelated third party) that the Fallback Cash Index Sponsor determines is appropriate.

The Fallback Cash Index Sponsor is also responsible for the appointment of the calculation agent of the Fallback Cash Index (the **"Fallback Cash Index Calculation Agent"**), which may be the Fallback Cash Index Sponsor, an unrelated third party or an affiliate or subsidiary of the Fallback Cash Index Sponsor. JPMS is currently the Fallback Cash Index Calculation Agent. The Fallback Cash Index

Sponsor may at any time and for any reason (i) appoint a successor Fallback Cash Index Calculation Agent if the Fallback Cash Index Sponsor is at that time the Fallback Cash Index Calculation Agent or (ii) terminate the appointment of the Fallback Cash Index Calculation Agent and appoint an alternative entity as a replacement Fallback Cash Index Calculation Agent if the Fallback Cash Index Sponsor is not at that time the Fallback Cash Index Calculation Agent. The Fallback Cash Index Calculation Agent (unless the Fallback Cash Index Calculation Agent is the same entity as the Fallback Cash Index Sponsor) must obtain written permission from the Fallback Cash Index Sponsor prior to any delegation or transfer of the Fallback Cash Index Calculation Agent's responsibilities or obligations in connection with the Fallback Cash Index. The Fallback Cash Index Calculation Agent is responsible for making calculations and determinations as described above and in the Fallback Cash Index Rules.

Fallback Cash Index Sponsor and Fallback Cash Index Calculation Agent Determinations

The Fallback Cash Index Calculation Agent will act in good faith and in a commercially reasonable manner in making determinations, interpretations and calculations pursuant to the Fallback Cash Index Rules. Subject to the prior agreement of the Fallback Cash Index Sponsor, the Fallback Cash Index Calculation Agent's determinations, and all calculations related to the Fallback Cash Index and the Fallback Cash Index Calculation Agent's interpretations of the Fallback Cash Index Rules, will be final.

None of the Fallback Cash Index Sponsor, the Fallback Cash Index Calculation Agent and any of their respective affiliates and subsidiaries and any of their respective directors, officers, employees, representatives, delegates and agents (for purposes of this section, each, a "**Relevant Person**") will have any responsibility to any person (whether as a result of negligence or otherwise) for any determinations, interpretations or calculations made or anything done (or omitted to be determined or done) in connection with the Fallback Cash Index or any use to which any person may put the Fallback Cash Index or the Fallback Cash Index Levels.

Subject to the prior agreement of the Fallback Cash Index Sponsor, the Fallback Cash Index Calculation Agent may make certain determinations, adjustments, amendments and interpretations related to the Fallback Cash Index. All such determinations, adjustments, amendments and interpretations (in each case, subject to such prior agreement on the part of the Fallback Cash Index Sponsor) of the Fallback Cash Index Calculation Agent related to the Fallback Cash Index and all calculations performed by the Fallback Cash Index Calculation Agent related to the Fallback Cash Index will be final, conclusive and binding and no person will be entitled to make any claim against the Fallback Cash Index Sponsor, the Fallback Cash Index Calculation Agent, or any of the Relevant Persons in respect thereof. Once a determination, adjustment, amendment or interpretation is made or action is taken by the Fallback Cash Index Calculation Agent (in each case, as agreed in advance by the Fallback Cash Index Sponsor) in relation to the Fallback Cash Index, or a calculation is performed by the Fallback Cash Index Calculation Agent in relation to the Fallback Cash Index, none of the Fallback Cash Index Sponsor, the Fallback Cash Index Calculation Agent or any Relevant Person will be under any obligation to revise any such determination, adjustment, amendment, interpretation or calculation made or anything done (or omitted to be determined, adjusted, amended, interpreted, calculated or done) for any reason.

The Fallback Cash Index Calculation Agent's exercise of discretion or failure to exercise discretion in relation to the Fallback Cash Index may have a detrimental effect on the Fallback Cash Index Level and the volatility of the Fallback Cash Index. The Fallback Cash Index Sponsor or the Fallback Cash Index Calculation Agent may make certain determinations or calculations based on information obtained from publicly available sources without independently verifying such information.

Amendment of the Fallback Cash Index Rules; Termination of the Fallback Cash Index

The Fallback Cash Index Rules may be supplemented, amended or restated from time to time in the sole discretion of JPMS in its capacity as the Fallback Cash Index Sponsor. Although the Fallback Cash Index Rules are intended to be comprehensive and accurate, ambiguities may arise and errors or omissions may have been made. Under these circumstances, the Fallback Cash Index Sponsor will resolve these ambiguities and, if necessary, amend the Fallback Cash Index Rules to reflect their resolution. In the case of any errors or omissions, the Fallback Cash Index Sponsor may amend the

Fallback Cash Index Rules to address those errors or omissions. The Fallback Cash Index Rules will be made available (in a manner determined by the Fallback Cash Index Sponsor from time to time) following any supplementation, amendment or restatement.

Following any amendment, the Fallback Cash Index Sponsor will make available (as soon as practicable) the amended version of the Fallback Cash Index Rules and will include the effective date of such amendment in the new version of the Fallback Cash Index Rules. However, the Fallback Cash Index Sponsor is under no obligation to inform any person about any amendments to the Fallback Cash Index (except as required by law or regulation).

The Fallback Cash Index Sponsor may at any time, for any reason and without notice, terminate or cease the calculation or publication of the Cash Index.

The J.P. Morgan 2M Spread-Adjusted SOFR Index or the J.P. Morgan 3M Spread-Adjusted SOFR Index

The J.P. Morgan 2M Spread-Adjusted SOFR Index and the J.P. Morgan 3M Spread-Adjusted SOFR Index (each, a “**SOFR Index**”) were developed and are maintained and calculated by JPMS. The description of the SOFR Indices and methodology included in this underlying supplement is based on rules formulated by JPMS (the “**SOFR Index Rules**”). The SOFR Index Rules, and not this description, will govern the calculation and constitution of the SOFR Indices and other decisions and actions related to their maintenance. The SOFR Index Rules in effect as of the date of this underlying supplement are attached as Annex C to this underlying supplement. Each SOFR Index is the intellectual property of JPMS, and JPMS reserves all rights with respect to its ownership of the SOFR Indices. The J.P. Morgan 2M Spread-Adjusted SOFR Index is reported by Bloomberg L.P. under the ticker symbol “JPUS002M Index” and the J.P. Morgan 3M Spread-Adjusted SOFR Index is reported by Bloomberg L.P. under the ticker symbol “JPUS003M Index.”

Each SOFR Index seeks to track the daily SOFR rate, as adjusted by a spread of 0.0018456 (in the case of the J.P. Morgan 2M Spread-Adjusted SOFR Index) or 0.0026161 (in the case of the J.P. Morgan 3M Spread-Adjusted SOFR Index), as applicable. See “— What Is SOFR?” below for additional information about SOFR.

The SOFR Index Calculation Agent (as defined below) began calculating the level of each SOFR Index (each, a “**SOFR Index Level**”) on a live basis on November 23, 2021. The SOFR Index Calculation Agent calculates the SOFR Index Level of each SOFR Index with respect to each weekday on which SOFR is scheduled to be published and will publish the SOFR Index Level of each SOFR Index to an accuracy of four decimal places. The SOFR Index Calculation Agent may calculate each SOFR Index to a greater degree of accuracy or specificity and may use any rounding convention it considers appropriate for any data used or calculations performed (which may include using data with a higher level of specificity than that which is published on any particular data source) to determine the SOFR Index Level of each SOFR Index. See the SOFR Index Rules for additional information about the calculation of the SOFR Index Level.

No assurance can be given that the methodology used to construct the SOFR Indices will achieve its intended results or that any SOFR Index will be successful.

Each SOFR Index is described as a notional cash position because there is no actual portfolio of financial instruments to which any person is entitled or in which any person has any ownership interest. The SOFR Index of each SOFR Index merely references certain financial instruments, the performance of which will be used as a reference point for calculating that SOFR Index Level.

What Is SOFR?

SOFR is published by the Federal Reserve Bank of New York (“**FRBNY**”) and is intended to be a broad measure of the cost of borrowing cash overnight collateralized by Treasury securities. FRBNY reports that SOFR includes all trades in the Broad General Collateral Rate, plus bilateral Treasury

repurchase agreement (“repo”) transactions cleared through the delivery-versus-payment service offered by the Fixed Income Clearing Corporation (the “FICC”), a subsidiary of The Depository Trust & Clearing Corporation (“DTCC”). SOFR is filtered by FRBNY to remove a portion of the foregoing transactions considered to be “specials.” According to FRBNY, “specials” are repos for specific-issue collateral which take place at cash-lending rates below those for general collateral repos because cash providers are willing to accept a lesser return on their cash in order to obtain a particular security.

FRBNY reports that SOFR is calculated as a volume-weighted median of transaction-level tri-party repo data collected from The Bank of New York Mellon, which currently acts as the clearing bank for the tri-party repo market, as well as General Collateral Finance Repo transaction data and data on bilateral Treasury repo transactions cleared through the FICC’s delivery-versus-payment service. FRBNY notes that it obtains information from DTCC Solutions LLC, an affiliate of DTCC.

FRBNY currently publishes SOFR daily on its website. FRBNY states on its publication page for SOFR that use of SOFR is subject to important disclaimers, limitations and indemnification obligations, including that FRBNY may alter the methods of calculation, publication schedule, rate revision practices or availability of SOFR at any time without notice. Information contained in the publication page for SOFR is not incorporated by reference in, and should not be considered part of, this underlying supplement.

Succession and Extraordinary Events

If a daily SOFR rate is not calculated and announced by the relevant sponsor or publisher, but is calculated and announced by a successor sponsor or publisher acceptable to the SOFR Index Calculation Agent, or if a daily SOFR rate is replaced by a successor rate that, in the determination of the SOFR Index Calculation Agent, is the same or substantially similar to that daily SOFR rate, then that daily SOFR rate will be deemed to be the successor daily SOFR rate, with effect from a date determined by the SOFR Index Calculation Agent.

If a daily SOFR rate materially changes, is cancelled or becomes non-representative or is not published for a sustained period, then the SOFR Index Calculation Agent may determine to select a replacement rate that possesses substantially similar characteristics to the rate that is being replaced or, if the SOFR Index Calculation Agent determines that there is no replacement rate that possesses substantially similar characteristics to the original rate, then the SOFR Index Calculation Agent may select a replacement rate that it determines will be an appropriate replacement rate or, if not canceled, continue to reference the original rate.

In addition, the SOFR Index Sponsor may, in its discretion, at any time and without notice, terminate the calculation or publication of a SOFR Index, including, without limitation, subsequent to the occurrence of an event described above affecting a daily SOFR rate. The SOFR Index Sponsor is under no obligation to continue the calculation and publication of any SOFR Index.

In connection with any of the changes described above, the SOFR Index Calculation Agent may make any adjustments to the SOFR Index Rules that it determines are appropriate to account for that change. These adjustments to the SOFR Index Rules may include, without limitation, the addition or subtraction of a spread adjustment to that successor or replacement rate, giving due consideration to any industry-accepted spread adjustment or method for calculating or determining a spread adjustment for that successor or replacement rate. The inclusion of a spread adjustment could adversely affect the daily SOFR rate and therefore the return on and market value of the notes.

Corrections

If the level of any daily SOFR rate is publicly corrected after its initial dissemination or if the SOFR Index Calculation Agent identifies an error or omission in respect of the daily SOFR rate, and if the SOFR Index Calculation Agent determines that the correction, error or omission is material, then the SOFR Index Calculation Agent may make an adjustment or correction to the SOFR Index Level.

The SOFR Index Sponsor and the SOFR Index Calculation Agent

JPMS is currently the sponsor of each SOFR Index (together with any successor sponsor or assign, the “**SOFR Index Sponsor**”). The SOFR Index Sponsor may appoint a successor sponsor or assign, delegate or transfer any or all of its rights, obligations or responsibilities in its capacity as SOFR Index Sponsor in connection with each SOFR Index to one or more entities (including an unrelated third party) that the SOFR Index Sponsor determines is appropriate.

The SOFR Index Sponsor is also responsible for the appointment of the calculation agent of each SOFR Index (the “**SOFR Index Calculation Agent**”), which may be the SOFR Index Sponsor, an unrelated third party or an affiliate or subsidiary of the SOFR Index Sponsor. JPMS is currently the SOFR Index Calculation Agent. The SOFR Index Sponsor may at any time and for any reason (i) appoint a successor SOFR Index Calculation Agent if the SOFR Index Sponsor is at that time the SOFR Index Calculation Agent or (ii) terminate the appointment of the SOFR Index Calculation Agent and appoint an alternative entity as a replacement SOFR Index Calculation Agent if the SOFR Index Sponsor is not at that time the SOFR Index Calculation Agent. The SOFR Index Calculation Agent (unless the SOFR Index Calculation Agent is the same entity as the SOFR Index Sponsor) must obtain written permission from the SOFR Index Sponsor prior to any delegation or transfer of the SOFR Index Calculation Agent’s responsibilities or obligations in connection with any SOFR Index. The SOFR Index Calculation Agent is responsible for making calculations and determinations as described above and in the SOFR Index Rules.

SOFR Index Sponsor and SOFR Index Calculation Agent Determinations

The SOFR Index Calculation Agent will act in good faith and in a commercially reasonable manner in making determinations, interpretations and calculations pursuant to the SOFR Index Rules. Subject to the prior agreement of the SOFR Index Sponsor, the SOFR Index Calculation Agent’s determinations, and all calculations related to any SOFR Index and the SOFR Index Calculation Agent’s interpretations of the SOFR Index Rules, will be final.

None of the SOFR Index Sponsor, the SOFR Index Calculation Agent and any of their respective affiliates and subsidiaries and any of their respective directors, officers, employees, representatives, delegates and agents (for purposes of this section, each, a “**Relevant Person**”) will have any responsibility to any person (whether as a result of negligence or otherwise) for any determinations, interpretations or calculations made or anything done (or omitted to be determined or done) in connection with any SOFR Index or any use to which any person may put any SOFR Index or the SOFR Index Levels of any SOFR Index.

Subject to the prior agreement of the SOFR Index Sponsor, the SOFR Index Calculation Agent may make certain determinations, adjustments, amendments and interpretations related to any SOFR Index. All such determinations, adjustments, amendments and interpretations (in each case, subject to such prior agreement on the part of the SOFR Index Sponsor) of the SOFR Index Calculation Agent related to any SOFR Index and all calculations performed by the SOFR Index Calculation Agent related to any SOFR Index will be final, conclusive and binding and no person will be entitled to make any claim against the SOFR Index Sponsor, the SOFR Index Calculation Agent, or any of the Relevant Persons in respect thereof. Once a determination, adjustment, amendment or interpretation is made or action is taken by the SOFR Index Calculation Agent (in each case, as agreed in advance by the SOFR Index Sponsor) in relation to any SOFR Index, or a calculation is performed by the SOFR Index Calculation Agent in relation to any SOFR Index, none of the SOFR Index Sponsor, the SOFR Index Calculation Agent or any Relevant Person will be under any obligation to revise any such determination, adjustment, amendment, interpretation or calculation made or anything done (or omitted to be determined, adjusted, amended, interpreted, calculated or done) for any reason.

The SOFR Index Calculation Agent’s exercise of discretion or failure to exercise discretion in relation to any SOFR Index may have a detrimental effect on the SOFR Index Level of that SOFR Index and the volatility of that SOFR Index. The SOFR Index Sponsor or the SOFR Index Calculation Agent may make

certain determinations or calculations based on information obtained from publicly available sources without independently verifying such information.

Amendment of the SOFR Index Rules; Termination of a SOFR Index

The SOFR Index Rules may be supplemented, amended or restated from time to time in the sole discretion of JPMS in its capacity as the SOFR Index Sponsor. Although the SOFR Index Rules are intended to be comprehensive and accurate, ambiguities may arise and errors or omissions may have been made. Under these circumstances, the SOFR Index Sponsor will resolve these ambiguities and, if necessary, amend the SOFR Index Rules to reflect their resolution. In the case of any errors or omissions, the SOFR Index Sponsor may amend the SOFR Index Rules to address those errors or omissions. The SOFR Index Rules will be made available (in a manner determined by the SOFR Index Sponsor from time to time) following any supplementation, amendment or restatement.

Following any amendment, the SOFR Index Sponsor will make available (as soon as practicable) the amended version of the SOFR Index Rules and will include the effective date of such amendment in the new version of the SOFR Index Rules. However, the SOFR Index Sponsor is under no obligation to inform any person about any amendments to any SOFR Index (except as required by law or regulation).

The SOFR Index Sponsor may at any time, for any reason and without notice, terminate or cease the calculation or publication of any SOFR Index.

SUPPLEMENTAL TERMS OF THE 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 notes set forth in the accompanying product supplement. Except as noted below, capitalized terms used in this section without definition are as defined in “The J.P. Morgan Efficiente® Plus Index Series” above.

Postponement of a Determination Date

Notes linked solely to an Index

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

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

- (a) for each Basket Constituent (including any successor Basket Constituent) that is an exchange-traded fund (an “ETF”), the closing price of one share of that Basket Constituent (or, if a market disruption event or a non-trading day that affected that Basket Constituent has occurred, the calculation agent’s good faith estimate of the closing price of one share of that Basket Constituent that would have prevailed but for that market disruption event or non-trading day) on the scheduled trading day immediately preceding that Final Disrupted Determination Date;
- (b) for any Basket Constituent (including any successor Basket Constituent) that is an index, the official closing level of that Basket Constituent (or, if a market disruption event or a non-trading day that affected that Basket Constituent has occurred, the closing level of that Basket Constituent determined by the calculation agent in accordance with the formula for and method of calculating the closing level of that Basket Constituent last in effect prior to the commencement of that market disruption event or non-trading day), using the calculation agent’s good faith estimate of the closing price, fixing level, settlement price or other trading price or level that would have prevailed but for that market disruption event or non-trading day) on the scheduled trading day immediately preceding that Final Disrupted Determination Date of each security, commodity, futures contract, loan or other asset most recently composing that Basket Constituent (and, if applicable, any futures contract required to roll any expiring futures contract in accordance with the method of calculating that Basket Constituent) and, if applicable, the amount of any dividend or other distribution per share on each such security; and
- (c) the relevant interest rates associated with the notional financing cost (or, if such interest rates are not published on that day, the calculation agent’s good faith estimate of such interest rates) on the scheduled trading day immediately preceding that Final Disrupted Determination Date.

Notes linked to an Index and other reference assets

If the notes are linked to an Index and other reference assets, the provisions relating to postponement of a Determination Date as set forth in the accompanying product supplement will apply, except that if a Determination Date is or has been postponed to the applicable Final Disrupted Determination Date and, on that day, the closing level of the relevant Index has not been established in accordance with the postponement provisions of the accompanying product supplement that apply prior to the applicable Final

Disrupted Determination Date, the closing level of that Index for that Determination Date will be determined by the calculation agent on the applicable Final Disrupted Determination Date in accordance with the formula for and method of calculating the closing level of that Index last in effect prior to the commencement of the market disruption event (or prior to the non-trading day), using:

- (a) for each Basket Constituent that is an ETF, the closing price of one share of that Basket Constituent (or, if a market disruption event or a non-trading day that affected that Basket Constituent has occurred, the calculation agent's good faith estimate of the closing price of one share of that Basket Constituent that would have prevailed but for that market disruption event or non-trading day) on the scheduled trading day immediately preceding that Final Disrupted Determination Date;
- (b) for any Basket Constituent (including any successor Basket Constituent) that is an index, the official closing level of that Basket Constituent (or, if a market disruption event or a non-trading day that affected that Basket Constituent has occurred, the closing level of that Basket Constituent determined by the calculation agent in accordance with the formula for and method of calculating the closing level of that Basket Constituent last in effect prior to the commencement of that market disruption event or non-trading day), using the calculation agent's good faith estimate of the closing price, fixing level, settlement price or other trading price or level that would have prevailed but for that market disruption event or non-trading day) on the scheduled trading day immediately preceding that Final Disrupted Determination Date of each security, commodity, futures contract, loan or other asset most recently composing that Basket Constituent (and, if applicable, any futures contract required to roll any expiring futures contract in accordance with the method of calculating that Basket Constituent) and, if applicable, the amount of any dividend or other distribution per share on each such security; and
- (c) the relevant interest rates associated with the notional financing cost (or, if such interest rates are not published on that day, the calculation agent's good faith estimate of such interest rates) on the scheduled trading day immediately preceding that Final Disrupted Determination Date.

Additional Defined Terms

Notwithstanding any contrary definition in the accompanying product supplement, with respect to an Index, a **"scheduled trading day"** is, unless otherwise specified in the relevant terms supplement, a day, as determined by the calculation agent, on which (a) each of the following exchanges is scheduled to be open for trading for their respective regular trading sessions: the relevant exchanges for the Basket Constituents (other than the Cash Constituent) and the principal options and futures exchanges relating to the Basket Constituents (other than the Cash Constituent), and (b) banking institutions in the City of New York are not scheduled to be authorized or required by law, regulation or executive order to close.

Notwithstanding any contrary definition in the accompanying product supplement, with respect to an Index, a **"trading day"** is, unless otherwise specified in the relevant terms supplement, a day, as determined by the calculation agent, on which (a) trading is generally conducted on the relevant exchanges for the Basket Constituents (other than the Cash Constituent) and the principal options and futures exchanges relating to the Basket Constituents (other than the Cash Constituent) and (b) banking institutions in the City of New York are not otherwise authorized or required by law, regulation or executive order to close.

Notwithstanding any contrary definition in the accompanying product supplement, **"relevant exchange"** means (i) with respect to each Basket Constituent that is an ETF, (1) the primary exchange or market of trading for that Basket Constituent, (2) the primary exchange or market of trading for any security, commodity, futures contract, loan or other asset (or, in each case, any combination thereof) included in the underlying index for that Basket Constituent or (3) if that Basket Constituent does not have an underlying index, the primary exchange or market of trading for any security, commodity, futures contract, loan or other asset (or, in each case, any combination thereof) included in that Basket Constituent, and (ii) with respect to each Basket Constituent that is an index (other than the Cash

Constituent), the primary exchange or market of trading for any security, commodity, futures contract, loan or other asset (or, in each case, any combination thereof) included in that Basket Constituent.

Market Disruption Events

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

- (1) any suspension of, or limitation on, trading imposed by the relevant exchange for any Basket Constituent (other than the Cash Constituent);
- (2) any other event has occurred that disrupts or impairs the ability of market participants to effect transactions in or related to, or obtain levels or market values for, (a) an Index or any relevant successor index, (b) any Basket Constituent, (c) any underlying index or reference commodity of any Basket Constituent, (d) any securities or other components that in the aggregate compose 20% or more of the level or value of any of the foregoing, or (e) any futures or options contracts or other financial contracts relating to any of the foregoing;
- (3) the closure of any relevant exchange for any Basket Constituent (other than the Cash Constituent) prior to its scheduled closing time unless that earlier closing time is announced at least one hour prior to the actual closing time;
- (4) the failure of any relevant exchange with respect to any Basket Constituent (other than the Cash Constituent) to open;
- (5) the closure of a material number of leading commercial banks in the City of New York prior to their scheduled weekday closing time;
- (6) the failure of the administrator or publisher of the relevant interest rates associated with the notional financing cost (or any other relevant entity) to report those interest rates; or
- (7) the failure of the Index Calculation Agent to calculate and publish the official closing level of that Index (or that successor index),

in each case as determined by the calculation agent in its sole discretion; and

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

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

Consequences of a Commodity Hedging Disruption Event

The concept of a commodity hedging disruption event will apply to notes linked in whole or in part to an Index. Please see the accompanying product supplement for more information about commodity hedging disruption events and their consequences.

Discontinuation of an Index; Alteration of Method of Calculation

The provisions relating to the discontinuation of an index as set forth in the accompanying product supplement will apply, except that, if the calculation agent is to determine the closing level of an Index or any successor index for any Determination Date or other relevant date because no successor index is available at that time, or the calculation agent has previously selected a successor index and publication of that successor index is discontinued prior to, and that discontinuation is continuing on, that Determination Date or other relevant date, then the closing level of that Index will be computed by the calculation agent in accordance with the rules governing that Index or successor index, as applicable, last in effect prior to that discontinuation.

ANNEX A

The J.P. Morgan Efficiente Plus Index Series Index Rules

J.P.Morgan

February 20, 2015, as amended and restated as of February 8, 2022

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PART A

THE J.P. MORGAN EFFICIENTE PLUS INDEX SERIES INDEX RULES

1. Introduction

This document comprises the rules (as may be supplemented, amended or restated from time to time, the “**Index Rules**”) of the J.P. Morgan Efficiente Plus Index Series, a family of notional rules-based proprietary indices. The Index Rules are divided into Part A (which includes Schedule 1 and Schedule 2 and applies to every index comprised in the J.P. Morgan Efficiente Plus Index Series) and Part B.

Table A in Schedule 1 sets out each index in the J.P. Morgan Efficiente Plus Index Series (each, an “**Efficiente Plus Index**” and together the “**Efficiente Plus Indices**”). The relevant parameters for each Efficiente Plus Index (Name, Bloomberg Ticker, Start Date, Index Level on the Start Date, Target Volatility, Exposure on the Start Date, Daily Series Applicability, Return Type, Fee, Monthly Re-weighting Selection Date, Monthly Re-weighting Dates and Weighting Constraints) are provided in the applicable module in Part B for such Efficiente Plus Index (each, a “**Module**”).

ALL PERSONS READING THIS DOCUMENT SHOULD REFER TO THE RISK FACTORS AND NOTICES, DISCLAIMERS AND CONFLICTS OF INTEREST SECTIONS BELOW AND CONSIDER THE INFORMATION CONTAINED IN THIS DOCUMENT IN LIGHT OF SUCH RISK FACTORS, NOTICES, DISCLAIMERS AND CONFLICTS OF INTEREST.

NOTHING IN THE INDEX RULES CONSTITUTES AN OFFER TO BUY OR SELL ANY FINANCIAL PRODUCT, PARTICIPATE IN ANY TRANSACTION OR ADOPT ANY INVESTMENT STRATEGY. THE INDEX RULES DO NOT CONSTITUTE INVESTMENT, LEGAL, TAX, REGULATORY OR ACCOUNTING ADVICE.

This document is published by the Index Sponsor, J.P. Morgan Securities LLC of 383 Madison Avenue, 5th Floor, New York, New York 10179, United States, in its capacity as such. Further information relating to: (i) the internal governance framework; and (ii) the identity and role of third parties that are non-affiliates of JPMorgan, in respect of this Index is available on request to the Index Sponsor.

2. Index Sponsor and Index Calculation Agent

2.1 Identity and responsibilities

Effective as of February 8, 2022, J.P. Morgan Securities LLC (“**JPMS LLC**”) is the sponsor of the Index (the “**Index Sponsor**”, which term shall include any successor or assign of the Index Sponsor). The Index Sponsor may appoint a successor sponsor or assign, delegate or transfer any or all of its rights, obligations or responsibilities in its capacity as Index Sponsor in connection with the Index to one or more entities (including an unrelated third party) that the Index Sponsor determines appropriate. The Index Calculation Agent (unless the Index Calculation Agent is the same entity as the Index Sponsor) must obtain written permission from the Index Sponsor prior to any delegation or transfer of the Index Calculation Agent’s responsibilities or obligations in connection with the Index.

The Index Sponsor is responsible for, among other things, the creation and design of the Index and the documentation of the Index Rules. The Index Sponsor is responsible for the appointment of the calculation agent of the Index (the “**Index Calculation Agent**”), which may be the Index Sponsor, an unrelated third party or an affiliate or subsidiary of the Index Sponsor. The Index Calculation Agent will (unless the Index Calculation Agent is the same entity as the Index Sponsor) be an agent of the Index Sponsor. Effective as of February 8, 2022, the Index Sponsor has appointed JPMS LLC to be the Index Calculation Agent.

The Index Sponsor may at any time and for any reason (i) appoint a successor Index Calculation Agent, if the Index Sponsor is at that time the Index Calculation Agent or (ii) terminate the appointment of the Index

Calculation Agent and appoint an alternative entity as a replacement Index Calculation Agent, if the Index Sponsor is not at that time the Index Calculation Agent.

The Index Calculation Agent is responsible for (i) calculating the Index Level in respect of each Trading Day (each as defined herein) in accordance with the Index Rules and (ii) determining (among other things and subject to the prior agreement of the Index Sponsor or at the direction of the Index Sponsor) if a Market Disruption Event or Extraordinary Event (each as defined herein) has occurred or whether an anti-dilution adjustment shall be made in respect of any Basket Constituent (as defined herein), whether any input necessary to perform any calculations under the Index Rules is not published or otherwise made available by the relevant data provider, sponsor of a Basket Constituent or Reference Index (as defined herein), other input sponsor or exchange to the Index Calculation Agent, and any related consequences or adjustments in accordance with the Index Rules.

The Index Calculation Agent shall act in good faith and in a commercially reasonable manner in making determinations, interpretations and calculations pursuant to the Index Rules. Subject to the prior agreement of the Index Sponsor, the Index Calculation Agent's determinations, and all calculations related to the Index and the Index Calculation Agent's interpretations of the Index Rules, shall be final.

None of the Index Sponsor, the Index Calculation Agent, or any of their respective affiliates or subsidiaries or any of their respective directors, officers, employees, representatives, delegates or agents (each, a "**Relevant Person**") shall have any responsibility to any person (whether as a result of negligence or otherwise) for any determinations, interpretations or calculations made or anything done (or omitted to be determined or done) in connection with the Index or any use to which any person may put the Index or the Index Levels.

The Index Sponsor may, in its discretion, at any time and without notice, terminate the calculation or publication of the Index, including, without limitation, subsequent to the occurrence of one of the events described in Section 12 (*Extraordinary Events and Anti-Dilution Events*).

2.2 Index Sponsor determinations and Index Calculation Agent determinations

The Index Calculation Agent's exercise of discretion or failure to exercise discretion in relation to the Index may have a detrimental effect on the Index Level and the volatility of the Index. The Index Sponsor or the Index Calculation Agent may make certain determinations or calculations based on information obtained from publicly available sources without independently verifying such information.

Subject to the prior agreement of the Index Sponsor, the Index Calculation Agent may make certain determinations, adjustments, amendments and interpretations related to the Index. All such determinations, adjustments, amendments and interpretations (in each case, subject to such prior agreement on the part of the Index Sponsor) of the Index Calculation Agent related to the Index and all calculations performed by the Index Calculation Agent related to the Index shall be final, conclusive and binding and no person shall be entitled to make any claim against the Index Sponsor, the Index Calculation Agent, or any of the Relevant Persons in respect thereof. Once a determination, adjustment, amendment or interpretation is made or action is taken by the Index Calculation Agent (in each case, as agreed in advance by the Index Sponsor) in relation to the Index, or a calculation is performed by the Index Calculation Agent in relation to the Index, none of the Index Sponsor, the Index Calculation Agent or any Relevant Person shall be under any obligation to revise any such determination, adjustment, amendment, interpretation or calculation made or anything done (or omitted to be determined, adjusted, amended, interpreted, calculated or done) for any reason.

3. Amendments

The Index Rules may be supplemented, amended or restated from time to time in the sole discretion of the Index Sponsor. The Index Rules will be made available (in a manner determined by the Index Sponsor from time to time) following such supplementation, amendment or restatement. Following any amendment, the Index Sponsor will make available (as soon as practicable) the amended version of the Index Rules and will include the effective date of such amendment in the new version of the Index Rules. However, the Index

Sponsor is under no obligation to inform any person about any amendments to the Index (except as required by law or regulation).

Although the Index Rules are intended to be comprehensive and accurate, ambiguities may arise and errors or omissions may have been made. In such circumstances, the Index Sponsor will resolve such ambiguities and, if necessary, amend the Index Rules to reflect such resolution. In the case of any inaccuracy, the Index Sponsor may amend the Index Rules to address errors or omissions. The Index Sponsor is under no obligation to inform any person of any amendments to the Index (except as may be required by law).

4. General Notes on the Efficiente Plus Indices

These general notes on the Efficiente Plus Indices set forth in this Section 4 are qualified in their entirety by the remainder of the Index Rules.

Objective. The Efficiente Plus Indices are designed to track the excess or total return, as applicable for each Efficiente Plus Index, of a notional portfolio of exchange-traded funds selected from a pre-set universe and rebalanced monthly to weights determined pursuant to these Index Rules, which implement a momentum-driven allocation strategy, subject to a historical volatility constraint and portfolio concentration limits.

Each Efficiente Plus Index is a notional dynamic basket that tracks the return of a basket consisting of (i) twenty exchange-traded funds (each, an **“ETF Constituent”**), in the case of each ETF Constituent with distributions notionally reinvested, and (ii) the JPMorgan Cash Index USD 3 Month (the **“Cash Constituent”**, together with the ETF Constituents, the **“Basket Constituents”**). The Rules for an Efficiente Plus Index will specify whether the Return Type is “Excess Return” or “Total Return” and whether there will be a deduction for a per annum fee that accrues daily. In addition, by indicating whether the Daily Series Mechanism is applicable, the Index Rules for an Efficiente Plus Index will specify whether or not a particular index targets a specific volatility on a daily basis. The Basket Constituents are subject to the provisions of Section 12 (*Extraordinary Events*) below. The ETF Constituents represent a diverse range of asset classes and geographic regions.

If the Daily Series Mechanism is not applicable, the exposure of the relevant Efficiente Plus Index to the Basket Constituents is determined by means of a monthly selection process. If the Daily Series Mechanism is applicable, the exposure of the relevant Efficiente Plus Index to the Basket Constituents is determined by means of a two-step process, the first step of which is the same monthly selection process used for each Efficiente Plus Index to which the Daily Series Mechanism is not applicable and the second step of which targets a specific volatility on a daily basis.

Whether or not the Daily Series Mechanism is applicable, each Efficiente Plus Index uses a monthly selection process that selects every month a Monthly Reference Portfolio (as defined in Section 10.1 (*The Monthly Reference Portfolios*) below) composed of the Basket Constituents. Unless a Market Disruption Event on a Monthly Re-weighting Date has occurred or is continuing (as provided for in Section 11.2 (*Market Disruption on a Monthly Re-weighting Date*)), on a monthly basis, the relevant Monthly Reference Portfolios will be rebalanced over the Monthly Re-weighting Period in the current calendar month, which is a specified period of Index Business Days commencing with and including a specified Index Business Day in such month as provided in the applicable Module for such Efficiente Plus Index (each such day, a **“Monthly Re-weighting Date”**) (as described in Section 9 (*Efficiente Plus Index Monthly Rebalancing*) below).

As further described in Section 9 (*Efficiente Plus Index Monthly Rebalancing*), the weight assigned to each Basket Constituent in the new Monthly Reference Portfolio (being the Monthly Reference Portfolio to which an Efficiente Plus Index is rebalancing) with respect to a current Monthly Re-weighting Period will be determined on the Monthly Re-weighting Selection Date specified in the applicable Module for such Efficiente Plus Index (such day, the **“Monthly Re-weighting Selection Date”**) immediately preceding the first scheduled Monthly Re-weighting Date in respect of such Monthly Re-weighting Period in accordance with the methodology in Section 8 (*Determining the Monthly Basket Constituent Weights for the Basket Constituents in the Monthly Reference Portfolio*) by reference to the returns and volatilities of multiple hypothetical portfolios composed of

the Basket Constituents measured over the Performance Observation Period that includes and ends on such Monthly Re-weighting Selection Date.

The re-weighting methodology (as described in more detail below) selects the Monthly Reference Portfolio by seeking to identify a weight for each of the Basket Constituents that would have resulted in the hypothetical portfolio with the highest return over the relevant Performance Observation Period, subject to an annualized volatility over the same period equal to or less than a specified volatility (the “**Target Volatility**”). The Target Volatility for each Efficient Plus Index is specified in the applicable Module.

If the Daily Series Mechanism is not applicable, the exposure of the relevant Efficient Plus Index to the Basket Constituents is determined by means of the monthly selection process (described above) and the targeting of a specific volatility on a daily basis (described below) does not apply. If the Daily Series Mechanism is applicable, the exposure of the relevant Efficient Plus Index to the Basket Constituents is determined by means of a two-step process, the first step of which is the monthly selection process (described above) and the second step of which targets a specific volatility on a daily basis (described below).

If the applicable Module for an Efficient Plus Index specifies that the Daily Series Mechanism is Applicable (each such Efficient Plus Index, a “**Daily Series Index**”), there is a second step in determining the exposure. In the second step, during the course of the month, each Daily Series Index targets its Target Volatility on a daily basis by dynamically adjusting its Exposure (as defined and more fully described in Section 10.4 (*Exposure Calculation*)) to the relevant Monthly Reference Portfolios on a daily basis, pursuant to the Index Rules, based on the historical volatility of the relevant Monthly Reference Portfolios (the Underlying Portfolio Volatility as defined in and as more fully described in Section 10.3 (*Determining the Underlying Portfolio Volatility*)).

The Underlying Portfolio Volatility will be determined as of each Trading Day pursuant to Section 10.3 (*Determining the Underlying Portfolio Volatility*) by reference to a daily rolling Volatility Measurement Period. It should be noted that, as each Basket Constituent changes in value after the Closing Time on the first Effective Monthly Re-weighting Date in a given Monthly Re-weighting Period, the effective weight of each Basket Constituent in the relevant Monthly Reference Portfolio will change (during the period from the Closing Time on the first Effective Monthly Re-weighting Date in a given Monthly Re-weighting Period to the Closing Time on the final Effective Monthly Re-weighting Date in the next Monthly Re-weighting Period); however, for the purpose of calculating the Underlying Portfolio Volatility over the Volatility Measurement Period, the Monthly Basket Constituent Weights of the Basket Constituents in each Monthly Reference Portfolio will not change from those determined on the relevant Monthly Re-weighting Selection Date.

The Exposure of a Daily Series Index on any Trading Day to the relevant Monthly Reference Portfolios is determined in the second step by dividing the Target Volatility by the Underlying Portfolio Volatility for the relevant Volatility Measurement Period, subject to a minimum of zero percent (0%) and a variable maximum of up to two hundred percent (200%); *provided that* the Exposure may not change by more than 50% each day. As the Underlying Portfolio Volatility increases, the Exposure to the relevant Monthly Reference Portfolios decreases; as the Underlying Portfolio Volatility decreases, the Exposure to the relevant Monthly Reference Portfolios increases. The Exposure for each Daily Series Index will be greater than 100 percent (100%) when (1) the Underlying Portfolio Volatility of the relevant Monthly Reference Portfolios is lower than the Target Volatility and (2) the Monthly Reference Portfolios include a non-zero weight for the Cash Constituent.

No assurance can be given that the investment strategy used to construct any Efficient Plus Index will be successful or that any Efficient Plus Index will outperform any alternative basket or strategy that might be constructed from the Basket Constituents. Furthermore, no assurance can be given that any Efficient Plus Index will achieve its Target Volatility. The actual realized volatility of each Efficient Plus Index may be greater or less than its Target Volatility.

Subject to the occurrence of a Market Disruption Event, the level of each Efficient Plus Index (the “**Index Level**”) will be calculated by the Index Calculation Agent on each Trading Day in USD in accordance with the methodology set out in Section 10 (*Efficient Plus Index Level*) below. The Index Calculation Agent will publish the Index Level on each Trading Day to an accuracy of two decimal places.

Each Efficiente Plus Index is described as a notional basket of assets because there is no actual portfolio of assets to which any person is entitled or in which any person has any ownership interest. Each Efficiente Plus Index merely references certain assets, the performance of which will be used as a reference point for calculating the Index Level.

5. Index Calculation Agent

JPMS LLC or any affiliate or subsidiary designated by it will act as calculation agent (the “**Index Calculation Agent**”) for each Efficiente Plus Index. The Index Calculation Agent’s determinations and calculations in respect of each Efficiente Plus Index and interpretations of the Index Rules are final. Further information is contained in the statement of Responsibility set out in Section 3 (*Responsibility*) above.

6. The Basket Constituents

Each Efficiente Plus Index is a notional dynamic basket that tracks the return of twenty-one Basket Constituents (including the Cash Constituent). The Basket Constituents are twenty exchange-traded funds, in the case of each such ETF Constituent with distributions notionally reinvested, and the Cash Constituent. The Index Rules for an Efficiente Plus Index will specify whether the Return Type is “Excess Return” or “Total Return” and whether there will be a deduction for a per annum fee that accrues daily. In addition, by indicating whether the Daily Series Mechanism is applicable, the Index Rules for an Efficiente Plus Index will specify whether or not a particular index targets a specific volatility on a daily basis.

Each Basket Constituent is set out in Table 1 below. For each Basket Constituent, Table 1 contains the Bloomberg ticker for each Basket Constituent for ease of identification, as well as the current primary exchange and Related Exchange for each ETF Constituent.

Table 1

i	Basket Constituents	Bloomberg Ticker	Current primary exchange for each ETF Constituent on February 8, 2022	Related Exchange for each ETF Constituent
1	Vanguard S&P 500 ETF	VOO	NYSE Arca	All Exchanges
2	Vanguard Small-Cap ETF	VB	NYSE Arca	All Exchanges
3	Vanguard FTSE Developed Markets ETF	VEA	NYSE Arca	All Exchanges
4	iShares® MSCI EAFE Small-Cap ETF	SCZ	NASDAQ Global Market	All Exchanges
5	Vanguard FTSE Emerging Markets ETF	VWO	NYSE Arca	All Exchanges
6	iShares® 20+ Year Treasury Bond ETF	TLT	NASDAQ Global Market	All Exchanges
7	iShares® 7-10 Year Treasury Bond ETF	IEF	NASDAQ Global Market	All Exchanges
8	iShares® iBoxx \$ Investment Grade Corporate Bond ETF	LQD	NYSE Arca	All Exchanges
9	iShares® TIPS Bond ETF	TIP	NYSE Arca	All Exchanges

i	Basket Constituents	Bloomberg Ticker	Current primary exchange for each ETF Constituent on February 8, 2022	Related Exchange for each ETF Constituent
10	Vanguard Short-Term Corporate Bond ETF	VCSH	NASDAQ Global Market	All Exchanges
11	SPDR® Bloomberg High Yield Bond ETF	JNK	NYSE Arca	All Exchanges
12	PIMCO 0-5 Year High Yield Corporate Bond Index ETF	HYS	NYSE Arca	All Exchanges
13	Invesco Senior Loan ETF	BKLN	NYSE Arca	All Exchanges
14	iShares® Preferred and Income Securities ETF	PFF	NASDAQ Global Market	All Exchanges
15	iShares® J.P. Morgan USD Emerging Markets Bond ETF	EMB	NASDAQ Global Market	All Exchanges
16	Vanguard Real Estate ETF	VNQ	NYSE Arca	All Exchanges
17	VanEck Gold Miners ETF	GDX	NYSE Arca	All Exchanges
18	Alerian MLP ETF**	AMLP	NYSE Arca	All Exchanges
19	Invesco DB Commodity Index Tracking Fund	DBC	NYSE Arca	All Exchanges
20	iShares® Gold Trust	IAU	NYSE Arca	All Exchanges
21	J.P. Morgan Fallback Cash Index*	JPUSCAFB	Not Applicable	Not Applicable

* Effective February 25, 2020, the Basket Constituent numbered 18 in Table 1 above ceased to be the ETRACS Alerian MLP Infrastructure Index ETN (ticker: MLPI) and became the Alerian MLP ETF (ticker: AMLP).

** Effective January 3, 2022, the Basket Constituent numbered 21 in Table 1 above ceased to be the JPMorgan Cash Index USD 3 Month (ticker: JPCAUS3M) and became the J.P. Morgan Fallback Cash Index (ticker: JPUSCAFB).

7. Initial Composition of the Efficient Plus Indices

On the applicable Start Date for the relevant Efficient Plus Index, such Efficient Plus Index may be composed of notional holdings in up to two different Monthly Reference Portfolios, being (x) the Monthly Reference Portfolio determined as of the Monthly Re-weighting Selection Date immediately preceding the Start Date (the “**Starting Selection Date**”) and also, if applicable, (y) the Monthly Reference Portfolio determined as of the Monthly Re-weighting Selection Date immediately preceding the Starting Selection Date. References in the Index Rules to (i) the “Monthly Re-weighting Period” shall be deemed to include references to the Monthly Re-weighting Period with respect to the Monthly Reference Portfolio determined as of the Starting Selection Date (the “**Initial Re-weighting Period**”), (ii) the “Monthly Re-weighting Dates” shall be deemed to include references to the Index Business Days in the Starting Re-weighting Period and (iii) the “Monthly Re-weighting Selection Date” shall be deemed to include references to the Starting Selection Date and the Monthly Re-weighting Selection Date immediately preceding the Starting Selection Date.

The composition of each Efficient Plus Index will be adjusted in accordance with the methodology described in the Index Rules.

The Index Level on the Start Date for each Efficiente Plus Index is provided in the applicable Module for that Efficiente Plus Index. The Index Level for each Efficiente Plus Index was 100.00 on November 1, 2007 (the “**Base Date**”) unless otherwise specified in the applicable Module. The Live Date for each Efficiente Plus Index is December 31, 2014.

8. Determining the Monthly Basket Constituent Weights for the Basket Constituents in the Monthly Reference Portfolio

On the Starting Selection Date and thereafter on a monthly basis on each subsequent Monthly Re-weighting Selection Date, the Index Calculation Agent will determine the weight (the “**Monthly Basket Constituent Weight**”) to be assigned to each Basket Constituent, whether zero or a positive number, for the relevant Monthly Reference Portfolio determined as of such Monthly Re-weighting Selection Date in accordance with the methodology described in this Section 8.

Each Basket Constituent is set to the relevant Monthly Basket Constituent Weight, determined as of the relevant Monthly Re-weighting Selection Date, only once a month in order to create the relevant Monthly Reference Portfolio. The actual weight of each of the Basket Constituents within a Monthly Reference Portfolio determined on the relevant Monthly Re-weighting Selection Date may fluctuate during the period from the Closing Time on the first Effective Monthly Re-weighting Date in the Monthly Re-weighting Period immediately following such Monthly Re-weighting Selection Date to the Closing Time on the final Effective Monthly Re-weighting Date in the next Monthly Re-weighting Period due to movements in the levels of the Basket Constituents.

8.1 Identifying the Performance Observation Periods

On each Monthly Re-weighting Selection Date k , the Index Calculation Agent will identify the applicable Performance Observation Period k (being the period of 126 Weekdays comprised of (i) the 125 Weekdays immediately prior to Monthly Re-weighting Selection Date k and (ii) the Weekday that is Monthly Re-weighting Selection Date k) (the “**Performance Observation Period**”).

8.2 Identifying the Unique Portfolio for Each Performance Observation Period

With respect to the applicable Performance Observation Period identified by the Index Calculation Agent with respect to a Monthly Re-weighting Selection Date, the Index Calculation Agent will:

- (a) Calculate the Closing TR Level of each ETF Constituent and obtain the Closing Level of each Basket Constituent that is an index, including the Cash Constituent, for each Weekday in respect of the relevant Performance Observation Period. If any such Weekday is not a Dealing Day with respect to the relevant Basket Constituent or if the Index Calculation Agent cannot obtain relevant reliable information from third party sources as of such Weekday for such Basket Constituent, the Closing TR Level or Closing Level, as the case may be, for that Basket Constituent in respect of such Weekday shall be deemed to be the Closing TR Level or the Closing Level, as the case may be, for that Basket Constituent as of the immediately preceding Dealing Day for that Basket Constituent for which the Index Calculation Agent can obtain relevant reliable information from third party sources.

Closing TR Level means, subject to the provisions of Section 11 (*Market Disruption Events*), with respect to an ETF Constituent and a Dealing Day t , the Closing Level of the ETF Constituent with distributions re-invested, which will be determined as follows:

$$\text{Closing TR Level}_t = \text{Closing TR Level}_{t-1} \times \left(\frac{\text{Closing Level}_t + d_t}{\text{Closing Level}_{t-1}} \right)$$

Where:

Closing TR Level_{t-1} means the Closing TR Level of the relevant ETF Constituent as of the Dealing Day immediately preceding Dealing Day t;

Closing Level_t means the Closing Level of the relevant ETF Constituent as of Dealing Day t;

Closing Level_{t-1} means the Closing Level of the relevant ETF Constituent as of the Dealing Day immediately preceding Dealing Day t;

- d_t means, in respect of an ETF Constituent and a Dealing Day t,
- (a) if such Dealing Day t is an Ex-Distribution Date for the relevant ETF Constituent, the Gross Distribution Amount in respect of such Basket Constituent i for such Ex-Distribution Date; or
 - (b) otherwise, 0.

For purposes of determining the Closing TR Level for any such ETF Constituent for any Dealing Day, if the immediately preceding Dealing Day (the “**Prior Dealing Day**”) for such ETF Constituent was a Disrupted Day then, in the formula for determining the Closing TR Level for such Dealing Day, (i) the Closing TR Level for that Prior Dealing Day shall be replaced with the Closing TR Level for the Dealing Day immediately preceding such Prior Dealing Day that was not a Disrupted Day (the “**Prior Non-Disrupted Dealing Day**”) for such ETF Constituent, (ii) the Closing Level for that Prior Dealing Day shall be replaced with the Closing Level for such Prior Non-Disrupted Dealing Day for such ETF Constituent, and (iii) the Gross Distribution Amount of such ETF Constituent in respect of such Dealing Day shall be replaced with the sum of each of the Gross Distribution Amounts for the ETF Constituent in respect of each day from but excluding the Prior Non-Disrupted Dealing Day to and including such Dealing Day.

- (b) Identify all possible Eligible Portfolios in accordance with Section 8.4 (*Eligible Portfolios & Weighting Constraints*) below.
- (c) Calculate the Performance of each such Eligible Portfolio over the relevant Performance Observation Period in accordance with the following formula:

$$P_k^j = \left(\sum_{i=1}^{21} \frac{S_k^i}{S_{k,0}^i} \times \lambda_j^i \right) - 1$$

where:

P_k^j means the Performance of Eligible Portfolio j as of Monthly Re-weighting Selection Date k;

S_k^i means (i) the Closing TR Level of Basket Constituent i as of Monthly Re-weighting Selection Date k if such Basket Constituent is an ETF Constituent or (ii) the Closing Level of Basket Constituent i as of Monthly Re-weighting Selection Date k if such Basket Constituent is an index;

$S_{k,0}^i$ means (i) the Closing TR Level of Basket Constituent i as of the first Weekday in respect of Performance Observation Period k (being the Weekday that is 125 Weekdays prior to Monthly Re-weighting Selection Date k) if such Basket Constituent is an ETF Constituent or (ii) the Closing Level of Basket Constituent i as of the first Weekday in respect of Performance Observation Period k (being the Weekday that is 125 Weekdays prior to Monthly Re-weighting Selection Date k) if such Basket Constituent is an index;

λ_j^i means the weighting of Basket Constituent i within Eligible Portfolio j.

- (d) Calculate the Realized Volatility of each such Eligible Portfolio over Performance Observation Period k in accordance with the following formula:

$$\sigma_k^j = \sqrt{\frac{L \times \sum_{n=1}^L (R_{k,n}^j)^2 - (\sum_{n=1}^L R_{k,n}^j)^2}{L^2} \times 260}$$

where:

σ_k^j means the Realized Volatility of Eligible Portfolio j as of Monthly Re-weighting Selection Date k;
 L means 125, the number of Weekday returns in respect of Performance Observation Period k; and
 $R_{k,n}^j$ means the weighted sum of the natural logarithms of daily returns of each Basket Constituent from Weekday n-1 to Weekday n in respect of Performance Observation Period k, calculated in accordance with the following formula:

$$R_{k,n}^j = \sum_{i=1}^{21} \lambda_j^i \times \ln \left(\frac{S_{k,n}^i}{S_{k,n-1}^i} \right)$$

where:

$S_{k,n}^i$ means (i) the Closing TR Level of Basket Constituent i for Weekday n in respect of Performance Observation Period k if such Basket Constituent is an ETF Constituent or (ii) the Closing Level of Basket Constituent for Weekday n in respect of Performance Observation Period k if such Basket Constituent is an index;

$S_{k,n-1}^i$ means (i) the Closing TR Level of Basket Constituent i for Weekday n-1 in respect of Performance Observation Period k if such Basket Constituent is an ETF Constituent or (ii) the Closing Level of Basket Constituent i for Weekday n-1 in respect of Performance Observation Period k if such Basket Constituent is an index;

n denotes a Weekday in respect of Performance Observation Period k that is not the first Weekday of Performance Observation Period k (for the avoidance of doubt, the first Weekday n in respect of Performance Observation Period k shall be the Weekday that is 124 Weekdays prior to Monthly Re-weighting Selection Date k and the last Weekday n of Performance Observation Period k shall be the Weekday that is Monthly Re-weighting Selection Date k);

$n - 1$ denotes a Weekday in respect of Performance Observation Period k that is immediately prior to Weekday n (for the avoidance of doubt, the first Weekday n-1 in respect of Performance Observation Period k shall be the Weekday that is 125 Weekdays prior to Monthly Re-weighting Selection Date k and the last Weekday n-1 of Performance Observation Period k shall be the Weekday immediately prior to Monthly Re-weighting Selection Date k); and

λ_j^i means the weighting of Basket Constituent i within Eligible Portfolio j.

- (e) Select the Eligible Portfolio with the highest Performance over the relevant Performance Observation Period that has an annualized Realized Volatility equal to or less than the Target Volatility; *provided that*, if there is more than one such Eligible Portfolio with the same highest Performance over the relevant Performance Observation Period, the Eligible Portfolio that has the lowest annualized Realized Volatility shall be selected. The Eligible Portfolio that satisfies these criteria is known as the **“Unique Portfolio”** for that Performance Observation Period.
- (f) If none of the Eligible Portfolios has an annualized Realized Volatility equal to or less than the Target Volatility, the Index Calculation Agent shall increase the Target Volatility by one percent (1%) and repeat step 6.2(e) above until a Unique Portfolio is selected. These steps, including an increase to the Target Volatility, may be repeated further until a Unique Portfolio is selected.

8.3 *Determining the Monthly Basket Constituent Weight to be assigned to each Basket Constituent with respect to the relevant Monthly Reference Portfolio*

The Monthly Basket Constituent Weight to be assigned to each Basket Constituent within a Monthly Reference Portfolio will be determined by the Index Calculation Agent as the weight assigned to such Basket Constituent within the Unique Portfolio identified with respect to the relevant Monthly Re-weighting Selection Date in accordance with Section 8.2 above.

The actual weight of each of the Basket Constituents within a Monthly Reference Portfolio determined on the relevant Monthly Re-weighting Selection Date may fluctuate during the period from the Closing Time on the first Effective Monthly Re-weighting Date in the Monthly Re-weighting Period immediately following such Monthly Re-weighting Selection Date to the Closing Time on the final Effective Monthly Re-weighting Date in the next Monthly Re-weighting Period due to movements in the levels of the Basket Constituents.

Each Basket Constituent is set to the relevant Monthly Basket Constituent Weight, determined as of the relevant Monthly Re-weighting Selection Date, only once a month in order to create the relevant Monthly Reference Portfolio.

8.4 Eligible Portfolios & Weighting Constraints

For each Efficient Plus Index, an “**Eligible Portfolio**” is any hypothetical portfolio of Basket Constituents that is composed of all twenty-one (21) of the Basket Constituents and that satisfies the “**Weighting Constraints**” detailed in the applicable Module for such Efficient Plus Index. The weight assigned to each Basket Constituent in an Eligible Portfolio may be zero or a positive number.

9. Efficient Plus Index Monthly Rebalancing

Unless a Market Disruption Event has occurred and is continuing, on a monthly basis, an Efficient Plus Index will be rebalanced over the Monthly Re-weighting Period in the current calendar month, which is a specified period of Index Business Days commencing with and including a specified Index Business Day in such month. Such rebalancing over the Monthly Re-weighting Period in the current calendar month will be into the next Monthly Reference Portfolio that was selected on the most recent Monthly Re-weighting Selection Date (the “**Next Monthly Reference Portfolio**”) and out of the prior Monthly Reference Portfolio that was selected on the Monthly Re-weighting Selection Date prior to such most recent Monthly Re-weighting Selection Date (the “**Prior Monthly Reference Portfolio**”).

10. Efficient Plus Index Level

10.1 The Monthly Reference Portfolios

Each Monthly Re-weighting Selection Date k will be associated with a reference portfolio composed of the Basket Constituents with weights set equal to the Monthly Basket Constituent Weights determined as of such Monthly Re-weighting Selection Date k (the “**Monthly Reference Portfolio**”). During Monthly Re-weighting Period k , the relevant Efficient Plus Index progressively rolls out of the Monthly Reference Portfolio associated with the previous Monthly Re-weighting Selection Date (*i.e.*, Monthly Re-weighting Selection Date $k-1$) (which is the Prior Monthly Reference Portfolio) and rolls into the Monthly Reference Portfolio associated with Monthly Re-weighting Selection Date k (which is the Next Monthly Reference Portfolio). After the Closing Time on the final Effective Monthly Re-weighting Date in Monthly Re-weighting Period k , the relevant Efficient Plus Index will be exposed only to the Monthly Reference Portfolio associated with Monthly Re-weighting Selection Date k and will continue to remain exposed only to such portfolio until the Closing Time on the first Effective Monthly Re-weighting Date in the next Monthly Re-weighting Period (*i.e.*, Monthly Re-weighting Period $k+1$).

The actual weight of each of the Basket Constituents within a Monthly Reference Portfolio determined on the relevant Monthly Re-weighting Selection Date may fluctuate during the period from the Closing Time on the first Effective Monthly Re-weighting Date in the Monthly Re-weighting Period immediately following such Monthly Re-weighting Selection Date to the Closing Time on the final Effective Monthly Re-weighting Date in the next Monthly Re-weighting Period due to movements in the levels of the Basket Constituents.

10.2 The Levels of the Monthly Reference Portfolios

On the first Effective Monthly Re-weighting Date in Monthly Re-weighting Period k, the level of the Monthly Reference Portfolio determined as of Monthly Re-weighting Selection Date k with respect to such Monthly Re-weighting Period k is equal to 1.0. On each Index Business Day t from but excluding the first Effective Monthly Re-weighting Date in Monthly Re-weighting Period k to and including the final Effective Monthly Re-weighting Date in Monthly Re-weighting Period k+1, the level of the Monthly Reference Portfolio determined as of Monthly Re-weighting Selection Date k is determined as follows:

$$RP_{k,t} = RP_k \times \left[100\% + \left(\sum_{i=1}^{21} \frac{S_t^i}{S_k^i} \times \lambda_k^i \right) - \frac{S_t^{21}}{S_k^{21}} \right]$$

where:

t means an Index Business Day from but excluding the first Effective Monthly Re-weighting Date in Monthly Re-weighting Period k to and including the final Effective Monthly Re-weighting Date in Monthly Re-weighting Period k+1;

$RP_{k,t}$ means the level of the Monthly Reference Portfolio associated with Monthly Re-weighting Selection Date k for Index Business Day t;

RP_k means the level of the Monthly Reference Portfolio associated with Monthly Re-weighting Selection Date k on the first Effective Monthly Re-weighting Date in Monthly Re-weighting Period k, which equals 1.0;

S_t^i means, for i=1 through 20, (i) the Closing TR Level of Basket Constituent i for Index Business Day t if such Basket Constituent is an ETF Constituent or (ii) the Closing Level of Basket Constituent i as of Index Business Day t if such Basket Constituent is an index;

S_k^i means, for i=1 through 20, (i) the Closing TR Level of Basket Constituent i on the first Effective Monthly Re-weighting Date in Monthly Re-weighting Period k if such Basket Constituent is an ETF Constituent or (ii) the Closing Level of Basket Constituent i on the first Effective Monthly Re-weighting Date in Monthly Re-weighting Period k if such Basket Constituent is an index;

λ_k^i means the Monthly Basket Constituent Weight set for Basket Constituent i in the Monthly Reference Portfolio associated with Monthly Re-weighting Selection Date k;

S_t^{21} means the Closing Level of the Cash Constituent for Index Business Day t; and

S_k^{21} means the Closing Level of the Cash Constituent on the first Effective Monthly Re-weighting Date in Monthly Re-weighting Period k;

where i for each Basket Constituent is the number (1 through 21) assigned to that Basket Constituent in Table 1 in Section 6 (*The Basket Constituents*) above.

10.3 Determining the Underlying Portfolio Volatility

If the applicable Module for an Efficient Plus Index specifies that the Daily Series Mechanism is Applicable (each such Efficient Plus Index being a Daily Series Index as defined in Section 4), such Daily Series Index shall target its Target Volatility on a daily basis by dynamically adjusting its Exposure to the relevant Monthly Reference Portfolios, pursuant to the Index Rules, based on the historical volatility (the “**Underlying Portfolio Volatility**”) of the relevant Monthly Reference Portfolios underlying such Daily Series Index. Specifically, (x) from and including the first Effective Monthly Re-weighting Date in Monthly Re-weighting Period k to but excluding the final Effective Monthly Re-weighting Date in Monthly Re-weighting Period k, where such Daily Series Index is exposed to a weighted combination of the Monthly Reference Portfolio with respect to Monthly Re-weighting Selection Date k and the Monthly Reference Portfolio with respect to Monthly Re-weighting Selection Date k-1, the Underlying Portfolio Volatility will be the volatility of a portfolio with portfolio weights set equal to the weighted average of the Monthly Basket Constituent Weights with respect to these two Monthly Reference Portfolios, and (y) from and including the final Effective Monthly Re-weighting Date in Monthly Re-weighting Period k (following the occurrence of the re-weighting for such day) to but excluding the first Effective Monthly Re-weighting Date in the following Monthly Re-weighting Period k+1, such Daily Series Index will be exposed only to the Monthly Reference Portfolio with respect to Monthly Re-weighting Selection Date k, and the Underlying Portfolio Volatility will be the volatility of a portfolio with portfolio weights set equal to the Monthly Basket Constituent Weights for this Monthly Reference Portfolio.

(a) Identifying the Volatility Measurement Period

In respect of each Trading Day t , the Index Calculation Agent will identify the applicable Volatility Measurement Period for such Trading Day t as the period of 21 Trading Days prior to and ending with the Trading Day that is 2 Trading Days immediately preceding such Trading Day t (the “**Volatility Measurement Period**”). Accordingly, the first Trading Day of each Volatility Measurement Period in respect of a Trading Day t (the “**Volatility Measurement Start Date**”) is the Trading Day that is 22 Trading Days immediately preceding such Trading Day t . The last Trading Day of each Volatility Measurement Period in respect of a Trading Day t is the Trading Day that is 2 Trading Days immediately preceding such Trading Day t . For each Trading Day in the Volatility Measurement Period in respect of a Trading Day t , the Index Calculation Agent will determine for each Basket Constituent (including any Basket Constituent with a Monthly Basket Constituent Weight in the Monthly Reference Portfolio equal to zero) (i) the Closing TR Level for each ETF Constituent and (ii) the Closing Level for each Basket Constituent that is an index.

If the Index Calculation Agent has made a good faith estimate (or correction thereof) pursuant to Section 11.3 (*Exposure Determination and Calculation of Index Levels in Connection with Market Disruption*) of (i) a Closing TR Level for an ETF Constituent or (ii) a Closing Level for a Basket Constituent that is an index, in any case for a Trading Day that falls in the Volatility Measurement Period, the Index Calculation Agent shall use such good faith estimate (or correction thereof) for purposes of this Section 10.3.

If the Index Calculation Agent cannot obtain relevant reliable information from third party sources for a Basket Constituent in respect of any Trading Day in the Volatility Measurement Period, then, for purposes of this Section 10.3, the Closing TR Level or the Closing Level, as the case may be, for that Basket Constituent in respect of such Trading Day shall be deemed to be the Closing TR Level or the Closing Level, as the case may be, for that Basket Constituent as of the immediately preceding Dealing Day for that Basket Constituent for which the Index Calculation Agent can obtain relevant reliable information from third party sources; *provided that* if the Index Calculation Agent has made a good faith estimate (or correction thereof) pursuant to Section 11.3 (*Exposure Determination and Calculation of Index Levels in Connection with Market Disruption*) of such Closing TR Level or such Closing Level, the Index Calculation Agent shall instead use such good faith estimate (or correction thereof) for purposes of this Section 10.3.

(b) Volatility Calculation

$Volatility_{t,t-2}$ means the Underlying Portfolio Volatility in respect of a Trading Day t , with such volatility determined as of the Trading Day that is 2 Trading Days immediately preceding Trading Day t (such prior Trading Day being Trading Day $t-2$). $Volatility_{t,t-2}$ is determined in accordance with the following formula:

$$Volatility_{t,t-2} = \sqrt{\frac{L \times \sum_{n=1}^L (R_{t,n})^2 - (\sum_{n=1}^L R_{t,n})^2}{L(L-1)}} \times 252$$

where:

- L means 20, which is the number of daily returns in the Volatility Measurement Period in respect of Trading Day t , each being a daily return from Trading Day $n-1$ to Trading Day n ;
- n is an integer ranging from 1 to 20; and
- $R_{t,n}$ means the weighted sum of the natural logarithms of the daily return of each of the Basket Constituents in respect of Trading Day t (including any Basket Constituent with a Monthly Basket

Constituent Weight in the relevant Monthly Reference Portfolios currently underlying the applicable Daily Series Index equal to zero), such daily return being from the Trading Day that is n-1 Trading Days immediately following the Volatility Measurement Start Date for the Volatility Measurement Period in respect of Trading Day t, to the Trading Day that is n Trading Days immediately following the Volatility Measurement Start Date for the Volatility Measurement Period in respect of Trading Day t, calculated in accordance with the following formula:

$$R_{t,n} = \sum_{i=1}^{21} \lambda_t^i \times \ln \frac{S_{t,n}^i}{S_{t,n-1}^i}$$

where:

$S_{t,n}^i$ means (a) for each Basket Constituent i that is an ETF Constituent, the Closing TR Level of such Basket Constituent i for the Trading Day that is n Trading Days immediately following the Volatility Measurement Start Date for the Volatility Measurement Period in respect of Trading Day t and (b) for each Basket Constituent i that is an index, the Closing Level of such Basket Constituent i for the Trading Day that is n Trading Days immediately following the Volatility Measurement Start Date for the Volatility Measurement Period in respect of Trading Day t;

$S_{t,n-1}^i$ means (a) for each Basket Constituent i that is an ETF Constituent, the Closing TR Level of such Basket Constituent i for the Trading Day that is n-1 Trading Days immediately following the Volatility Measurement Start Date for the Volatility Measurement Period in respect of Trading Day t and (b) for each Basket Constituent i that is an index, the Closing Level of such Basket Constituent i for the Trading Day that is n-1 Trading Days immediately following the Volatility Measurement Start Date for the Volatility Measurement Period in respect of Trading Day t;

For the avoidance of doubt, if n-1 equals 0, the Trading Day that is n-1 Trading Days immediately following the Volatility Measurement Start Date is the Volatility Measurement Start Date.

λ_t^i means:

(x) if Trading Day t occurs on a day that is an Effective Monthly Re-weighting Date in a Monthly Re-weighting Period k other than the final Effective Monthly Re-weighting Date in such Monthly Re-weighting Period k, λ_t^i will be a weighted average of the Monthly Basket Constituent Weight for Basket Constituent i with respect to Monthly Re-weighting Period k determined as of the immediately preceding Monthly Re-weighting Selection Date k (which is the Next Monthly Reference Portfolio) and the Monthly Basket Constituent Weight for Basket Constituent i with respect to Monthly Re-weighting Period k-1 determined as of Monthly Re-weighting Selection Date k-1 (which is the Prior Monthly Reference Portfolio).

Where the weighted average is calculated as follows:

On the 1st Effective Monthly Re-weighting Date, λ_t^i will equal 20% of the Monthly Basket Constituent Weight for Basket Constituent i in the Monthly Reference Portfolio with respect to Monthly Re-weighting Period k determined as of the immediately preceding Monthly Re-weighting Selection Date k plus 80% of the Monthly Basket Constituent Weight for Basket Constituent i in the Monthly Reference Portfolio with respect to Monthly Re-weighting Period k-1 determined as of Monthly Re-weighting Selection Date k-1;

On the 2nd Effective Monthly Re-weighting Date, λ_t^i will equal 40% of the Monthly Basket Constituent Weight for Basket Constituent i in the Monthly Reference Portfolio with respect to Monthly Re-weighting Period k determined as of the immediately preceding Monthly Re-weighting Selection Date k plus 60% of the Monthly Basket Constituent Weight for Basket Constituent i in the Monthly Reference Portfolio with respect to Monthly Re-weighting Period k-1 determined as of Monthly Re-weighting Selection Date k-1;

On the 3rd Effective Monthly Re-weighting Date, λ_t^i will equal 60% of the Monthly Basket Constituent Weight for Basket Constituent i in the Monthly Reference Portfolio with respect to

Monthly Re-weighting Period k determined as of the immediately preceding Monthly Re-weighting Selection Date k plus 40% of the Monthly Basket Constituent Weight for Basket Constituent i in the Monthly Reference Portfolio with respect to Monthly Re-weighting Period k-1 determined as of Monthly Re-weighting Selection Date k-1;

On the 4th Effective Monthly Re-weighting Date, λ_t^i will equal 80% of the Monthly Basket Constituent Weight for Basket Constituent i in the Monthly Reference Portfolio with respect to Monthly Re-weighting Period k determined as of the immediately preceding Monthly Re-weighting Selection Date k plus 20% of the Monthly Basket Constituent Weight for Basket Constituent i in the Monthly Reference Portfolio with respect to Monthly Re-weighting Period k-1 determined as of Monthly Re-weighting Selection Date k-1.

(y) on any Trading Day t to which clause (x) above does not apply (which shall include the final Effective Monthly Re-weighting Date for each Monthly Re-weighting Period), for each Basket Constituent i, λ_t^i will equal 100% of the Monthly Basket Constituent Weight for Basket Constituent i in the Monthly Reference Portfolio with respect to the most recent Monthly Re-weighting Period determined as of the most recent Monthly Re-weighting Selection Date.

10.4 Exposure Calculation

The Exposure on the Start Date for each Efficient Plus Index is provided in the applicable Module for such Efficient Plus Index.

Subject to Section 11.3 (*Exposure Determination and Calculation of Index Levels in Connection with Market Disruption*), the exposure of an Efficient Plus Index to the relevant Monthly Reference Portfolios (the “**Exposure**”) as of any Trading Day t, which is effective as of the Closing Time on such Trading Day, will be (a) if the applicable Module for an Efficient Plus Index specifies that the Daily Series Mechanism is Not Applicable (each such Efficient Plus Index not being a Daily Series Index as defined in Section 4), 100%; or (b) if the applicable Module for an Efficient Plus Index specifies that the Daily Series Mechanism is Applicable (each such Efficient Plus Index being a Daily Series Index as defined in Section 4), a non-negative number equal to Exp_t that is calculated as follows:

- (i) For each Trading Day t prior to and including December 20, 2017, Exp_t was calculated as follows, with no constraint on the change from Exp_{t-1} to Exp_t :

$$Exp_t = \min\left(\frac{1}{1 - \lambda_t^{21}}, \frac{Volatility_{Target}}{Volatility_{t,t-2}}\right)$$

- (ii) For each Trading Day t from and excluding December 20, 2017, Exp_t was calculated as follows, with a maximum change from Exp_{t-1} to Exp_t of 50%:

$$Exp_t = \min\left(\frac{1}{1 - \lambda_t^{21}}, Exp_{t-1} + Step, \max\left(Exp_{t-1} - Step, \frac{Volatility_{Target}}{Volatility_{t,t-2}}\right)\right)$$

where:

λ_t^{21}	has the meaning given to the term λ_t^i in Section 10.3(b) (<i>Determining the Underlying Portfolio Volatility</i>) in respect of the Cash Constituent;
t	denotes the relevant Trading Day t;
t - 1	denotes the Trading Day that immediately precedes Trading Day t;
t - 2	denotes the Trading Day that immediately precedes Trading Day t-1;
Exp_t	means the exposure that the relevant Daily Series Index has to the relevant Monthly Reference Portfolios as of Trading Day t, which is effective as of the Closing Time on such Trading Day t;

Exp_{t-1}	means the exposure that the relevant Daily Series Index has to the relevant Monthly Reference Portfolios as of Trading Day t-1, which is effective as of the Closing Time on such Trading Day t-1;
$Volatility_{t,t-2}$	has the meaning given to such term in Section 10.3(b) (<i>Determining the Underlying Portfolio Volatility</i>);
<i>Step</i>	means 50%; and
$Volatility_{Target}$	means the Target Volatility as specified in the applicable Module for such Daily Series Index.

For each Daily Series Index, the value of Exp_t calculated under formula (i) above for each Trading Day t from the relevant Start Date to December 20, 2017 is the same as the value of Exp_t that would have resulted had formula (ii) above been applied, subject to the following exception: the value of Exp_t for September 8, 2015 for the Daily Series Indices described under Modules B3 and B4 would have been different had formula (ii) been applied.

For each Daily Series Index, the value of Exp_t calculated under formula (i) above for each Trading Day t from the relevant Base Date to the relevant State Date is the same as the value of Exp_t that would have resulted had formula (ii) above been applied, subject to the following exceptions: the values of Exp_t for October 6, 2008 and April 20, 2009 for the Daily Series Indices described under Modules B3 and B4 and the value of Exp_t for October 6, 2008 for the Daily Series Indices described under Modules B8 and B9 would have been different had formula (ii) been applied.

10.5 Calculating the Efficient Plus Index Level

On the relevant Base Date, the Index Level was 100 for each Efficient Plus Index. Thereafter, subject to the provisions of Section 11.3 (*Exposure Determination and Calculation of Index Levels in Connection with Market Disruption*), the Index Level of each Efficient Plus Index will be calculated by the Index Calculation Agent for each Trading Day as follows.

- (a) On each Trading Day t from but excluding the final Effective Monthly Re-weighting Date in Monthly Re-weighting Period k to and including the first Effective Monthly Re-weighting Date in the immediately following Monthly Re-weighting Period k+1, if the Return Type specified in the applicable Module for such Efficient Plus Index is “Excess Return”, its level will be calculated in accordance with the following formula:

$$Index_t = Index_{t-1} \times \left[1 + Exp_{t-1} \times \left(\frac{RP_{k,t}}{RP_{k,t-1}} - 1 \right) - Fee \times \frac{Days_{t-1,t}}{360} \right]$$

and if the Return Type specified in the applicable Module for such Efficient Plus Index is “Total Return”, its level will be calculated in accordance with the following formula:

$$Index_t = Index_{t-1} \times \left[\frac{S_t^{21}}{S_{t-1}^{21}} + Exp_{t-1} \times \left(\frac{RP_{k,t}}{RP_{k,t-1}} - 1 \right) - Fee \times \frac{Days_{t-1,t}}{360} \right]$$

where:

t	denotes the relevant Trading Day t;
$t - 1$	denotes the Trading Day that immediately precedes Trading Day t;
$Index_t$	means the Index Level of the applicable Efficient Plus Index for Trading Day t;
$Index_{t-1}$	means the Index Level of the applicable Efficient Plus Index for Trading Day t-1;
$RP_{k,t}$	means the level of the Monthly Reference Portfolio with respect to Monthly Re-weighting Selection Date k for Trading Day t;
$RP_{k,t-1}$	means the level of the Monthly Reference Portfolio with respect to Monthly Re-weighting Selection Date k for Trading Day t-1;
<i>Fee</i>	means the Fee specified in the Module for the applicable Efficient Plus Index;

$Days_{t-1,t}$	means the number of calendar days from but excluding Trading Day t-1 to and including Trading Day t;
Exp_{t-1}	means the exposure of the applicable Efficiente Plus Index to the relevant Monthly Reference Portfolios as of Trading Day t-1, which is effective as of the Closing Time on such Trading Day, that is determined pursuant to Section 10.4 (<i>Exposure Calculation</i>);
S_t^{21}	means the Closing Level of the Cash Constituent for Trading Day t; and
S_{t-1}^{21}	means the Closing Level of the Cash Constituent for Trading Day t-1.

- (b) Subject to the provisions of Section 11.2 (*Market Disruption on a Monthly Re-weighting Date*), on each Trading Day t from but excluding the first Effective Monthly Re-weighting Date in Monthly Re-weighting Period k to and including the final Effective Monthly Re-weighting Date in Monthly Re-weighting Period k, if the Return Type specified in the applicable Module for such Efficiente Plus Index is “Excess Return”, its level will be calculated according to the following formula:

$$Index_t = Index_{t-1} \times \left[1 + Exp_{t-1} \times \left(\frac{d-n}{d} \times \frac{RP_{k-1,t}}{RP_{k-1,t-1}} + \frac{n}{d} \times \frac{RP_{k,t}}{RP_{k,t-1}} - 1 \right) - Fee \times \frac{Days_{t-1,t}}{360} \right]$$

and if the Return Type specified in the applicable Module for such Efficiente Plus Index is “Total Return”, its level will be calculated in accordance with the following formula:

$$Index_t = Index_{t-1} \times \left[\frac{S_t^{21}}{S_{t-1}^{21}} + Exp_{t-1} \times \left(\frac{d-n}{d} \times \frac{RP_{k-1,t}}{RP_{k-1,t-1}} + \frac{n}{d} \times \frac{RP_{k,t}}{RP_{k,t-1}} - 1 \right) - Fee \times \frac{Days_{t-1,t}}{360} \right]$$

where:

t	denotes the relevant Trading Day t (which in the case of this Section 10.5(b) will always also be an Effective Monthly Re-weighting Date);
$t - 1$	denotes the Trading Day that immediately precedes Trading Day t (which in the case of this Section 10.5(b) will always also be an Effective Monthly Re-weighting Date);
$Index_t$	means the Index Level of the applicable Efficiente Plus Index for Trading Day t;
$Index_{t-1}$	means the Index Level of the applicable Efficiente Plus Index for Trading Day t-1;
$RP_{k,t}$	means the level of the Monthly Reference Portfolio with respect to Monthly Re-weighting Selection Date k for Trading Day t;
$RP_{k,t-1}$	means the level of the Monthly Reference Portfolio with respect to Monthly Re-weighting Selection Date k for Trading Day t-1;
$RP_{k-1,t}$	means the level of the Monthly Reference Portfolio with respect to Monthly Re-weighting Selection Date k-1 for Trading Day t;
$RP_{k-1,t-1}$	means the level of the Monthly Reference Portfolio with respect to Monthly Re-weighting Selection Date k-1 for Trading Day t-1;
n	is an integer from 1 to 4, such that: when t denotes the second Effective Monthly Re-weighting Date in Monthly Re-weighting Period k, n=1; when t denotes the third Effective Monthly Re-weighting Date in Monthly Re-weighting Period k, n=2; when t denotes the fourth Effective Monthly Re-weighting Date in Monthly Re-weighting Period k, n=3; when t denotes the fifth Effective Monthly Re-weighting Date in Monthly Re-weighting Period k, n=4;
d	means the number of Index Business Days in a scheduled Monthly Re-weighting Period and shall equal 5;
Exp_{t-1}	means the exposure of the applicable Efficiente Plus Index to the relevant Monthly Reference Portfolios as of Trading Day t-1, which is effective as of the Closing Time on such Trading Day, that is determined pursuant to Section 10.4 (<i>Exposure Calculation</i>);
S_t^{21}	means the Closing Level of the Cash Constituent for Trading Day t; and
S_{t-1}^{21}	means the Closing Level of the Cash Constituent for Trading Day t-1.

For the avoidance of doubt:

For the Trading Day that is the ...	The Index Level calculated for such day will reflect* . . .	The Index Level calculated for the next Trading Day will reflect* . .
1st Effective Monthly Re-weighting Date	100% of the Performance of Monthly Reference Portfolio k-1 (which is the Prior Monthly Reference Portfolio)	80% of the Performance of Monthly Reference Portfolio k-1 (which is the Prior Monthly Reference Portfolio) and 20% of the Performance of Monthly Reference Portfolio k (which is the Next Monthly Reference Portfolio)
2nd Effective Monthly Re-weighting Date	80% of the Performance of Monthly Reference Portfolio k-1 and 20% of the Performance of Monthly Reference Portfolio k	60% of the Performance of Monthly Reference Portfolio k-1 and 40% of the Performance of Monthly Reference Portfolio k
3rd Effective Monthly Re-weighting Date	60% of the Performance of Monthly Reference Portfolio k-1 and 40% of the Performance of Monthly Reference Portfolio k	40% of the Performance of Monthly Reference Portfolio k-1 and 60% of the Performance of Monthly Reference Portfolio k
4th Effective Monthly Re-weighting Date	40% of the Performance of Monthly Reference Portfolio k-1 and 60% of the Performance of Monthly Reference Portfolio k	20% of the Performance of Monthly Reference Portfolio k-1 and 80% of the Performance of Monthly Reference Portfolio k
5th Effective Monthly Re-weighting Date	20% of the Performance of Monthly Reference Portfolio k-1 and 80% of the Performance of Monthly Reference Portfolio k	100% of the Performance of Monthly Reference Portfolio k

*as adjusted for the relevant Exposure (determined pursuant to Section 10.4 (*Exposure Calculation*)) that applies to the determination of such Index Level pursuant to this Section 10.5.

11. Market Disruption

11.1 Market Disruption on a Monthly Re-weighting Selection Date

If a Monthly Re-weighting Selection Date is a Disrupted Day in respect of any Basket Constituent (for these purposes, each such Basket Constituent shall be an “**Affected Basket Constituent**”), then the relevant Monthly Re-weighting Selection Date shall remain the originally scheduled Monthly Re-weighting Selection Date and the Closing TR Level or Closing Level, as the case may be, for each Affected Basket Constituent in respect of such Disrupted Day shall be deemed to be the Closing TR Level or Closing Level, as the case may be, for the Affected Basket Constituent as of the immediately preceding day that was both (x) a Dealing Day for such Affected Basket Constituent and (y) not a Disrupted Day for such Affected Basket Constituent.

11.2 Market Disruption on a Monthly Re-weighting Date

If an originally scheduled Monthly Re-weighting Date for a Monthly Re-weighting Period is postponed, then each subsequent Monthly Re-weighting Date originally scheduled to occur after that Monthly Re-weighting Date shall also be postponed so that all of the Monthly Re-weighting Dates for that Monthly Re-weighting Period will occur in the order in which they were originally scheduled to occur, each on a different Index Business Day.

If an originally scheduled Monthly Re-weighting Date for a Monthly Re-weighting Period is a Disrupted Day in respect of any Basket Constituent, then such Monthly Re-weighting Date and each other Monthly Re-

weighting Date for the same Monthly Re-weighting Period originally scheduled to follow such Monthly Re-weighting Date shall each be an “**Affected Monthly Re-Weighting Date**”.

In that case, each Affected Monthly Re-weighting Date will be postponed to the first of the following days to occur (which day shall be a “**Postponed Monthly Re-weighting Date**”):

- (i) the first following Index Business Day that is (x) not a Disrupted Day for any Basket Constituent and (y) not the postponed date of any Affected Monthly Re-weighting Date for the same Monthly Re-weighting Period that was originally scheduled to occur prior to the date on which such Affected Monthly Re-weighting Date was originally scheduled to occur; and
- (ii) the fifth Index Business Day following the date on which such Affected Monthly Re-weighting Date was originally scheduled to occur.

For the avoidance of doubt, no two Effective Monthly Re-weighting Dates should occur on the same day as a result of the operation of this Section 11.2.

11.3 Exposure Determination and Calculation of Index Levels in Connection with Market Disruption

For an Efficient Plus Index, (i) if a Postponed Monthly Re-weighting Date is a Disrupted Day for any Basket Constituent, then such Postponed Monthly Re-weighting Date shall be a “**Re-weighting Disruption Determination Date**” and (ii) if a Portfolio Disruption Day immediately follows five consecutive Portfolio Disruption Days, then such Portfolio Disruption Day shall be a “**Portfolio Disruption Determination Date**.” “**Final Disruption Determination Date**” means a day that is either a Re-weighting Disruption Determination Date or a Portfolio Disruption Determination Date.

On each Final Disruption Determination Date, the Index Calculation Agent will calculate its good faith estimate of the Exposure of that Efficient Plus Index (that is otherwise determined pursuant to Section 10.4 (*Exposure Calculation*)) and the Index Level as of such Final Disruption Determination Date (notwithstanding the fact that such Final Disruption Determination Date is a Disrupted Day for at least one Basket Constituent) using its good faith estimate of (i) the Closing TR Level for any ETF Constituent, if such Final Disruption Determination Date is a Disrupted Day for such ETF Constituent, (ii) the Closing Level for any Basket Constituent that is an index, if such Final Disruption Determination Date is a Disrupted Day for such Basket Constituent, and (iii) the level of any Monthly Reference Portfolio that affects the calculation of the Index Level. Any such estimate of the Exposure of an Efficient Plus Index and any such estimated levels may be subject to correction on any of (x) the first succeeding Index Business Day that is not a Final Disruption Determination Date for such Efficient Plus Index, (y) the first succeeding Index Business Day that is not a Disrupted Day in respect of any Basket Constituent and (z) the first succeeding Index Business Day that is not a Disrupted Day for a Basket Constituent with respect to which such an estimated level was determined pursuant to this Section 11.3.

For the avoidance of doubt, on each Re-weighting Disruption Determination Date, the Index Calculation Agent will re-weight the portion of the Efficient Plus Index to be rebalanced on such day in accordance with Section 10.5(b) using its good faith estimates determined pursuant to this Section 11.3. For purposes of determining the Closing TR Level for any ETF Constituent for any Dealing Day, if the Prior Dealing Day for such ETF Constituent was a Disrupted Day then, in the formula for determining the Closing TR Level for such Dealing Day, (i) the Closing TR Level for that Prior Dealing Day shall be replaced with the Closing TR Level on the Prior Non-Disrupted Dealing Day for such ETF Constituent, (ii) the Closing Level for that Prior Dealing Day shall be replaced with the Closing Level on such Prior Non-Disrupted Dealing Day for such ETF Constituent, and (iii) the Gross Distribution Amount of such ETF Constituent in respect of such Dealing Day shall be replaced with the sum of each of the Gross Distribution Amounts for such ETF Constituent in respect of each day from but excluding the Prior Non-Disrupted Dealing Day to and including such Dealing Day. Such Final Disruption Determination Date shall be a Trading Day for the purposes of the Index Rules, notwithstanding the fact that it is a Disrupted Day for at least one Basket Constituent.

11.4 *Definitions Related to Market Disruption*

- (a) **“Disrupted Day”** means, in respect of a Basket Constituent, a Dealing Day on which a Market Disruption Event occurs or is continuing in respect of such Basket Constituent.
 - (b) **“Portfolio Disruption Day”** means, in respect of an Efficient Plus Index, an Index Business Day that (i) occurs during the period from but excluding the final Effective Monthly Re-weighting Date in a given Monthly Re-weighting Period to but excluding the first Effective Monthly Re-weighting Date in the immediately following Monthly Re-weighting Period and (ii) is a Disrupted Day for any Basket Constituent that has a non-zero Monthly Basket Constituent Weight in the Monthly Reference Portfolio determined as of the Monthly Re-weighting Selection Date associated with the Monthly Re-weighting Selection Date immediately preceding the most recently completed Monthly Re-weighting Period.
 - (c) A **“Market Disruption Event”** occurs if the Index Calculation Agent determines in its sole discretion that on any Dealing Day there has been:
 - (i) in respect of any Basket Constituent that is an index or any Reference Index of any ETF Constituent, a failure by the relevant sponsor or its agent to calculate and publish the Closing Level for such index on such Dealing Day, or any event that, in the determination of the Index Calculation Agent, disrupts or impairs the ability of market participants to effect transactions in or obtain levels or market values for (a) the relevant index, (b) any securities or components that in the aggregate comprise 20 percent or more of the level of the relevant index, (c) any futures or options contracts or other financial contracts relating to the relevant index, or (d) any futures or options contracts or other financial contracts relating to securities or components that in the aggregate comprise 20 percent or more of the level of the relevant index; or
 - (ii) in respect of a Basket Constituent that is an equity index (including, for the avoidance of doubt, an index composed of one or more of the following types of securities: equities, preferred stocks, MLPs and REITs) or any Reference Index of any ETF Constituent that is an equity index (including, for the avoidance of doubt, an index composed of one or more of the following types of securities: equities, preferred stocks, MLPs and REITs), an Equity Index Disruption Event; or
 - (iii) in respect of a Basket Constituent that is a commodity index, any Reference Index of any ETF Constituent that is a commodity index or any Reference Commodities of any ETF Constituent, a Commodity Disruption Event; or
 - (iv) in respect of an ETF Constituent, an ETF Disruption Event; andthe Index Calculation Agent determines in its sole discretion that the applicable event described above could materially interfere with the ability of market participants to transact in positions with respect to the relevant Efficient Plus Index (including, without limitation, positions with respect to any Basket Constituent or the Reference Index or any Reference Commodity of any ETF Constituent).
- For the purpose of determining whether a Market Disruption Event with respect to an index and a Dealing Day exists at any time, if trading in a security or component included in the applicable index is materially suspended or materially limited at that time, then the relevant percentage contribution of that security or component to the level of the applicable index will be based on a comparison of (x) the portion of the level of the applicable index attributable to that security or component relative to (y) the overall level of the applicable index, in each case immediately before that suspension or limitation.
- (d) **“Equity Index Disruption Event”** means, in each case as determined by the Index Calculation Agent in its sole discretion, subject to the provisions of Section 11.4(h):
 - (i) the occurrence or existence of a suspension, absence or material limitation of trading of securities then constituting 20% or more of the level of the equity index (including, for the avoidance of doubt, an index composed of one or more of the following types of securities: equities, preferred stocks, MLPs and REITs) on the relevant primary exchanges for such securities for more than two hours of trading during, or during the last one-half hour period preceding the close of, the principal trading session on such relevant primary exchanges; or

- (ii) if applicable, the occurrence or existence of a suspension, absence or material limitation of trading on the primary exchange or market for trading in futures or options contracts related to the equity index (including, for the avoidance of doubt, an index composed of one or more of the following types of securities: equities, preferred stocks, MLPs and REITs) for more than two hours of trading during, or during the last one-half hour period preceding the close of, the principal trading session on such applicable exchange or market.
- (e) **“Commodity Disruption Event”** means, in each case as determined by the Index Calculation Agent in its sole discretion:
- (i) A material limitation, suspension, discontinuation or disruption of trading in one or more of the relevant Reference Commodities;
 - (ii) A material limitation, suspension, discontinuation or disruption of trading in one or more options or futures contracts on (x) a relevant commodity or commodities related to the relevant commodity index or (y) any of the relevant Reference Commodities, which results in failure by the relevant exchange on which any 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;
 - (iii) a limitation, suspension or disruption of trading in one or more options or futures contracts on (x) a relevant commodity or commodities related to the relevant commodity index or (y) any of the relevant Reference Commodities, by reason of movements exceeding “limit up” or “limit down” levels permitted by the relevant exchange and which the Index Calculation Agent determines is material to trading volume or market conditions in such option(s) and/or futures contract(s) for the relevant day;
 - (iv) publication by the relevant exchange of a “limit price” as the official settlement price for one or more futures contracts on (x) a relevant commodity or commodities related to the relevant commodity index or (y) any of the relevant Reference Commodities, by reason of movements exceeding “limit up” or “limit down” levels permitted by the relevant exchange;
 - (v) the occurrence of a Commodity Index Non-Publication Event;
 - (vi) the relevant exchange for any options or futures contracts on (x) the relevant commodity or commodities related to the relevant commodity index or (y) any of the relevant Reference Commodities, is not open for trading during its regular trading session as scheduled for the relevant day; or
 - (vii) the relevant market for any of the relevant Reference Commodities is not open for trading during its regular trading session as scheduled for the relevant day.
- (f) **“Commodity Index Non-Publication Event”** means, the failure by the relevant exchange, index sponsor of the relevant commodity index 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 (x) the relevant commodity or commodities related to the relevant commodity index or (y) the relevant Reference Commodities; or (b) the closing level of the relevant commodity index, in either case by noon (London time) on the immediately following Dealing Day, *provided, however* that the occurrence of such an event shall not constitute a “Commodity Index 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 Dealing Day that the information necessary for determining the closing level of the relevant commodity index has been announced publicly or published by the relevant exchange, index sponsor of the relevant commodity index or other price source, in which case the Index Calculation Agent shall determine the closing level of such commodity index (the closing level so determined being a **“Proxy Calculated Level”**) in good faith and in a commercially reasonable manner.
- (g) **“ETF Disruption Event”** means, in each case as determined by the Index Calculation Agent in its sole discretion, subject to the provisions of Section 11.4(h):

- (i) the occurrence or existence of a suspension, absence or material limitation of trading of the securities of an ETF Constituent on the relevant primary exchange for such securities for more than two hours of trading during, or during the last one-half hour period preceding the close of, the principal trading session on such relevant primary exchange;
 - (ii) a breakdown or failure in the price and trade reporting systems of the relevant primary exchange for the securities of an ETF Constituent as a result of which the reported trading prices for such securities are materially inaccurate for more than two hours of trading during, or during the last one-half hour period preceding the close of, the principal trading session on such relevant primary exchange;
 - (iii) if applicable, the occurrence or existence of a suspension, absence or material limitation of trading on the primary exchange or market for trading in futures or options contracts related to the securities of an ETF Constituent or on any Related Exchange for such ETF Constituent for more than two hours of trading during, or during the last one-half hour period preceding the close of, the principal trading session on the applicable exchange or market;
 - (iv) as applicable, if any of the following is calculated or announced in the ordinary course, but is not calculated or is not announced by or on behalf of the relevant sponsor or issuer of the ETF Constituent or the relevant calculation agent or information provider that the relevant sponsor or issuer of the ETF Constituent designates: the intraday net asset value or the intraday indicative value of an ETF Constituent, the intraday indicative value of a Reference Index or a Reference Commodity of an ETF Constituent, or any intraday value or level that indicates or affects the approximate intrinsic economic value of an ETF Constituent or the amount of any payment in respect of an ETF Constituent;
 - (v) as applicable, if any of the following is calculated or announced in the ordinary course, but is not calculated or is not announced by or on behalf of the relevant sponsor or issuer of the ETF Constituent or the relevant calculation agent or information provider that the relevant sponsor or issuer of the ETF Constituent designates: the closing net asset value or the closing indicative value of an ETF Constituent, the closing indicative value of a Reference Index or a Reference Commodity of an ETF Constituent, or any closing value or level or other value or level that indicates or affects the approximate intrinsic economic value of an ETF Constituent or the amount of any payment in respect of an ETF Constituent; or
 - (vi) as applicable, the relevant sponsor or issuer of an ETF Constituent suspends creations, issuances or redemptions of securities of such ETF Constituent.
- (h) For the purpose of determining whether an Equity Index Disruption Event or an ETF Disruption Event has occurred:
- (1) a limitation on the hours or number of days of trading will not constitute an Equity Index Disruption Event or an ETF Disruption Event if it results from an announced change in the regular business hours of the relevant primary exchange or the primary exchange or market for trading in futures or options contracts related to the relevant securities;
 - (2) limitations pursuant to the rules of any relevant primary exchange similar to New York Stock Exchange Rule 80B (or any applicable rule or regulation enacted or promulgated by any other self-regulatory organization or any government agency of scope similar to New York Stock Exchange Rule 80B as determined by the Index Calculation Agent) on trading during significant market fluctuations will constitute a suspension, absence or material limitation of trading;
 - (3) a suspension of trading in futures or options contracts on the applicable equity index (including, for the avoidance of doubt, an index composed of one or more of the following types of securities: equities, preferred stocks, MLPs and REITs) or securities of an ETF Constituent by the primary exchange or market for trading in such contracts or securities of such ETF Constituent by reason of (a) a price change exceeding limits set by such exchange or market, (b) an imbalance of orders relating to such contracts or securities of such ETF Constituent or (c) a disparity in bid and ask quotes relating to such contracts or securities of such ETF Constituent, will constitute a suspension,

absence or material limitation of trading in futures or options contracts related to such equity index or the securities of such ETF Constituent; and

(4) a suspension, absence or material limitation of trading on any relevant primary exchange or, if applicable, on the primary exchange or market on which futures or options contracts related to the applicable equity index (including, for the avoidance of doubt, an index composed of one or more of the following types of securities: equities, preferred stocks, MLPs and REITs) or the securities of an ETF Constituent are traded will not include any time when such exchange or market is itself closed for trading under ordinary circumstances.

12. Extraordinary Events

12.1 Extraordinary Events for each Basket Constituent

- (i) (a) For an ETF Constituent, (x) if any of the following is calculated or announced in the ordinary course, but is not calculated or is not announced by or on behalf of the relevant sponsor or issuer for the ETF Constituent or the relevant calculation agent or information provider that such sponsor or issuer designates: its intraday or closing net asset value or another value or level that indicates or affects the approximate intrinsic economic value of the ETF Constituent or the amount of any payment in respect of the ETF Constituent, (y) yet such value or level is calculated and announced by or on behalf of a successor sponsor or issuer acceptable to the Index Calculation Agent or a calculation agent or information agent (in either case, that such successor sponsor or issuer designates) acceptable to the Index Calculation Agent;
- (b) for a Basket Constituent that is an index (including, for the avoidance of doubt, the Cash Constituent) or for the Reference Index of an ETF Constituent, (x) if the relevant index is replaced by a successor index, (y) yet such successor index uses, in the determination of the Index Calculation Agent, the same or a substantially similar formula for and method of calculation as used in the calculation of the relevant index or such successor index is otherwise acceptable to the Index Calculation Agent;
- (c) for a Basket Constituent that is an index (including, for the avoidance of doubt, the Cash Constituent) or for the Reference Index of an ETF Constituent, (x) if the relevant index sponsor makes a material change in the formula for or the method of calculating that index or in any other way materially modifies that index (other than a modification prescribed in that formula or method to maintain that index in routine circumstances), (y) yet such change or modification is acceptable to the Index Calculation Agent;
- (d) for an ETF Constituent that has one or more Reference Commodities, (x) if it is replaced by a successor ETF, (y) yet any Reference Commodities of such successor ETF are the same as that of the replaced ETF Constituent or such successor ETF is otherwise acceptable to the Index Calculation Agent; or
- (e) for an ETF Constituent, (x) if it is replaced by a successor ETF Constituent, (y) yet (1) the Reference Index of such successor ETF Constituent is either the same as that of the replaced ETF Constituent or is an index using, in the determination of the Index Calculation Agent, the same or a substantially similar formula for and method of calculation as used in the calculation of the replaced ETF Constituent's Reference Index or (2) such successor ETF Constituent is otherwise acceptable to the Index Calculation Agent,

then, in each case, that Basket Constituent, that Reference Index or the relevant sponsor, issuer, calculation agent or information provider will thereafter be deemed to be the successor Basket Constituent, successor Reference Index or the successor sponsor, issuer, calculation agent or information provider described in the relevant clause above, with effect from a date determined by the Index Calculation Agent, which may make such adjustments to the Index Rules of the relevant Efficient Plus Index as it determines in good faith are appropriate to account for such change

(including, without limitation, adjustments to market disruption provisions in respect of an index that includes securities or components that are bonds or loans).

For the avoidance of doubt, the Index Calculation Agent shall not accept a particular successor ETF or successor index if the Index Calculation Agent determines, in its sole discretion, that doing so would immediately result in the occurrence of an Extraordinary Event. Upon the acceptance of a successor ETF or successor index, such successor shall take the place of the relevant Basket Constituent. For the avoidance of doubt, the prior Performance of such successor ETF or index shall be used in the identification of the Unique Portfolio for future Performance Observation Periods and for determining Exposure pursuant to Section 10.4 (*Exposure Calculation*) if the relevant prior Performance of such successor is available; *provided that*, if some portion of the relevant prior Performance of such successor is not available, the prior Performance of the replaced ETF or index shall be used (in place of such portion of the relevant prior performance of such successor that is not available) in the identification of the Unique Portfolio for future Performance Observation Periods and for determining Exposure pursuant to Section 10.4 (*Exposure Calculation*) with such adjustments as the Index Calculation Agent determines in good faith are appropriate to account for the use of prior Performance of both such successor and such replaced ETF or index.

- (ii) If an Extraordinary Event occurs in respect of a Basket Constituent, the Index Calculation Agent, acting in good faith and a commercially reasonable manner, shall select as a substitute for such Basket Constituent:

- (w) an ETF that has a Reference Index;
- (x) an ETF that has one or more Reference Commodities; or
- (y) an index,

(such substitute ETF or index being referred to herein as a “substitute ETF” or “substitute index,” respectively) that, in any case, the Index Calculation Agent determines, in its sole discretion, possesses substantially similar characteristics or provides a substantially similar exposure (as considered prior to the occurrence of such Extraordinary Event, with the understanding that (1) a substitute ETF or a substitute index can be substantially similar to an ETF Constituent, and (2) a substitute ETF or a substitute index can be substantially similar to an index that is a Basket Constituent) as compared to the Basket Constituent that is being replaced, *provided that*, if the Index Calculation Agent determines that no such substitute is available, the Index Calculation Agent shall instead select an appropriate substitute by considering the context of the relevant Efficient Plus Index and its Weighting Constraints.

In such a case, the Index Calculation Agent shall, in good faith, make such adjustments that it determines to be appropriate to any variable, calculation methodology, valuation terms or any other rule in relation to the relevant Efficient Plus Index to account for such substitution (including, without limitation, adjustments to market disruption provisions in respect of an index that includes securities or components that are bonds or loans);

provided further that the Index Calculation Agent shall not select a substitute ETF for the Cash Constituent, but may select a substitute index for the Cash Constituent;

provided further that, for any Basket Constituent other than the Cash Constituent, if the Index Calculation Agent determines, in its sole discretion, that no such substitute ETF or substitute index is available, then the Index Calculation Agent will, in its sole discretion, (x) determine its good faith estimate of the closing price of such Basket Constituent as of a date on or prior to the occurrence of such Extraordinary Event and use such estimate of the closing price (without modification over time) in respect of such Basket Constituent in subsequent calculations of the Index Level of the relevant Efficient Plus Index until the final Effective Monthly Re-weighting Date in the immediately following Monthly Re-weighting Period, (y) replace such Basket Constituent with the Cash Constituent as its substitute and (z) in good faith, make such adjustments that it determines to be appropriate to any variable, calculation methodology, valuation terms or any other rule in relation to the relevant

Efficiente Plus Index to account for such substitution (for the avoidance of doubt, as a result of such a replacement of any Basket Constituent with the Cash Constituent, the aggregate weight of the Cash Constituent would be allowed to exceed the Weighting Constraints specific to the Cash Constituent, because a portion of such aggregate weight would be subject to the Weighting Constraints specific to the replaced Basket Constituent and not the Weighting Constraints specific to the Cash Constituent);

provided further that, for the Cash Constituent, if the Index Calculation Agent determines, in its sole discretion, that no such substitute index is available, then the Index Calculation Agent will, in its sole discretion, calculate the level of the Cash Constituent using, in lieu of a published level for the Cash Constituent, the level for the Cash Constituent as of any future Index Business Day as determined by the Index Calculation Agent in accordance with the formula for and method of calculating the Cash Constituent last in effect prior to the occurrence of such Extraordinary Event, but using only the types of components that composed the Cash Constituent immediately prior to such Extraordinary Event (and in the case of components with an expiration or maturity, any components required to roll any expiring positions in accordance with the formula for and method of calculating the Cash Constituent shall be permitted).

The Index Calculation Agent shall not select a particular substitute ETF or index if the Index Calculation Agent determines, in its sole discretion, that doing so would immediately result in the occurrence of an Extraordinary Event. Upon the selection of a substitute ETF or index, such substitute shall take the place of the relevant Basket Constituent. For the avoidance of doubt, the prior Performance of such substitute ETF or index shall be used in the identification of the Unique Portfolio for future Performance Observation Periods and for determining Exposure pursuant to Section 10.4 (*Exposure Calculation*) if the relevant prior Performance of such substitute is available; *provided that*, if some portion of the relevant prior Performance of such substitute is not available, the prior Performance of the replaced ETF or index shall be used (in place of such portion of the relevant prior performance of such substitute that is not available) in the identification of the Unique Portfolio for future Performance Observation Periods and for determining Exposure pursuant to Section 10.4 (*Exposure Calculation*) with such adjustments as the Index Calculation Agent determines in good faith are appropriate to account for the use of prior Performance of both such substitute and such replaced ETF or index.

An “**Extraordinary Event**” occurs if the Index Calculation Agent determines in its sole discretion that (i) on any Dealing Day in respect of a Basket Constituent one or more of the following events has occurred and (ii) the applicable event or events described below materially interferes with the ability of market participants to transact in positions with respect to the relevant Efficiente Plus Index (including, without limitation, positions with respect to any Basket Constituent or the Reference Index or any Reference Commodity of any ETF Constituent):

- (1) for any ETF Constituent for which the securities of the relevant exchange-traded fund are issued by a trust (such issuer trust, the “**Trust Issuer**”), the trust agreement or any similar governing document of the Trust Issuer is terminated, or the Trust Issuer becomes, for any reason, subject to voluntary or involuntary termination, liquidation, bankruptcy, insolvency, dissolution or winding-up or any other analogous proceeding;
- (2) for any ETF Constituent, the issuer becomes, for any reason, subject to voluntary or involuntary termination, liquidation, bankruptcy, insolvency, dissolution or winding-up or any other analogous proceeding;
- (3) for any ETF Constituent or its issuer, all the securities of the ETF Constituent or its issuer or all or substantially all of the assets of the ETF Constituent or its issuer are nationalized, expropriated or otherwise required to be transferred to any governmental agency, authority, entity or instrumentality thereof;
- (4) for any Basket Constituent, the sponsor or issuer of the Basket Constituent permanently cancels the Basket Constituent, and no successor exists, or the Basket Constituent’s level, net asset value or indicative value is not calculated and is not announced by or on behalf of the relevant sponsor or issuer of the Basket Constituent, and is not calculated and announced by or on behalf of a successor sponsor or issuer acceptable to the Index Calculation Agent;

- (5) for a relevant Basket Constituent, the event specified in clause (x) of subsection (a), (b), (c), (d), (e) or (f) of Section 12.1(i) occurs, but the relevant event specified in clause (y) of such subsection of Section 12.1(i) does not occur;
- (6) in respect of any Basket Constituent that is an index, a failure by the relevant sponsor to calculate and publish the Closing Level for such index for 5 consecutive Dealing Days;
- (7) in respect of any ETF Constituent, such ETF Constituent is de-listed from the relevant primary exchange for such ETF Constituent and is not concurrently listed on a U.S. securities exchange acceptable to the Index Calculation Agent;
- (8) in respect of any ETF Constituent, an ETF Material Event occurs in respect of such ETF Constituent;
- (9) in respect of a Basket Constituent, a Market Disruption Event occurs for 10 consecutive Dealing Days and the Index Calculation Agent determines that such Market Disruption Event is reasonably likely to continue for a period of an indeterminate duration;
- (10) in respect of a Basket Constituent, (x) a suspension or limitation on trading in respect of a Relevant Underlying is announced or imposed for 10 consecutive relevant days or for a period of indeterminate duration that the Index Calculation Agent determines is reasonably likely to include 10 consecutive relevant days or (y) any other event occurs or condition exists that causes trading to cease in respect of a Relevant Underlying for 10 consecutive relevant days;
- (11) if, at any time, any relevant license or other right or ability of the Index Calculation Agent or the Index Sponsor (or any of their affiliates) to use any Constituent, underlying reference input or relevant data or information or to refer to the level or price or other information in respect of any Constituent, underlying reference input or relevant data or information (or other component or input of the Index or other matter that could affect the Index) terminates, becomes impaired, ceases or cannot be obtained or will cease to be available on commercially reasonable terms or the Index Calculation Agent's right or ability to use (i) any Constituent for the purposes of the Index or (ii) the Index in connection with the grant or receipt of any other inbound or outbound licensing or sub-licensing rights is otherwise impaired, ceases or cannot be obtained or will cease to be available on commercially reasonable terms (for any reason); or
- (12) the occurrence or continuation of a Change in Law.

An “**ETF Material Event**” occurs in respect of an ETF Constituent when one or more of the following events occurs, and the Index Calculation Agent determines in its sole discretion that such event or combination of events is material (although, for the avoidance of doubt, the Index Calculation Agent has no obligation to monitor actively whether or not any of the following events has occurred):

(a) there is an amendment, variation or modification to the constitutional documents or offering documents of the ETF Constituent, that the Index Calculation Agent determines has or is reasonably likely to have an adverse impact on the ability of market participants to trade in securities of the ETF Constituent;

(b) there is an amendment, variation or modification to the terms of the ETF Constituent or the obligations of the issuer in respect of the ETF Constituent, in any case and by any means, that the Index Calculation Agent determines has or is reasonably likely to have an adverse impact on the value, redeemability or liquidity of the securities of the ETF Constituent;

(c) an ETF Regulatory Action occurs in respect of the ETF Constituent; “**ETF Regulatory Action**” means (i) any cancellation, suspension or revocation of the registration or approval of the ETF Constituent or the securities of the ETF Constituent by any governmental, legal or regulatory entity with authority over the ETF Constituent or the securities of the ETF Constituent, (ii) any change in the legal, tax, accounting, or regulatory treatments of the ETF Constituent, any sponsor, issuer or adviser of the ETF Constituent or the securities of the ETF Constituent that the Index Calculation Agent determines has or is reasonably likely to have an adverse impact on the holders of the securities of the ETF Constituent or on the value of the securities of the ETF Constituent, (iii) the ETF Constituent or any sponsor, issuer or adviser of the ETF Constituent becoming subject to any investigation, proceeding or litigation by any relevant governmental, legal or regulatory authority involving any activities relating to or resulting from the operation of the ETF Constituent (including, without limitation, any future, announced or implemented material change to any one or more exemptive orders, no action letters or interpretative guidance of the U.S. Securities and Exchange Commission (the “**SEC**”), including guidance issued by the SEC’s staff, relating to the ETF Constituent or to exchange-traded funds generally that affects

holders of the securities of the ETF Constituent, whether occurring through action of the SEC or otherwise, including as a result of a court order or executive order) that the Index Calculation Agent determines has or is reasonably likely to have a material adverse effect on the value, redeemability or liquidity of the securities of the ETF Constituent, or the operation of the ETF Constituent in accordance with the terms of the ETF Constituent or the ETF Constituent's offering documents or (iv) the issuance by the SEC of an order to suspend redemption obligations of the ETF Constituent, to freeze assets of the ETF Constituent or to take any other action that the Index Calculation Agent determines is reasonably likely to have a material effect on the value, redeemability or liquidity of the ETF Constituent;

(d) the Average Daily Trading Volume of any ETF Constituent declines below (x) (i) in the case of an ETF Constituent included on the Start Date, an amount equal to 20 percent of its Average Daily Trading Volume as of December 31, 2014 or (ii) in the case of an ETF Constituent included after the Start Date, an amount equal to 20 percent of its Average Daily Trading Volume as of the date of its inclusion; or (y) \$7.5 million;

(e) the Market Capitalization of any ETF Constituent declines below (x) (i) in the case of an ETF Constituent included on the Start Date, an amount equal to 20 percent of its Market Capitalization as of December 31, 2014 or (ii) in the case of an ETF Constituent included after the Start Date, an amount equal to 20 percent of its Market Capitalization as of the date of its inclusion; or (y) \$500 million;

(f) the relevant primary exchange for the ETF Constituent announces that such ETF Constituent will be delisted from such exchange;

(g) if any of the following is calculated or announced in the ordinary course, but, for a period of 5 consecutive Dealing Days, is not calculated or is not announced by or on behalf of the relevant sponsor or issuer of the ETF Constituent or the relevant calculation agent or information provider that the relevant sponsor or issuer of the ETF Constituent designates: the intraday net asset value of the ETF Constituent, the intraday indicative value of a Reference Index or a Reference Commodity of the ETF Constituent, or any intraday value or level that indicates or affects the approximate intrinsic economic value of the ETF Constituent or the amount of any payment in respect of the ETF Constituent;

(h) if any of the following is calculated or announced in the ordinary course, but, for a period of 5 consecutive Dealing Days, is not calculated or is not announced by or on behalf of the relevant sponsor or issuer of the ETF Constituent or the relevant calculation agent or information provider that the relevant sponsor or issuer of the ETF Constituent designates: the closing net asset value of the ETF Constituent, the closing indicative value of a Reference Index or a Reference Commodity of the ETF Constituent, or any closing value or level or other value or level that indicates or affects the approximate intrinsic economic value of the ETF Constituent or the amount of any payment in respect of the ETF Constituent;

(i) if any of the following is calculated or announced in the ordinary course, but, for a period of 5 consecutive Dealing Days, the Closing Level of the ETF Constituent reflects a premium greater than 5% or a discount greater than 5% as compared to the closing net asset value of the ETF Constituent, the closing indicative value of a Reference Index or a Reference Commodity of the ETF Constituent, or any closing value or level or other value or level that indicates or affects the approximate intrinsic economic value of the ETF Constituent or the amount of any payment in respect of the ETF Constituent;

(j) the relevant sponsor of the Reference Index of the ETF Constituent fails to calculate and publish the Closing Level for such index for 5 consecutive Dealing Days; or

(k) the relevant sponsor of the ETF Constituent suspends new issuances, creations or redemptions of securities of such ETF Constituent for 5 consecutive Dealing Days or announces a suspension of unlimited duration of such creations or redemptions.

A "**Change in Law**" occurs when, due to either:

(a) the adoption of, or any change in, any applicable law, regulation or rule (including, without limitation, (x) any tax law or (y) adoption or promulgation of new regulations authorized or mandated by existing statute); or

(b) the promulgation of, or any change in, the announcement or statement of a formal or informal interpretation 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 Futures Trading Commission, the U.S. Securities and Exchange Commission or any exchange or trading facility), and

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) a position in or a transaction referencing or relating to (1) a Basket Constituent, (2) a component of a Basket Constituent that is an index, (3) a component of a Reference Index of an ETF Constituent or (4) a Reference Commodity of an ETF Constituent (each such underlying described in any of the immediately preceding clauses (1), (2), (3) and (4), being a “**Relevant Underlying**”) or (y) holding a position in or a transaction referencing or relating to a Relevant Underlying 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 or regulation in relation to a Relevant Underlying, including in any case traded on any exchange(s), market or other trading facility.

12.2 Anti-Dilution Adjustments

With respect to each ETF Constituent (or the relevant successor or substitute ETF Constituent), the Index Calculation Agent will make anti-dilution adjustments to the Closing Level of such ETF Constituent only (a) if the securities of such ETF Constituent are subject to a split or reverse split, once such split has become effective, or (b) if such ETF Constituent is subject to (i) an issuance of additional securities of such ETF Constituent that is given ratably to all or substantially all holders of securities of such ETF Constituent or (ii) a distribution of securities of such ETF Constituent as a result of the triggering of any provision of the corporate charter of such ETF Constituent or its issuer, as applicable, once the dividend or distribution has become effective and the securities of such ETF Constituent are trading ex-distribution. The Index Calculation Agent will be solely responsible for the determination and calculation of any such anti-dilution adjustments and any related determinations and calculations, and its determinations and calculations with respect thereto will be conclusive in the absence of manifest error.

13. Corrections

If (i) the Closing Level of any Basket Constituent as of any date which is published or otherwise made available in respect of the relevant Basket Constituent is subsequently corrected and such correction is published or otherwise made available in respect of such Basket Constituent; or (ii) the Index Calculation Agent identifies an error or omission in any of its calculations, determinations or interpretations in respect of an Efficient Plus Index, then the Index Calculation Agent may, if practicable and if the Index Calculation Agent determines in good faith that such correction, error or omission (as the case may be) is material, adjust or correct the relevant calculation, determination or interpretation and/or the Index Level as of any Index Business Day to take into account any such correction, error or omission (as the case may be).

Definitions

Terms not otherwise defined herein, shall have the following meanings:

“Affected Basket Constituent”	has the meaning given to such term in Section 11.1.
“Affected Monthly Re-weighting Date”	has the meaning given to such term in Section 11.2.
“Average Daily Trading Volume”	means, with respect to an ETF Constituent and an Index Business Day, the product of (a) the ratio of (i) the total volume of trading in the securities of such ETF Constituent on all U.S. exchanges from but excluding the calendar day 6 months prior to such Index Business Day, to and including such Index Business Day, as reported by Bloomberg using the function Bloomberg Ticker US Equity HP or another information provider selected by the Index Calculation Agent, divided by (ii) the total number of Index Business Days from but excluding the calendar day 6 months prior to such Index Business Day, to and including such Index Business Day, times (b) the Closing Level of such ETF Constituent on such Index Business Day. The Average Daily Trading Volume for each ETF Constituent on December 31, 2014 is provided in Schedule 2 to this Part A.
“Base Date”	means the date specified in Section 7 (<i>Initial Composition of the Efficiente Plus Indices</i>).
“Basket Constituent”	has the meaning given to such term in Section 6 (<i>The Basket Constituents</i>), subject to the provisions of Section 12 (<i>Extraordinary Events</i>).
“Basket Constituent Weight”	for any Basket Constituent, has the meaning given to such term in Section 6 (<i>The Basket Constituents</i>).
“Cash Constituent”	means the J.P. Morgan Fallback Cash Index or any successor or substitute determined pursuant to Section 12 (<i>Extraordinary Events</i>).
“Change in Law”	has the meaning given to such term in Section 12 (<i>Extraordinary Events</i>).
“Closing Level”	means, subject to the provisions of Section 11 (<i>Market Disruption</i>) and Section 12 (<i>Extraordinary Events</i>), (a) in respect of a Basket Constituent that is an index, including the Cash Constituent, and a Dealing Day, (i) the official closing level of such Basket Constituent published by the relevant sponsor of such Basket Constituent for such Dealing Day; <i>provided, however</i> that if the Index Calculation Agent determines that such official closing level reflects manifest error on the part of the relevant sponsor of such Basket Constituent, the Index Calculation Agent shall determine the closing level of such Basket Constituent in good faith and in a commercially reasonable manner or (ii) in such circumstances as set out in the definition of Commodity Index Non-Publication Event relating to the calculation of a Proxy Calculated Level, the Proxy Calculated Level, and (b) in respect of an ETF Constituent, and a Dealing Day, the official closing price of the regular trading session on such Dealing Day on the primary exchange in the United States on which such ETF Constituent is listed.

"Closing Time"	means, for an Index Business Day, the scheduled closing time of the regular trading session for NYSE Arca.
"Closing TR Level"	means, in respect of an ETF Constituent and a Dealing Day, as defined in Section 8.2 (<i>Identifying the Unique Portfolio for Each Performance Observation Period</i>).
"Commodity Disruption Event"	has the meaning given to such term in Section 11.4 (<i>Definitions Related to Market Disruption</i>).
"Commodity Index Non-Publication Event"	has the meaning given to such term in Section 11.4 (<i>Definitions Related to Market Disruption</i>).
"Daily Series Index"	has the meaning given to such term in Section 4 (<i>General Notes on the Efficiente Plus Indices</i>).
"Dealing Day"	means either: (a) in respect of any Basket Constituent that is an index, including the Cash Constituent, a day on which the Closing Level for that Basket Constituent is (or, but for the occurrence of a Market Disruption Event, would have been) scheduled to be calculated and published by the relevant sponsor of such Basket Constituent; or (b) in respect of an ETF Constituent, a day on which the primary exchange in the United States on which such ETF Constituent is listed is scheduled to be open for trading for its regular trading session.
"Disrupted Day"	has the meaning given to such term in Section 11.4 (<i>Definitions Related to Market Disruption</i>).
"Effective Monthly Re-weighting Date"	means (i) a scheduled Monthly Re-weighting Date that occurs as originally scheduled (and is not postponed pursuant to Section 11.2) or (ii) a Postponed Monthly Re-weighting Date.
"Eligible Portfolio"	has the meaning given to such term in Section 8.4 (<i>Eligible Portfolios & Weighting Constraints</i>).
"Equity Index Disruption Event"	has the meaning given to such term in Section 11.4 (<i>Definitions Related to Market Disruption</i>).
"ETF"	means an exchange-traded fund listed on a U.S. securities exchange.
"ETF Constituent"	has the meaning given to such term in Section 4 (<i>General Notes on the Efficiente Plus Indices</i>).
"Efficiente Plus Index"	means each index included in the J.P. Morgan Efficiente Plus Index Series.
"ETF Material Event"	has the meaning given to such term in Section 12 (<i>Extraordinary Events</i>).
"ETF Regulatory Action"	has the meaning given to such term in Section 12 (<i>Extraordinary Events</i>).
"ETF Disruption Event"	has the meaning given to such term in Section 11.4 (<i>Definitions Related to Market Disruption</i>).

“Ex-Distribution Date”	means, with respect to a distribution for an ETF Constituent, the first trading day on which transactions in the securities of such ETF Constituent trade on the relevant primary exchange without the right to receive that distribution.
“Exposure”	has the meaning given to such term in Section 10.4 (<i>Exposure Calculation</i>).
“Extraordinary Event”	has the meaning given to such term in Section 12 (<i>Extraordinary Events</i>).
“Fee”	means the Fee specified in the applicable Module for the applicable Efficiente Plus Index.
“Final Disruption Determination Date”	has the meaning given to such term in Section 11.3 (<i>Exposure Determination and Calculation of Index Levels in Connection with Market Disruption</i>).
“Gross Distribution Amount”	means, in respect of an ETF Constituent and an Ex-Distribution Date for such ETF Constituent, 100% of the amount of any distribution per share or security of the ETF Constituent that a shareholder or securityholder in that ETF Constituent on that Ex-Distribution Date would no longer have the right to receive due to the occurrence of such Ex-Distribution Date, as determined by the Index Calculation Agent in its sole discretion as the sum of (x) the amount of any cash distribution made and (y) the fair market value of any distribution of shares of capital stock, evidences of indebtedness or other assets or property of such ETF Constituent or its issuer (other than share dividends or distributions referred to in Section 12.2(b) (<i>Anti-Dilution Adjustments: Share Dividends or Distributions</i>)). If a portion of such distribution consists of property traded on the Ex-Distribution Date on a U.S. national securities exchange, the fair market value of such portion will equal the closing price of such distributed property on such Ex-Distribution Date.
“Index Business Day”	means a day (i) on which NYSE Arca is scheduled to open for trading for its regular trading session and (ii) that is a Dealing Day for all of the Basket Constituents.
“Index Calculation Agent”	has the meaning given to such term in Section 5 (<i>Index Calculation Agent</i>).
“Index Level”	has the meaning given to such term in Section 4 (<i>General Notes on the Efficiente Plus Indices</i>).
“Index Rules”	means the rules of the J.P. Morgan Efficiente Plus Index Series as set out in this document, as the same may be supplemented, amended or restated from time to time.
“JPMS LLC”	means J.P. Morgan Securities LLC.
“Market Capitalization”	means, with respect to an ETF Constituent and an Index Business Day, the market capitalization of the ETF Constituent as provided by Bloomberg on the “DES” page or by another information provider

selected by the Index Calculation Agent for such ETF Constituent on such Index Business Day. The Market Capitalization for each ETF Constituent on December 31, 2014 is provided in Schedule 2 to this Part A.

"Market Disruption Event"	has the meaning given to such term in Section 11.4 (<i>Definitions Related to Market Disruption</i>).
"MLP"	means interests in a master limited partnership listed on a U.S. securities exchange.
"Module"	has the meaning given to such term in Section 1 (<i>Introduction</i>).
"Monthly Basket Constituent Weights"	has the meaning given to such term in Section 8 (<i>Determining the Monthly Basket Constituent Weights for the Basket Constituents in the Monthly Reference Portfolio</i>).
"Monthly Reference Portfolio"	has the meaning given to such term in Section 10.1 (<i>The Monthly Reference Portfolios</i>).
"Monthly Re-weighting Date"	has the meaning given to such term in Section 4 (<i>General Notes on the Efficiente Plus Indices</i>) and is subject to the provisions of Section 11.2.
"Monthly Re-weighting Period"	means, for a given calendar month, the period of Index Business Days from and including the first scheduled Monthly Re-weighting Date for such calendar month to and including the final Effective Monthly Re-weighting Date for such calendar month.
"Monthly Re-weighting Selection Date"	has the meaning given to such term in Section 4 (<i>General Notes on the Efficiente Plus Indices</i>).
"Next Monthly Reference Portfolio"	has the meaning given to such term in Section 9 (<i>Efficiente Plus Index Monthly Rebalancing</i>).
"Performance"	means, in respect of an Eligible Portfolio and a Performance Observation Period, the performance of such Eligible Portfolio over such Performance Observation Period, as determined by the Index Calculation Agent in accordance with Section 8 (<i>Determining the Monthly Basket Constituent Weights for the Basket Constituents in the Monthly Reference Portfolio</i>).
"Performance Observation Period"	has the meaning given to such term in Section 8.1 (<i>Identifying the Performance Observation Periods</i>).
"Portfolio Disruption Day"	has the meaning given to such term in Section 11.4 (<i>Definitions Related to Market Disruption</i>).
"Portfolio Disruption Determination Date"	has the meaning given to such term in Section 11.3 (<i>Definitions Related to Market Disruption</i>).
"Postponed Monthly Re-weighting Date"	has the meaning given to such term in Section 11.2 (<i>Market Disruption on a Monthly Re-weighting Date</i>).
"Prior Dealing Day"	has the meaning given to such term in Section 8.2 (<i>Identifying the Unique Portfolio for each Performance Observation Period</i>).

"Prior Monthly Reference Portfolio"	has the meaning given to such term in Section 9 (<i>Efficiente Plus Index Monthly Rebalancing</i>).
"Prior Non-Disrupted Dealing Day"	has the meaning given to such term in Section 8.2 (<i>Identifying the Unique Portfolio for each Performance Observation Period</i>).
"Proxy Calculated Level"	has the meaning given to such term in Section 11.4 (<i>Definitions Related to Market Disruption</i>).
"Realized Volatility"	means, in respect of an Eligible Portfolio and a Performance Observation Period, the annualized realized volatility of such Eligible Portfolio over such Performance Observation Period, as determined by the Index Calculation Agent pursuant to Section 8.2 (<i>Identifying the Unique Portfolio for each Performance Observation Period</i>).
"Reference Commodity"	means with respect to an ETF Constituent, each commodity underlying such ETF Constituent.
"Reference Index"	means with respect to an ETF Constituent, the index, if applicable, whose performance such ETF Constituent attempts to track. The Reference Index for each ETF Constituent on December 31, 2014 is provided in Schedule 2 to this Part A.
"REIT"	means interests in a real estate investment trust listed on a U.S. securities exchange.
"Related Exchange"	means, in respect of any ETF Constituent, each exchange or quotation system, if any, specified as such in Table 1 (above in Section 6 (<i>The Basket Constituents</i>)), any successor to such exchange or quotation system or any substitute exchange or quotation system to which trading in futures or options contracts relating to the ETF Constituent has temporarily relocated (<i>provided that</i> the Index Calculation Agent has determined that there is comparable liquidity relative to the futures or options contracts relating to the ETF Constituent on such temporary substitute exchange or quotation system as on the original Related Exchange), <i>provided, however</i> , that where "All Exchanges" is specified as the Related Exchange, "Related Exchange" shall mean each exchange or quotation system (as determined by the Index Calculation Agent) where trading has a material effect (as determined by the Index Calculation Agent) on the overall market for futures or options contracts relating to the ETF Constituent.
"Relevant Person"	has the meaning given to such term in Section 3 (<i>Responsibility</i>).
"Relevant Underlying"	has the meaning given to such term in Section 12 (<i>Extraordinary Events</i>).
"Re-weighting Disruption Determination Date"	has the meaning given to such term in Section 11.2 (<i>Market Disruption on a Monthly Re-weighting Date</i>).
"SEC"	has the meaning given to such term in Section 12 (<i>Extraordinary Events</i>).

“Specified Indebtedness”	has the meaning given to such term in Section 12 (<i>Extraordinary Events</i>).
“Start Date”	for each Efficiente Plus Index, has the meaning given to such term in the applicable Module.
“Starting Re-weighting Period”	has the meaning given to such term in Section 7 (<i>Initial Composition of the Efficiente Plus Indices</i>).
“Starting Selection Date”	has the meaning given to such term in Section 7 (<i>Initial Composition of the Efficiente Plus Indices</i>).
“Target Volatility”	has the meaning given to such term in Section 4 (<i>General Notes on the Efficiente Plus Indices</i>) and is specified in the applicable Module, subject to adjustment in accordance with Section 8.2(f).
“Trading Day”	for any Efficiente Plus Index, means a day that is: (i) an Index Business Day that (x) occurs during the period from but excluding the final Effective Monthly Re-weighting Date in a given Monthly Re-weighting Period to but excluding the first Effective Monthly Re-weighting Date in the immediately following Monthly Re-weighting Period and (y) is not a Portfolio Disruption Day, (ii) an Index Business Day that is an Effective Monthly Re-weighting Date, or (iii) an Index Business Day that is a Portfolio Disruption Determination Date.
“Trust Issuer”	has the meaning given to such term in Section 12 (<i>Extraordinary Events</i>).
“Underlying Portfolio Volatility”	has the meaning given to such term in Section 10.3 (<i>Determining the Underlying Portfolio Volatility</i>).
“Unique Portfolio”	has the meaning given to such term in Section 8.2 (<i>Identifying the Unique Portfolio for Each Performance Observation Period</i>).
“Volatility Measurement Period”	has the meaning given to such term in Section 10.3 (<i>Determining the Underlying Portfolio Volatility</i>).
“Volatility Measurement Start Date”	has the meaning given to such term in Section 10.3 (<i>Determining the Underlying Portfolio Volatility</i>).
“Weekday”	means any day other than a Saturday or a Sunday.
“Weighting Constraints”	has the meaning given to such term in Section 8.4 (<i>Eligible Portfolios & Weighting Constraints</i>) and are detailed in the applicable Module for the applicable Efficiente Plus Index.

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Schedule 1:**The indices composing the J.P. Morgan Efficiente Plus Index Series:**

Table A below of this Schedule 1 sets out the name of each index in the J.P. Morgan Efficiente Plus Index Series. The relevant parameters for each Efficiente Plus Index are provided in the applicable Module.

Table A

Name	Ticker
J.P. Morgan Efficiente Plus 5 Index (Gross ER)	EFPLUS5B
J.P. Morgan Efficiente Plus 5 Index (Net ER)	EFPLUS5E
J.P. Morgan Efficiente Plus DS 5 Index (Gross ER)	EFPLUS5G
J.P. Morgan Efficiente Plus DS 5 Index (Net ER)	EFPLUS5D
J.P. Morgan Efficiente Plus 5 Index (Gross TR)	EFPLUS5T
J.P. Morgan Efficiente Plus 8 Index (Gross ER)	EFPLUS8B
J.P. Morgan Efficiente Plus 8 Index (Net ER)	EFPLUS8E
J.P. Morgan Efficiente Plus DS 8 Index (Gross ER)	EFPLUS8G
J.P. Morgan Efficiente Plus DS 8 Index (Net ER)	EFPLUS8D
J.P. Morgan Efficiente Plus 8 Index (Gross TR)	EFPLUS8T
J.P. Morgan Efficiente Plus 10 Index (Gross ER)	EFPLUSTB
J.P. Morgan Efficiente Plus 10 Index (Net ER)	EFPLUSTE
J.P. Morgan Efficiente Plus DS 10 Index (Gross ER)	EFPLUSTG
J.P. Morgan Efficiente Plus DS 10 Index (Net ER)	EFPLUSTD
J.P. Morgan Efficiente Plus 10 Index (Gross TR)	EFPLUSTT

This table may be amended from time to time to add additional Efficiente Plus Indices.

Schedule 2:

Appendix: ETF Constituent Name, Bloomberg Ticker, Reference Index or Reference Commodity, Average Daily Trading Volume and Market Capitalization (on December 31, 2014 in the case of i= 1-17, 19 and 20 or on February 25, 2020 in the case of i=18)

i	ETF Constituent Name	Bloomberg Ticker	Reference Index (in the case of i=1 to 19) or Reference Commodity (in the case of i=20) on December 31, 2014	Average Daily Trading Volume (\$MM*)	Market Capitalization (\$MM*)
1	Vanguard S&P 500 ETF	VOO	S&P 500® Index	270	27,518
2	Vanguard Small-Cap ETF	VB	CRSP U.S. Small Cap Index	51	9,814
3	Vanguard FTSE Developed Markets ETF	VEA	FTSE Developed ex North America Index	156	24,174
4	iShares® MSCI EAFE Small-Cap ETF	SCZ	MSCI EAFE Small Cap Index	23	3,615
5	Vanguard FTSE Emerging Markets ETF	VWO	FTSE Emerging Index	484	45,867
6	iShares® 20+ Year Treasury Bond ETF	TLT	Barclays U.S. 20+ Year Treasury Bond Index	978	6,447
7	iShares® 7-10 Year Treasury Bond ETF	IEF	Barclays U.S. 7-10 Year Treasury Bond Index	229	7,059
8	iShares® iBoxx \$ Investment Grade Corporate Bond ETF	LQD	Markit iBoxx® USD Liquid Investment Grade Index	217	19,344
9	iShares® TIPS Bond ETF	TIP	Barclays U.S. Treasury Inflation Protected Securities (TIPS) Index (Series-L)	69	12,288
10	Vanguard Short-Term Corporate Bond ETF	VCSH	Barclays U.S. 1–5 Year Corporate Bond Index	47	9,126
11	SPDR® Bloomberg High Yield Bond ETF	JNK	Barclays High Yield Very Liquid Index	250	9,653
12	PIMCO 0-5 Year High Yield Corporate Bond Index ETF	HYS	BofA Merrill Lynch 0-5 Year US High Yield Constrained Index	51	2,879
13	Invesco Senior Loan ETF	BKLN	S&P/LSTA U.S. Leveraged Loan 100 Index	74	5,714
14	iShares® Preferred and Income Securities ETF	PFF	S&P U.S. Preferred Stock Index™	71	11,692

15	iShares® J.P. Morgan USD Emerging Markets Bond ETF	EMB	J.P. Morgan EMBI SM Global Core Index	103	4,388
16	Vanguard Real Estate ETF	VNQ	MSCI US REIT Index	270	27,111
17	VanEck Gold Miners ETF	GDX	NYSE Arca Gold Miners Index	853	5,482
18	Alerian MLP ETF	AML	Alerian MLP Infrastructure Index	175	6,892
19	Invesco DB Commodity Index Tracking Fund	DBC	DBIQ Optimum Yield Diversified Commodity Index Excess Return TM	43	4,048
20	iShares® Gold Trust	IAU	Gold	38	6,125

* Numbers have been rounded to the nearest \$1 MM

Part B

PARAMETERS FOR EACH OF THE EFFICIENTE PLUS INDICES IN THE J.P. MORGAN EFFICIENTE PLUS INDEX SERIES

MODULE B1: J.P. MORGAN EFFICIENTE PLUS 5 INDEX (GROSS ER)

This index was terminated as of December 20, 2021.

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MODULE B2: J.P. MORGAN EFFICIENTE PLUS 5 INDEX (NET ER)

Name	J.P. Morgan Efficiente Plus 5 Index (Net ER)
Bloomberg Ticker	EFPLUS5E
Start Date	December 31, 2014
Index Level on the Start Date	156.85
Target Volatility	5.00%
Exposure on the Start Date	100.00%
Daily Series Applicability	Not Applicable
Return Type	Excess Return
Fee	0.85% per annum
Monthly Re-weighting Selection Date	For any Monthly Re-weighting Period, the day that is two Index Business Days immediately preceding the first scheduled Monthly Re-weighting Date in such Monthly Re-weighting Period
Monthly Re-weighting Dates	For any Monthly Re-weighting Period, the period of five consecutive Index Business Days from and including the first Index Business Day of each calendar month
Weighting Constraints	<p>(i) The minimum possible Monthly Basket Constituent Weight assigned to any Basket Constituent is zero percent (0%);</p> <p>(ii) The Monthly Basket Constituent Weight assigned to each Basket Constituent is an integral multiple of five percent (5%);</p> <p>(iii) The maximum possible Monthly Basket Constituent Weight assigned to (x) the Cash Constituent is fifty percent (50%), (y) each Basket Constituent numbered 1, 3, 5, 6, 7, 8, 11 or 17 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) is twenty percent (20%), and (z) any other Basket Constituent is ten percent (10%);</p> <p>(iv) The sum of the Monthly Basket Constituent Weights assigned to the Basket Constituents numbered 1 through 5 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) shall not be greater than fifty per cent (50%). For the avoidance of doubt, the sum of the Monthly Basket Constituent Weights assigned to the Vanguard S&P 500 ETF, the Vanguard Small-Cap ETF, the Vanguard FTSE Developed Markets ETF, the iShares® MSCI EAFE Small-Cap ETF and the Vanguard FTSE Emerging Markets ETF shall not be greater than fifty percent (50%);</p> <p>(v) The sum of the Monthly Basket Constituent Weights assigned to the Basket Constituents numbered 6 through 10 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) shall not be greater than fifty per cent (50%). For the avoidance of doubt, the sum of the Monthly Basket Constituent Weights assigned to the iShares® 20+ Year Treasury Bond ETF, the iShares® 7-10 Year Treasury Bond ETF, the iShares® iBoxx \$ Investment Grade Corporate Bond ETF, the iShares® TIPS Bond ETF and the Vanguard Short-Term Corporate Bond ETF shall not be greater than fifty per cent (50%);</p> <p>(vi) The sum of the Monthly Basket Constituent Weights assigned to the Basket Constituents numbered 11 through 15 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) shall not be greater than fifty per cent (50%). For the avoidance of doubt, the sum of the Monthly Basket Constituent Weights assigned</p>

	<p>to the SPDR® Bloomberg High Yield Bond ETF, the PIMCO 0-5 Year High Yield Corporate Bond Index ETF, the Invesco Senior Loan ETF, the iShares® Preferred and Income Securities ETF and the iShares® J.P. Morgan USD Emerging Markets Bond ETF shall not be greater than fifty per cent (50%);</p> <p>(vii) The sum of the Monthly Basket Constituent Weights assigned to the Basket Constituents numbered 16 through 20 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) shall not be greater than fifty per cent (50%). For the avoidance of doubt, the sum of the Monthly Basket Constituent Weights assigned to the Vanguard Real Estate ETF, the VanEck Gold Miners ETF, the Alerian MLP ETF, the Invesco DB Commodity Index Tracking Fund and the iShares® Gold Trust shall not be greater than fifty per cent (50%);</p> <p>(viii) The sum of the Monthly Basket Constituent Weights assigned to the Basket Constituents numbered 6 through 10 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) and the Monthly Basket Constituent Weight assigned to the Cash Constituent shall not be greater than seventy-five per cent (75%). For the avoidance of doubt, the sum of the Monthly Basket Constituent Weights assigned to the iShares® 20+ Year Treasury Bond ETF, the iShares® 7-10 Year Treasury Bond ETF, the iShares® iBoxx \$ Investment Grade Corporate Bond ETF, the iShares® TIPS Bond ETF, the Vanguard Short-Term Corporate Bond ETF and the Cash Constituent shall not be greater than seventy-five per cent (75%); and</p> <p>(ix) The sum of the Monthly Basket Constituent Weights assigned to all the Basket Constituents shall be equal to one hundred per cent (100%).</p> <p>Consequently, as long as Weighting Constraints (i) through (ix) above are satisfied, (a) the Monthly Basket Constituent Weight assigned to each Basket Constituent numbered 1, 3, 5, 6, 7, 8, 11 or 17 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) in an Eligible Portfolio may be any of 0%, 5%, 10%, 15% or 20%; (b) the Monthly Basket Constituent Weight assigned to each Basket Constituent numbered 2, 4, 9, 10, 12, 13, 14, 15, 16, 18, 19 or 20 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) may be any of 0%, 5% or 10%; and (c) the Monthly Basket Constituent Weight assigned to the Cash Constituent may be any of 0%, 5%, 10%, 15%, 20%, 25%, 30%, 35%, 40%, 45% or 50%.</p>
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MODULE B3: J.P. MORGAN EFFICIENTE PLUS DS 5 INDEX (GROSS ER)

Name	J.P. Morgan Efficiente Plus DS 5 Index (Gross ER)
Bloomberg Ticker	EFPLUS5G
Start Date	December 31, 2014
Index Level on the Start Date	169.28
Target Volatility	5.00%
Exposure on the Start Date	73.8593935381824%
Daily Series Applicability	Applicable
Return Type	Excess Return
Fee	0.00% per annum
Monthly Re-weighting Selection Date	For any Monthly Re-weighting Period, the day that is two Index Business Days immediately preceding the first scheduled Monthly Re-weighting Date in such Monthly Re-weighting Period
Monthly Re-weighting Dates	For any Monthly Re-weighting Period, the period of five consecutive Index Business Days from and including the first Index Business Day of each calendar month
Weighting Constraints	<p>(i) The minimum possible Monthly Basket Constituent Weight assigned to any Basket Constituent is zero percent (0%);</p> <p>(ii) The Monthly Basket Constituent Weight assigned to each Basket Constituent is an integral multiple of five percent (5%);</p> <p>(iii) The maximum possible Monthly Basket Constituent Weight assigned to (x) the Cash Constituent is fifty percent (50%), (y) each Basket Constituent numbered 1, 3, 5, 6, 7, 8, 11 or 17 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) is twenty percent (20%), and (z) any other Basket Constituent is ten percent (10%);</p> <p>(iv) The sum of the Monthly Basket Constituent Weights assigned to the Basket Constituents numbered 1 through 5 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) shall not be greater than fifty per cent (50%). For the avoidance of doubt, the sum of the Monthly Basket Constituent Weights assigned to the Vanguard S&P 500 ETF, the Vanguard Small-Cap ETF, the Vanguard FTSE Developed Markets ETF, the iShares® MSCI EAFE Small-Cap ETF and the Vanguard FTSE Emerging Markets ETF shall not be greater than fifty percent (50%);</p> <p>(v) The sum of the Monthly Basket Constituent Weights assigned to the Basket Constituents numbered 6 through 10 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) shall not be greater than fifty per cent (50%). For the avoidance of doubt, the sum of the Monthly Basket Constituent Weights assigned to the iShares® 20+ Year Treasury Bond ETF, the iShares® 7-10 Year Treasury Bond ETF, the iShares® iBoxx \$ Investment Grade Corporate Bond ETF, the iShares® TIPS Bond ETF and the Vanguard Short-Term Corporate Bond ETF shall not be greater than fifty per cent (50%);</p> <p>(vi) The sum of the Monthly Basket Constituent Weights assigned to the Basket Constituents numbered 11 through 15 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) shall not be greater than fifty per cent (50%). For the avoidance of doubt, the sum of the Monthly Basket Constituent Weights assigned</p>

	<p>to the SPDR® Bloomberg High Yield Bond ETF, the PIMCO 0-5 Year High Yield Corporate Bond Index ETF, the Invesco Senior Loan ETF, the iShares® Preferred and Income Securities ETF and the iShares® J.P. Morgan USD Emerging Markets Bond ETF shall not be greater than fifty per cent (50%);</p> <p>(vii) The sum of the Monthly Basket Constituent Weights assigned to the Basket Constituents numbered 16 through 20 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) shall not be greater than fifty per cent (50%). For the avoidance of doubt, the sum of the Monthly Basket Constituent Weights assigned to the Vanguard Real Estate ETF, the VanEck Gold Miners ETF, the Alerian MLP ETF, the Invesco DB Commodity Index Tracking Fund and the iShares® Gold Trust shall not be greater than fifty per cent (50%);</p> <p>(viii) The sum of the Monthly Basket Constituent Weights assigned to the Basket Constituents numbered 6 through 10 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) and the Monthly Basket Constituent Weight assigned to the Cash Constituent shall not be greater than seventy-five per cent (75%). For the avoidance of doubt, the sum of the Monthly Basket Constituent Weights assigned to the iShares® 20+ Year Treasury Bond ETF, the iShares® 7-10 Year Treasury Bond ETF, the iShares® iBoxx \$ Investment Grade Corporate Bond ETF, the iShares® TIPS Bond ETF, the Vanguard Short-Term Corporate Bond ETF and the Cash Constituent shall not be greater than seventy-five per cent (75%); and</p> <p>(ix) The sum of the Monthly Basket Constituent Weights assigned to all the Basket Constituents shall be equal to one hundred per cent (100%).</p> <p>Consequently, as long as Weighting Constraints (i) through (ix) above are satisfied, (a) the Monthly Basket Constituent Weight assigned to each Basket Constituent numbered 1, 3, 5, 6, 7, 8, 11 or 17 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) in an Eligible Portfolio may be any of 0%, 5%, 10%, 15% or 20%; (b) the Monthly Basket Constituent Weight assigned to each Basket Constituent numbered 2, 4, 9, 10, 12, 13, 14, 15, 16, 18, 19 or 20 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) may be any of 0%, 5% or 10%; and (c) the Monthly Basket Constituent Weight assigned to the Cash Constituent may be any of 0%, 5%, 10%, 15%, 20%, 25%, 30%, 35%, 40%, 45% or 50%.</p>
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MODULE B4: J.P. MORGAN EFFICIENTE PLUS DS 5 INDEX (NET ER)

Name	J.P. Morgan Efficiente Plus DS 5 Index (Net ER)
Bloomberg Ticker	EFPLUS5D
Start Date	December 31, 2014
Index Level on the Start Date	159.14
Target Volatility	5.00%
Exposure on the Start Date	73.8593935381824%
Daily Series Applicability	Applicable
Return Type	Excess Return
Fee	0.85% per annum
Monthly Re-weighting Selection Date	For any Monthly Re-weighting Period, the day that is two Index Business Days immediately preceding the first scheduled Monthly Re-weighting Date in such Monthly Re-weighting Period
Monthly Re-weighting Dates	For any Monthly Re-weighting Period, the period of five consecutive Index Business Days from and including the first Index Business Day of each calendar month
Weighting Constraints	<p>(i) The minimum possible Monthly Basket Constituent Weight assigned to any Basket Constituent is zero percent (0%);</p> <p>(ii) The Monthly Basket Constituent Weight assigned to each Basket Constituent is an integral multiple of five percent (5%);</p> <p>(iii) The maximum possible Monthly Basket Constituent Weight assigned to (x) the Cash Constituent is fifty percent (50%), (y) each Basket Constituent numbered 1, 3, 5, 6, 7, 8, 11 or 17 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) is twenty percent (20%), and (z) any other Basket Constituent is ten percent (10%);</p> <p>(iv) The sum of the Monthly Basket Constituent Weights assigned to the Basket Constituents numbered 1 through 5 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) shall not be greater than fifty per cent (50%). For the avoidance of doubt, the sum of the Monthly Basket Constituent Weights assigned to the Vanguard S&P 500 ETF, the Vanguard Small-Cap ETF, the Vanguard FTSE Developed Markets ETF, the iShares® MSCI EAFE Small-Cap ETF and the Vanguard FTSE Emerging Markets ETF shall not be greater than fifty percent (50%);</p> <p>(v) The sum of the Monthly Basket Constituent Weights assigned to the Basket Constituents numbered 6 through 10 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) shall not be greater than fifty per cent (50%). For the avoidance of doubt, the sum of the Monthly Basket Constituent Weights assigned to the iShares® 20+ Year Treasury Bond ETF, the iShares® 7-10 Year Treasury Bond ETF, the iShares® iBoxx \$ Investment Grade Corporate Bond ETF, the iShares® TIPS Bond ETF and the Vanguard Short-Term Corporate Bond ETF shall not be greater than fifty per cent (50%);</p> <p>(vi) The sum of the Monthly Basket Constituent Weights assigned to the Basket Constituents numbered 11 through 15 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) shall not be greater than fifty per cent (50%). For the avoidance of doubt, the sum of the Monthly Basket Constituent Weights assigned</p>

	<p>to the SPDR® Bloomberg High Yield Bond ETF, the PIMCO 0-5 Year High Yield Corporate Bond Index ETF, the Invesco Senior Loan ETF, the iShares® Preferred and Income Securities ETF and the iShares® J.P. Morgan USD Emerging Markets Bond ETF shall not be greater than fifty per cent (50%);</p> <p>(vii) The sum of the Monthly Basket Constituent Weights assigned to the Basket Constituents numbered 16 through 20 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) shall not be greater than fifty per cent (50%). For the avoidance of doubt, the sum of the Monthly Basket Constituent Weights assigned to the Vanguard Real Estate ETF, the VanEck Gold Miners ETF, the Alerian MLP ETF, the Invesco DB Commodity Index Tracking Fund and the iShares® Gold Trust shall not be greater than fifty per cent (50%);</p> <p>(viii) The sum of the Monthly Basket Constituent Weights assigned to the Basket Constituents numbered 6 through 10 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) and the Monthly Basket Constituent Weight assigned to the Cash Constituent shall not be greater than seventy-five per cent (75%). For the avoidance of doubt, the sum of the Monthly Basket Constituent Weights assigned to the iShares® 20+ Year Treasury Bond ETF, the iShares® 7-10 Year Treasury Bond ETF, the iShares® iBoxx \$ Investment Grade Corporate Bond ETF, the iShares® TIPS Bond ETF, the Vanguard Short-Term Corporate Bond ETF and the Cash Constituent shall not be greater than seventy-five per cent (75%); and</p> <p>(ix) The sum of the Monthly Basket Constituent Weights assigned to all the Basket Constituents shall be equal to one hundred per cent (100%).</p> <p>Consequently, as long as Weighting Constraints (i) through (ix) above are satisfied, (a) the Monthly Basket Constituent Weight assigned to each Basket Constituent numbered 1, 3, 5, 6, 7, 8, 11 or 17 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) in an Eligible Portfolio may be any of 0%, 5%, 10%, 15% or 20%; (b) the Monthly Basket Constituent Weight assigned to each Basket Constituent numbered 2, 4, 9, 10, 12, 13, 14, 15, 16, 18, 19 or 20 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) may be any of 0%, 5% or 10%; and (c) the Monthly Basket Constituent Weight assigned to the Cash Constituent may be any of 0%, 5%, 10%, 15%, 20%, 25%, 30%, 35%, 40%, 45% or 50%.</p>
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MODULE B5: J.P. MORGAN EFFICIENTE PLUS 5 INDEX (GROSS TR)

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MODULE B6: J.P. MORGAN EFFICIENTE PLUS 8 INDEX (GROSS ER)

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MODULE B7: J.P. MORGAN EFFICIENTE PLUS 8 INDEX (NET ER)

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MODULE B8: J.P. MORGAN EFFICIENTE PLUS DS 8 INDEX (GROSS ER)

This index was terminated as of December 20, 2021.

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MODULE B9: J.P. MORGAN EFFICIENTE PLUS DS 8 INDEX (NET ER)

Name	J.P. Morgan Efficiente Plus DS 8 Index (Net ER)
Bloomberg Ticker	EFPLUS8D
Start Date	December 31, 2014
Index Level on the Start Date	160.05
Target Volatility	8.00%
Exposure on the Start Date	96.6433642715798%
Daily Series Applicability	Applicable
Return Type	Excess Return
Fee	0.85% per annum
Monthly Re-weighting Selection Date	For any Monthly Re-weighting Period, the day that is two Index Business Days immediately preceding the first scheduled Monthly Re-weighting Date in such Monthly Re-weighting Period
Monthly Re-weighting Dates	For any Monthly Re-weighting Period, the period of five consecutive Index Business Days from and including the first Index Business Day of each calendar month
Weighting Constraints	<p>(i) The minimum possible Monthly Basket Constituent Weight assigned to any Basket Constituent is zero percent (0%);</p> <p>(ii) The Monthly Basket Constituent Weight assigned to each Basket Constituent is an integral multiple of five percent (5%);</p> <p>(iii) The maximum possible Monthly Basket Constituent Weight assigned to (x) the Cash Constituent is fifty percent (50%), (y) each Basket Constituent numbered 1, 3, 5, 6, 7, 8, 11 or 17 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) is twenty percent (20%), and (z) any other Basket Constituent is ten percent (10%);</p> <p>(iv) The sum of the Monthly Basket Constituent Weights assigned to the Basket Constituents numbered 1 through 5 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) shall not be greater than fifty per cent (50%). For the avoidance of doubt, the sum of the Monthly Basket Constituent Weights assigned to the Vanguard S&P 500 ETF, the Vanguard Small-Cap ETF, the Vanguard FTSE Developed Markets ETF, the iShares® MSCI EAFE Small-Cap ETF and the Vanguard FTSE Emerging Markets ETF shall not be greater than fifty percent (50%);</p> <p>(v) The sum of the Monthly Basket Constituent Weights assigned to the Basket Constituents numbered 6 through 10 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) shall not be greater than fifty per cent (50%). For the avoidance of doubt, the sum of the Monthly Basket Constituent Weights assigned to the iShares® 20+ Year Treasury Bond ETF, the iShares® 7-10 Year Treasury Bond ETF, the iShares® iBoxx \$ Investment Grade Corporate Bond ETF, the iShares® TIPS Bond ETF and the Vanguard Short-Term Corporate Bond ETF shall not be greater than fifty per cent (50%);</p> <p>(vi) The sum of the Monthly Basket Constituent Weights assigned to the Basket Constituents numbered 11 through 15 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) shall not be greater than fifty per cent (50%). For the avoidance of doubt, the sum of the Monthly Basket Constituent Weights assigned</p>

	<p>to the SPDR® Bloomberg High Yield Bond ETF, the PIMCO 0-5 Year High Yield Corporate Bond Index ETF, the Invesco Senior Loan ETF, the iShares® Preferred and Income Securities ETF and the iShares® J.P. Morgan USD Emerging Markets Bond ETF shall not be greater than fifty per cent (50%);</p> <p>(vii) The sum of the Monthly Basket Constituent Weights assigned to the Basket Constituents numbered 16 through 20 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) shall not be greater than fifty per cent (50%). For the avoidance of doubt, the sum of the Monthly Basket Constituent Weights assigned to the Vanguard Real Estate ETF, the VanEck Gold Miners ETF, the Alerian MLP ETF, the Invesco DB Commodity Index Tracking Fund and the iShares® Gold Trust shall not be greater than fifty per cent (50%);</p> <p>(viii) The sum of the Monthly Basket Constituent Weights assigned to the Basket Constituents numbered 6 through 10 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) and the Monthly Basket Constituent Weight assigned to the Cash Constituent shall not be greater than seventy-five per cent (75%). For the avoidance of doubt, the sum of the Monthly Basket Constituent Weights assigned to the iShares® 20+ Year Treasury Bond ETF, the iShares® 7-10 Year Treasury Bond ETF, the iShares® iBoxx \$ Investment Grade Corporate Bond ETF, the iShares® TIPS Bond ETF, the Vanguard Short-Term Corporate Bond ETF and the Cash Constituent shall not be greater than seventy-five per cent (75%); and</p> <p>(ix) The sum of the Monthly Basket Constituent Weights assigned to all the Basket Constituents shall be equal to one hundred per cent (100%).</p> <p>Consequently, as long as Weighting Constraints (i) through (ix) above are satisfied, (a) the Monthly Basket Constituent Weight assigned to each Basket Constituent numbered 1, 3, 5, 6, 7, 8, 11 or 17 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) in an Eligible Portfolio may be any of 0%, 5%, 10%, 15% or 20%; (b) the Monthly Basket Constituent Weight assigned to each Basket Constituent numbered 2, 4, 9, 10, 12, 13, 14, 15, 16, 18, 19 or 20 in Table 1 (in Section 6 (<i>The Basket Constituents</i>) of Part A) may be any of 0%, 5% or 10%; and (c) the Monthly Basket Constituent Weight assigned to the Cash Constituent may be any of 0%, 5%, 10%, 15%, 20%, 25%, 30%, 35%, 40%, 45% or 50%.</p>
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MODULE B10: J.P. MORGAN EFFICIENTE PLUS 8 INDEX (GROSS TR)

This index was terminated as of December 20, 2021.

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MODULE B11: J.P. MORGAN EFFICIENTE PLUS 10 INDEX (GROSS ER)

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MODULE B12: J.P. MORGAN EFFICIENTE PLUS 10 INDEX (NET ER)

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MODULE B13: J.P. MORGAN EFFICIENTE PLUS DS 10 INDEX (GROSS ER)

This index was terminated as of December 20, 2021.

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MODULE B14: J.P. MORGAN EFFICIENTE PLUS DS 10 INDEX (NET ER)

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MODULE B15: J.P. MORGAN EFFICIENTE PLUS 10 INDEX (GROSS TR)

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Risk Factors

The following list of risk factors does not purport to be a complete enumeration or explanation of all the risks associated with an Efficiente Plus Index.

(a) Proprietary and Rules-Based Trading Index

An Efficiente Plus Index follows a notional rules-based proprietary trading strategy that operates on the basis of pre-determined rules. Accordingly, potential investors in financial products which are linked to the performance of an Efficiente Plus Index should determine whether those rules as described in the Index Rules of that Efficiente Plus Index are appropriate in light of their individual circumstances and investment objectives.

No assurance can be given that the investment strategy on which an Efficiente Plus Index is based will be successful or that such Efficiente Plus Index will outperform any alternative strategy that might be employed in respect of the Basket Constituents.

(b) Notional Exposures

An Efficiente Plus Index comprises notional assets and liabilities. The exposures to the Basket Constituents are purely notional and will exist solely in the records maintained by or on behalf of the Index Calculation Agent. Consequently, investors in financial products which are linked to the performance of an Efficiente Plus Index will not have any claim against any of the reference assets composing that Efficiente Plus Index. The strategy tracks the excess returns of a notional dynamic basket of assets over a cash investment and as such any allocation in the strategy to the Cash Constituent will result in this portion of the portfolio not being invested.

(c) Lack of Operating History

Each Efficiente Plus Index is only recently established and therefore has no history to evaluate its likely performance. Any back-testing or similar analysis performed by any person in respect of any Efficiente Plus Index must be considered illustrative only and may be based on estimates or assumptions not used by the Index Calculation Agent when determining the Index Level of that Efficiente Plus Index.

Past performance should not be considered indicative of future performance.

(d) Market Risks

The performance of an Efficiente Plus Index is dependent on the performance of the 21 Basket Constituents (which are currently composed of 20 ETF Constituents and the Cash Constituent). As a consequence, investors in financial products with returns linked to an Efficiente Plus Index should appreciate that their investment is exposed to the performance of the 21 Basket Constituents (which are composed of 20 ETF Constituents and the Cash Constituent).

(e) Momentum Investment Strategy

Each Efficiente Plus Index is constructed using what is generally known as a momentum investment strategy. Momentum investing generally seeks to capitalize on positive trends in the price of assets. Even when the Closing Levels of the Basket Constituents are trending downwards, the Efficiente Plus Index will continue to be composed of the 21 Basket Constituents (which are currently composed of 20 ETF Constituents and the Cash Constituent). Due to the “long-only” construction of each Efficiente Plus Index in respect of all Basket Constituents, the weight of each such Basket Constituent will not be set below zero even if the relevant Basket Constituent displayed a negative performance over the relevant Performance Observation Periods.

Furthermore, the results that may be obtained from investing in any security or other investment or transaction linked to an Efficient Plus Index may be significantly different from the results that could theoretically be obtained from investing in the Basket Constituents. Such differences may arise for a number of reasons including, but not limited to, the fees deducted from the Index Level (if any).

(f) Extraordinary Events

Following the occurrence of certain extraordinary events as described in Section 10 (*Extraordinary Events*) of the Index Rules, with respect to a Basket Constituent, the affected Basket Constituent may be replaced by a substitute Basket Constituent.

(g) Index Calculation Agent Discretion

The Index Rules of each Efficient Plus Index confer on the Index Calculation Agent discretion in making certain determinations, interpretations and calculations from time to time. The exercise of such discretion in the making of calculations, determinations and interpretations may adversely affect the performance of an Efficient Plus Index. Without limitation to the generality of the foregoing, the Index Calculation Agent has discretion in relation to the calculation of the Index Level in the event of a Market Disruption Event.

(h) Potential Conflicts of Interest

Potential conflicts of interest may exist in the structure and operation of each Efficient Plus Index and in the course of the normal business activities of J.P. Morgan or any of its affiliates or subsidiaries or their respective directors, officers, employees, representatives, delegates or agents. Further information is set out in the disclaimer below.

The foregoing list of risk factors is not intended to be exhaustive. All persons should seek such advice as they consider necessary from their professional advisors, legal, tax or otherwise, without reliance on the Index Calculation Agent or any of its affiliates or subsidiaries or any of their respective directors, officers, employees, representatives, delegates or agents.

Notices, Disclaimers and Conflicts of Interest

The Index Rules have been prepared solely for informational purposes and nothing in the Index Rules constitutes (i) an offer to buy or sell any securities, participate in any transaction or adopt any investment linked to an Efficiente Plus Index or (ii) legal, tax, regulatory, financial or accounting advice. The Index Rules may change at any time without prior notice.

Neither the Index Calculation Agent nor any of its affiliates or subsidiaries or their respective directors, officers, employees, representatives, delegates or agents (each a **"Relevant Person"**) make any representation or warranty, whatsoever, express or implied, as to the results that may be obtained through the use of this document or any Efficiente Plus Index. 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, 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 any Efficiente Plus Index or the Index Level.

During the course of their normal business, the Index Calculation Agent or any of the other Relevant Persons may (i) enter into or promote, offer or sell transactions or investments (structured or otherwise) linked to any Efficiente Plus Index and/or any of the Basket Constituents and/or (ii) act as an investment manager, investment advisor, administrator, custodian, prime broker or other service provider to any of the Basket Constituent. 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 any Efficiente Plus Index or any of the Basket Constituents, or may invest or engage in transactions with other persons, or on behalf of such persons relating to any of these items. Such activity may or may not have an impact on the Index Level but all persons reading this document should be aware that a conflict of interest could arise where anyone is acting in more than one capacity, and such conflict may have an impact, positive or negative, on the Index Level. Neither the Index Calculation Agent nor any other Relevant Person has any duty to consider the circumstances of any person when participating in such transactions or to conduct themselves in a manner that is favorable to anyone with exposure to any Efficiente Plus Index.

The Index Rules have been developed with the possibility of the Index Calculation Agent or any of the other Relevant Persons entering into or promoting, offering or selling transactions or investments (structured or otherwise) linked to any Efficiente Plus Index and hedging such transactions or investments in any manner that they see fit. Accordingly it should be assumed that the Index Rules have and will be analyzed from this point of view.

As mentioned above, each Efficiente Plus Index is described as a notional basket because there is no actual portfolio of assets to which any person is entitled or in which any person has any ownership interest. Each Efficiente Plus Index merely identifies certain reference assets, the performance of which will be used as a reference point for calculating the Index Level.

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

The Index Rules shall be governed by and construed in accordance with the laws of New York.

Index Disclaimers

JPMorgan Indices

The J.P. Morgan Fallback Cash Index (the “**Cash Constituent**”) is an index determined, composed and calculated by JPMS LLC without regard to the Efficiente Plus Index.

JPMS LLC has no obligation to take into account the interests of prospective investors in instruments linked to the Efficiente Plus Index when determining, composing or calculating the Cash Constituent and can at any time and in its sole discretion, modify or change the method of calculating such index or cease its calculation, publication or dissemination. Accordingly, actions and omissions of JPMS LLC may affect the value of the Cash Constituent and, consequently, the value of any instruments linked to the Efficiente Plus Index.

JPMS LLC does not make any warranty or representation whatsoever, express or implied, as to the results to be obtained from the use of the Cash Constituent, or as to the performance and/or the value thereof at any time (past, present or future).

Neither JPMS LLC nor the Index Calculation Agent (whether as a result of negligence or for any other reason) shall be liable to any investor in instruments linked to the Efficiente Plus Index for any error or omission in the calculation of the Cash Constituent or be under any obligation to advise any person of any error therein or to guarantee the performance and/or value of the Cash Constituent.

Furthermore, JPMS LLC does not make any representation or warranty, either express or implied, regarding any instruments linked to the Efficiente Plus Index, its performance (present or future) or suitability as an investment or any information supplied to any prospective investor in connection with it. JPMS LLC shall not have any obligation or liability to any prospective investor (whether as a result of negligence or for any other reason) in connection with any instruments linked to the Efficiente Plus Index, including without limitation the administration, marketing or trading thereof.

Investors in any instruments linked to the Efficiente Plus Index should also be aware that any entity within the JPMorgan Chase & Co. group (JPMorgan) is or may be, in respect of the securities comprised in the Cash Constituent, engaged in securities trading, securities brokerage and financing activities, as well as providing investment banking and financial advisory services. Accordingly, JPMorgan may at any time hold long or short positions, and may trade or otherwise effect transactions, for its own account or the accounts of its customers.

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J.P. Morgan is the marketing name for JPMorgan Chase & Co. and its subsidiaries and affiliates worldwide. J.P. Morgan Securities LLC is a member of FINRA and SIPC. The Index Sponsor owns all intellectual property rights in: (i) the development of and methodology for producing the Index, (ii) the Index Levels and (iii) these Index Rules. Third parties shall not use the Index Sponsor’s intellectual property without the prior written consent of the Index Sponsor (including in situations where a third party performs certain functions in relation to the Index).

ANNEX B

J.P. Morgan Fallback Cash Index Index Rules

J.P.Morgan

November 23, 2021

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PART A

THE J.P. MORGAN FALLBACK CASH INDEX INDEX RULES

1. Introduction

This document comprises the rules (as may be supplemented, amended or restated from time to time, the “**Index Rules**”) of the J.P. Morgan Fallback Cash Index, a notional rules-based proprietary index.

ALL PERSONS READING THIS DOCUMENT SHOULD REFER TO THE NOTICES, DISCLAIMERS AND CONFLICTS OF INTEREST SECTIONS BELOW AND CONSIDER THE INFORMATION CONTAINED IN THIS DOCUMENT IN LIGHT OF SUCH NOTICES, DISCLAIMERS AND CONFLICTS OF INTEREST.

NOTHING IN THE INDEX RULES CONSTITUTES AN OFFER TO BUY OR SELL ANY FINANCIAL PRODUCT, PARTICIPATE IN ANY TRANSACTION OR ADOPT ANY INVESTMENT STRATEGY. THE INDEX RULES DO NOT CONSTITUTE INVESTMENT, LEGAL, TAX, REGULATORY OR ACCOUNTING ADVICE.

This document is published by the Index Sponsor, J.P. Morgan Securities LLC of 383 Madison Avenue, 5th Floor, New York, New York 10179, United States, in its capacity as such. Further information relating to: (i) the internal governance framework; and (ii) the identity and role of third parties that are non-affiliates of JPMorgan, in respect of this Index is available on request to the Index Sponsor. The following further information is available at <https://www.jpmorganindices.com>:

- (i) supplemental disclosure on the Index Sponsor’s governance and oversight framework;
- (ii) information on complaints handling; and
- (iii) further information on conflicts of interest.

2. Index Sponsor and Index Calculation Agent

2.1 Identity and responsibilities

As of the Live Date (as defined herein), J.P. Morgan Securities LLC (“**JPMS**”) is the sponsor of the Index (the “**Index Sponsor**”, which term shall include any successor or assign of the Index Sponsor). The Index Sponsor may appoint a successor sponsor or assign, delegate or transfer any or all of its rights, obligations or responsibilities in its capacity as Index Sponsor in connection with the Index to one or more entities (including an unrelated third party) that the Index Sponsor determines appropriate. The Index Calculation Agent (unless the Index Calculation Agent is the same entity as the Index Sponsor) must obtain written permission from the Index Sponsor prior to any delegation or transfer of the Index Calculation Agent’s responsibilities or obligations in connection with the Index.

The initial Index Sponsor is responsible for, among other things, the creation and design of the Index and the documentation of the Index Rules. The Index Sponsor is responsible for the appointment of the calculation agent of the Index (the “**Index Calculation Agent**”), which may be the Index Sponsor, an unrelated third party or an affiliate or subsidiary of the Index Sponsor. The Index Calculation Agent will (unless the Index Calculation Agent is the same entity as the Index Sponsor) be an agent of the Index Sponsor. As of the Live Date, the Index Sponsor has appointed JPMS to be the initial Index Calculation Agent.

The Index Sponsor may at any time and for any reason (i) appoint a successor Index Calculation Agent, if the Index Sponsor is at that time the Index Calculation Agent or (ii) terminate the appointment of the Index Calculation Agent and appoint an alternative entity as a replacement Index Calculation Agent, if the Index Sponsor is not at that time the Index Calculation Agent.

The Index Calculation Agent is responsible for (i) calculating the Index Level in respect of each Index Calculation Day (each as defined herein) in accordance with the Index Rules and (ii) determining (among other things and subject to the prior agreement of the Index Sponsor or at the direction of the Index Sponsor) if a Fallback Rate Extraordinary Event (as defined herein) has occurred, whether any input necessary to perform any calculations under the Index Rules is not published or otherwise made available by the relevant data provider, sponsor of a Fallback Rate (as defined herein), publisher of a Fallback Rate, other input sponsor or exchange to the Index Calculation Agent, and any related consequences or adjustments in accordance with the Index Rules.

The Index Calculation Agent shall act in good faith and in a commercially reasonable manner in making determinations, interpretations and calculations pursuant to the Index Rules. Subject to the prior agreement of the Index Sponsor, the Index Calculation Agent's determinations, and all calculations related to the Index and the Index Calculation Agent's interpretations of the Index Rules, shall be final.

None of the Index Sponsor, the Index Calculation Agent, or any of their respective affiliates or subsidiaries or any of their respective directors, officers, employees, representatives, delegates or agents (each, a "**Relevant Person**") shall have any responsibility to any person (whether as a result of negligence or otherwise) for any determinations, interpretations or calculations made or anything done (or omitted to be determined or done) in connection with the Index or any use to which any person may put the Index or the Index Levels.

The Index Sponsor may, in its discretion, at any time and without notice, terminate the calculation or publication of the Index, including, without limitation, subsequent to the occurrence of one of the events described in Section 7 (*Fallback Rate Extraordinary Events*).

2.2 *Index Sponsor determinations and Index Calculation Agent determinations*

The Index Calculation Agent's exercise of discretion or failure to exercise discretion in relation to the Index may have a detrimental effect on the Index Level and the volatility of the Index. The Index Sponsor or the Index Calculation Agent may make certain determinations or calculations based on information obtained from publicly available sources without independently verifying such information.

Subject to the prior agreement of the Index Sponsor, the Index Calculation Agent may make certain determinations, adjustments, amendments and interpretations related to the Index. All such determinations, adjustments, amendments and interpretations (in each case, subject to such prior agreement on the part of the Index Sponsor) of the Index Calculation Agent related to the Index and all calculations performed by the Index Calculation Agent related to the Index shall be final, conclusive and binding and no person shall be entitled to make any claim against the Index Sponsor, the Index Calculation Agent, or any of the Relevant Persons in respect thereof. Once a determination, adjustment, amendment or interpretation is made or action is taken by the Index Calculation Agent (in each case, as agreed in advance by the Index Sponsor) in relation to the Index, or a calculation is performed by the Index Calculation Agent in relation to the Index, none of the Index Sponsor, the Index Calculation Agent or any Relevant Person shall be under any obligation to revise any such determination, adjustment, amendment, interpretation or calculation made or anything done (or omitted to be determined, adjusted, amended, interpreted, calculated or done) for any reason.

3. **Amendments**

The Index Rules may be supplemented, amended or restated from time to time in the sole discretion of the Index Sponsor. The Index Rules will be made available (in a manner determined by the Index Sponsor from time to time) following such supplementation, amendment or restatement. Following any amendment, the Index Sponsor will make available (as soon as practicable) the amended version of the Index Rules and will include the effective date of such amendment in the new version of the Index Rules. However, the Index Sponsor is under no obligation to inform any person about any amendments to the Index (except as required by law or regulation).

Although the Index Rules are intended to be comprehensive and accurate, ambiguities may arise and errors or omissions may have been made. In such circumstances, the Index Sponsor will resolve such ambiguities and, if necessary, amend the Index Rules to reflect such resolution. In the case of any inaccuracy, the Index Sponsor

may amend the Index Rules to address errors or omissions. The Index Sponsor is under no obligation to inform any person of any amendments to the Index (except as may be required by law).

4. General Notes on the Index

These general notes on the Index set forth in this Section 4 are qualified in their entirety by the remainder of the Index Rules.

Objective. The Index is designed to track the return of a notional cash position subject to the provisions of Section 7 (*Fallback Rate Extraordinary Events*), pursuant to these Index Rules.

No assurance can be given that the investment strategy used to construct the Index will be successful or that the Index will outperform any alternative basket or strategy that might be constructed from the Fallback Rates or the reference data.

The Index is described as a notional cash position because there is no actual portfolio of financial instruments to which any person is entitled or in which any person has any ownership interest. The Index merely references certain financial instruments, the performance of which will be used as a reference point for calculating the Index Level.

5. Publication of the Index Level

The level of the Index (the “**Index Level**”) will be calculated by the Index Calculation Agent in respect of each Index Calculation Day (as defined in “*Definitions*”) in accordance with the methodology set out in Section 6 (*Calculation of the Index Level*) below. The Index Calculation Agent will publish the Index Level in respect of each Index Calculation Day. The Index Level for the Index in respect of a given Index Calculation Day may be obtained by reference to the Bloomberg ticker (“JPUSCAFB Index”) or from a successor or alternate source as may be identified by the Index Calculation Agent from time to time.

The Index Calculation Agent may, at any time and without notice, change the frequency of publication of the Index Level, the means or place of publication of the Index Level or cease the calculation, publication or dissemination of the Index Level. The published level will be initially published to an accuracy of four (4) decimal places; however, the Index Calculation Agent may calculate the Index to a greater degree of accuracy or specificity and may use any rounding convention it considers appropriate for any data used or calculations performed (which may include using data with a higher level of specificity than that which is published on any particular data source) to determine the Index Level.

6. Calculation of the Index Level

The Index Level of each Index will be calculated by the Index Calculation Agent in respect of each Index Calculation Day in accordance with the following.

In respect of the Index’s Base Date, the level of the notional Index was set equal to 100.00. In respect of each Index Calculation Day t following but excluding the Base Date, the Index Calculation Agent will calculate the Index Level in accordance with the following formula:

$$\text{Index}_t = \text{Index}_{t-1} \times \frac{1 + \text{Rate}_{t-2}^{3M} \times \frac{\text{Daycount}_{t-2}^{t,3M}}{360}}{1 + \text{Rate}_{t-1}^{3M-1} \times \frac{\text{Daycount}_{t-1}^{t,3M-1}}{360}}$$

where:

Index_t means, in respect of an Index Calculation Day t , the Index Level for such Index Calculation Day t .

Index_{t-1} means, in respect of an Index Calculation Day t and its associated Index Calculation Day $t-1$, the Index Level for Index Calculation Day $t-1$.

Index Calculation Day $t-1$ means, in respect of an Index Calculation Day t , the Index Calculation Day immediately preceding such Index Calculation Day t .

Index Calculation Day $t-2$ means, in respect of an Index Calculation Day t , the second Index Calculation Day immediately preceding such Index Calculation Day t .

Rate_{t-2}^{3M} means, in respect of an Index Calculation Day t and its associated Index Calculation Day $t-2$, the level of the 3M Fallback Rate Index in respect of such Index Calculation Day $t-2$, provided that if the Fallback Rate Publisher does not publish such level in respect of such Index Calculation Day $t-2$, then Rate_{t-2}^{3M} shall be such a level published by the Fallback Rate Publisher in respect of the most recent calendar day prior to such Index Calculation Day $t-2$.

Rate_{t-1}^{3M-1} means, in respect of an Index Calculation Day t and its associated Index Calculation Day $t-1$, the level of a hypothetical three-month-less-a-day interest rate, in respect of such Index Calculation Day $t-1$, calculated pursuant to the following formula:

$$\text{Rate}_{t-1}^{3M-1} = \text{Rate}_{t-1}^{2M} + \frac{\text{Rate}_{t-1}^{3M} - \text{Rate}_{t-1}^{2M}}{\text{Daycount}_{t-1}^{2M,3M}} \times (\text{Daycount}_{t-1}^{2M,3M} - \text{Daycount}_{t-1}^{t-1,t})$$

Rate_{t-1}^{3M} means, in respect of an Index Calculation Day t and its associated Index Calculation Day $t-1$, the level of the 3M Fallback Rate Index in respect of such Index Calculation Day $t-1$, provided that if the Fallback Rate Publisher does not publish such a level in respect of such Index Calculation Day $t-1$, then Rate_{t-1}^{3M} shall be such a level published by the Fallback Rate Publisher in respect of the most recent calendar day prior to such Index Calculation Day $t-1$.

Rate_{t-1}^{2M} means, in respect of an Index Calculation Day t and its associated Index Calculation Day $t-1$, the level of the 2M Fallback Rate Index in respect of such Index Calculation Day $t-1$, provided that if the Fallback Rate Publisher does not publish such a level in respect of such Index Calculation Day $t-1$, then Rate_{t-1}^{2M} shall be such a level published by the Fallback Rate Publisher in respect of the most recent calendar day prior to such Index Calculation Day $t-1$.

$\text{Daycount}_{t-1}^{t-1,t}$ means, in respect of an Index Calculation Day t and its associated Index Calculation Day $t-1$ and its associated Index Calculation Day $t-2$, the number of calendar days from but excluding such Index Calculation Day $t-2$ to and including such Index Calculation Day $t-1$.

$\text{Daycount}_{t-1}^{2M,3M}$ means, in respect of an Index Calculation Day t and its associated Index Calculation Day $t-1$, the number of calendar days from but excluding the Notional 2M Maturity Date in respect of such Index Calculation Day $t-1$ to and including the Notional 3M Maturity Date in respect of such Index Calculation Day $t-1$.

$\text{Daycount}_{t-2}^{t,3M}$ means, in respect of an Index Calculation Day t and its associated Index Calculation Day $t-2$, the number of calendar days from but excluding such Index Calculation Day $t-2$ to and including the Notional 3M Maturity Date in respect of such Index Calculation Day $t-2$.

Daycount $_{t-1}^{t,3M-1}$

means, in respect of an Index Calculation Day t and its associated Index Calculation Day t-1 and its associated Index Calculation Day t-2, the number of calendar days from but excluding such Index Calculation Day t-1 to and including the Notional 3M Maturity Date in respect of such Index Calculation Day t-2.

Notional 2M Maturity Date means, in respect of an Index Calculation Day, a day determined as follows:

- (i) If there is a day that numerically corresponds to such Index Calculation Day in the second (2nd) calendar month following the calendar month associated with such Index Calculation Day, and:
 - a) if such day is an Index Calculation Day, such day.
 - b) if such day is not an Index Calculation Day, then (x) if the first Index Calculation Day following such day falls in the same calendar month as such day, such first following Index Calculation Day, or (y) if the first Index Calculation Day following such day falls in the following calendar month, the Index Calculation Day immediately preceding such day.
- (ii) If there is not a day that numerically corresponds to such Index Calculation Day in the second (2nd) calendar month following the calendar month associated with such Index Calculation Day, the last Index Calculation Day of such second (2nd) following calendar month.

Notional 3M Maturity Date means, in respect of an Index Calculation Day, a day determined as follows:

- (i) If there is a day that numerically corresponds to such Index Calculation Day in the third (3rd) calendar month following the calendar month associated with such Index Calculation Day, and:
 - a) if such day is an Index Calculation Day, such day.
 - b) if such day is not an Index Calculation Day, then (x) if the first Index Calculation Day following such day falls in the same calendar month as such day, such first following Index Calculation Day, or (y) if the first Index Calculation Day following such day falls in the following calendar month, the Index Calculation Day immediately preceding such day.
- (ii) If there is not a day that numerically corresponds to such Index Calculation Day in the third (3rd) calendar month following the calendar month associated with such Index Calculation Day, the last Index Calculation Day of such third (3rd) following calendar month.

2M Fallback Rate Index means the J.P. Morgan 2M Spread-Adjusted SOFR Index (Bloomberg ticker JPUS002M Index), as administered and published by the Fallback Rate Publisher.

3M Fallback Rate Index means the J.P. Morgan 3M Spread-Adjusted SOFR Index (Bloomberg ticker JPUS003M Index), as administered and published by the Fallback Rate Publisher.

7. Fallback Rate Extraordinary Events

If either the 2M Fallback Rate Index or the 3M Fallback Rate Index (or both) (each, a “**Fallback Rate**”) is (a) not calculated and announced by the relevant sponsor or the relevant publisher, but is calculated and announced by a successor sponsor or a successor publisher acceptable to the Index Calculation Agent, or (b) replaced by a successor index that, in the determination of the Index Calculation Agent, is the same or substantially similar to that relevant index, then the Fallback Rate will be deemed to be the Fallback Rate so calculated and announced by that successor sponsor or that successor publisher or that successor index, as the case may be, with effect from a date determined by the Index Calculation Agent.

If on or prior to any Index Calculation Day, a Fallback Rate Extraordinary Event occurs, then the Index Calculation Agent shall do one of the following, as determined by the Index Calculation Agent in its sole discretion: (i) continue to use the original Fallback Rate in determining the Index Level (but only if the Fallback Rate has not been cancelled); (ii) cease calculation or publication of the Index on such date as is determined by

the Index Calculation Agent or (iii) select a replacement Fallback Rate that it determines possesses substantially similar characteristics to the Fallback Rate that is being replaced, with effect from a date determined by the Index Calculation Agent, provided that, if the Index Calculation Agent determines that there is no replacement Fallback Rate that possesses substantially similar characteristics to the original Fallback Rate, then the Index Calculation Agent may select a replacement Fallback Rate that it determines will be an appropriate replacement index or an appropriate replacement reference interest rate.

In connection with any of the changes described above, the Index Calculation Agent may make such adjustments to the Index Rules that it determines are appropriate to account for such change. Such adjustments to the Index Rules may include, without limitation, the addition or subtraction of a spread adjustment to such successor index or such replacement index or such replacement reference interest rate, giving due consideration to any industry-accepted spread adjustment or method for calculating or determining such a spread adjustment for such successor index or such replacement index or such replacement reference interest rate.

A “**Fallback Rate Extraordinary Event**” occurs when one or more of the following events occurs, as determined by the Index Calculation Agent in its sole discretion (although, for the avoidance of doubt, the Index Calculation Agent has no obligation to monitor actively whether or not any of the following events has occurred): (a) the Fallback Rate Publisher makes a material change in the formula for or the method of calculating a Fallback Rate or in any other way materially modifies a Fallback Rate (other than a modification prescribed in the formula or method for determining the Fallback Rate in the event of routine events), (b) the level of the Fallback Rate is not published for ten (10) consecutive scheduled publication days for such Fallback Rate, (c) a relevant regulatory supervisor or regulatory authority (if any) with jurisdiction over the Fallback Rate Publisher or the Fallback Rate Publisher itself makes a public statement or publishes information indicating or announcing that the Fallback Rate is not or will no longer be representative, (d) a relevant regulatory supervisor or regulatory authority (if any) with jurisdiction over the sponsor or publisher of an interest rate that a Fallback Rate references or such sponsor or such publisher itself makes a public statement or publishes information indicating or announcing that such interest rate is not or will no longer be representative or (e) the Fallback Rate is cancelled.

8. Corrections

If (i) the level of a Fallback Rate as of any date which is published or otherwise made available in respect of the relevant Fallback Rate is subsequently corrected and such correction is published or otherwise made available in respect of such Fallback Rate; or (ii) the Index Calculation Agent identifies an error or omission in any of its calculations, determinations or interpretations in respect of the Index, then the Index Calculation Agent may, if practicable and if the Index Calculation Agent determines in good faith that such correction, error or omission (as the case may be) is material, adjust or correct the relevant calculation, determination or interpretation and/or the Index Level as of any Index Calculation Day to take into account such correction.

Definitions

Terms not otherwise defined herein, shall have the following meanings:

"2M Fallback Rate Index"	has the meaning given to such term in Section 6 (<i>Calculation of the Index Level</i>).
"3M Fallback Rate Index"	has the meaning given to such term in Section 6 (<i>Calculation of the Index Level</i>).
"Base Date"	means April 3, 2018.
"Fallback Rate"	has the meaning given to such term in Section 7 (<i>Fallback Rate Extraordinary Events</i>).
"Fallback Rate Publisher"	means J.P. Morgan Securities LLC, and any successor or assign acceptable to the Index Calculation Agent .
"Index Calculation Day"	means a weekday.
"Index Calculation Agent"	has the meaning given to such term in Section 2.1 (<i>Identity and responsibilities</i>).
"Index Level"	has the meaning given to such term in Section 5 (<i>Publication of the Index Level</i>).
"Index Rules"	as defined in Section 1 (<i>Introduction</i>), means the rules of the J.P. Morgan Fallback Cash Index as set out in this document, as the same may be supplemented, amended or restated from time to time.
"Index Sponsor"	has the meaning given to such term in Section 2.1 (<i>Identity and responsibilities</i>).
"JPMS"	as defined in Section 1 (<i>Introduction</i>), means J.P. Morgan Securities LLC.
"Notional 2M Maturity Date"	has the meaning given to such term in Section 6 (<i>Calculation of the Index Level</i>).
"Notional 3M Maturity Date"	has the meaning given to such term in Section 6 (<i>Calculation of the Index Level</i>).
"Live Date"	means November 23, 2021.
"Relevant Person"	has the meaning given to such term in Section 2.1 (<i>Identity and responsibilities</i>).

Notices, Disclaimers and Conflicts of Interest

The Index Rules have been prepared solely for informational purposes and nothing in the Index Rules constitutes (i) an offer to buy or sell any securities, participate in any transaction or adopt any investment linked to the Index or (ii) legal, tax, regulatory, financial or accounting advice. The Index Rules may change at any time without prior notice.

Neither the Index Calculation Agent nor any of its affiliates or subsidiaries or their respective directors, officers, employees, representatives, delegates or agents (each a **"Relevant Person"**) make any representation or warranty, whatsoever, express or implied, as to the results that may be obtained through the use of this document or the Index. 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, 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 the Index Levels.

During the course of their normal business, the Index Calculation Agent or any of the other Relevant Persons may enter into or promote, offer or sell transactions or investments (structured or otherwise) linked to 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, or may invest or engage in transactions with other persons, or on behalf of such persons relating to any of these items. Such activity may or may not have an impact on the Index Levels but all persons reading this document should be aware that a conflict of interest could arise where anyone is acting in more than one capacity, and such conflict may have an impact, positive or negative, on the Index Levels. Neither the Index Calculation Agent nor any other Relevant Person has any duty to consider the circumstances of any person when participating in such transactions or to conduct themselves in a manner that is favorable 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 other Relevant Persons entering into or promoting, offering or selling transactions or investments (structured or otherwise) linked to the Index and hedging such transactions or investments in any manner that they see fit. Accordingly it should be assumed that the Index Rules have and will be analyzed from this point of view.

As mentioned above, the Index is described as a notional cash position because there is no actual portfolio of assets to which any person is entitled or in which any person has any ownership interest. The Index merely identifies certain reference assets, the performance of which will be used as a reference point for calculating the Index Levels.

Notwithstanding anything to the contrary herein, nothing in these Index Rules should be construed to be investment advice or a recommendation to purchase a specific instrument or make a specific investment. Nothing in these Index Rules or any other communication between you and J.P. Morgan Chase & Co. (together with its affiliates, "J.P. Morgan") should be deemed to or be construed as creating a "fiduciary relationship". J.P. Morgan and its subsidiaries, officers, directors, employees and agents, are not your fiduciary. You should make your own investment decision based on your own judgment and on your own examination of the specific product that you are purchasing or investment that you are entering into, and you should consult your own legal, regulatory, investment, tax, accounting and other professional advisers as you deem necessary in connection with any purchase of a financial product or undertaking any investment.

The Index is the exclusive property of the Index Sponsor and the Index Sponsor retains all proprietary rights in the Index.

The Index is protected by copyright and trade secret rights and is and will always remain the sole property of J.P. Morgan, all rights, title and full ownership in and to the Index are expressly reserved to and will remain

with J.P. Morgan, the Index were developed, compiled, prepared and arranged by J.P. Morgan through the expenditure of substantial time, effort and money and constitute valuable intellectual property and trade secrets of J.P. Morgan and all proprietary and intellectual property rights of any nature, including patents, copyrights, trademarks and trade secrets regarding the Index and the Index Rules, and any and all copies, modifications, enhancements and derivative works thereof are owned by and will remain the property of J.P. Morgan.

Third parties shall not use the Index Sponsor's intellectual property without the prior written consent of the Index Sponsor (including in situations where a third party performs certain functions in relation to the Index) and may not (directly or indirectly) (a) share, reproduce, distribute or otherwise disseminate the Index, Index Rules or any related data in any form without the express prior written consent of J.P. Morgan (b) alter, remove or conceal any copyright, trademark or other proprietary notice or disclaimer regarding the Index, (c) modify, copy, translate, distribute, recompile, decompile, disassemble or reverse engineer the Index; (d) make or distribute any other form of or any derivative work from, the Index or (e) grant any rights in, permit or provide access to the Index or the Index Rules in a manner that could infringe the intellectual property rights of J.P. Morgan or any third party or violate any applicable laws, tariffs, rules or regulations.

Any third party who enters into a transaction or investment or purchases a product that references the Index is thereby deemed to acknowledge that (i) THE INDEX, INDEX RULES AND RELATED DATA ARE PROVIDED "AS IS" WITH ALL FAULTS, (ii) ALL WARRANTIES AND REPRESENTATIONS OF ANY KIND WITH REGARD TO THE INDEX ARE DISCLAIMED BY J.P. MORGAN, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY, QUALITY, ACCURACY, FITNESS FOR A PARTICULAR PURPOSE OR AGAINST INFRINGEMENT AND WARRANTIES AS TO ANY RESULTS TO BE OBTAINED BY OR FROM THE USE OF THE INDEX, (iii) J.P. MORGAN DOES NOT GUARANTEE THE AVAILABILITY, SEQUENCE, TIMELINESS, ACCURACY OR COMPLETENESS OF THE INDEX, (iv) J.P. MORGAN MAY DISCONTINUE CALCULATION OF THE INDEX AT ANY TIME WITHOUT PRIOR NOTICE AND, (v) TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, J.P. MORGAN WILL NOT BE LIABLE (IN CONTRACT, TORT OR OTHERWISE) FOR ANY ORDINARY, DIRECT, INDIRECT, CONSEQUENTIAL, SPECIAL, PUNITIVE OR EXEMPLARY DAMAGES IN CONNECTION WITH ANY USE OF THE INDEX, THE INDEX RULES OR ANY ASSOCIATED DATA, EVEN IF J.P. MORGAN HAS BEEN APPRISED OF THE LIKELIHOOD OF SUCH DAMAGES OCCURRING, and agrees to release, indemnify, defend and hold J.P. Morgan harmless from and against any claim, liability, loss, injury, damage, cost, or expense of any kind (including reasonable attorney's fees), as incurred, relating to or arising out of such third party's use of the Index, the Index Rules or any associated data.

No one may reproduce or disseminate the information contained in this document or the Index Levels of the Index without the prior written consent of the Index Sponsor. This document is not intended for distribution to, or use by any person in, a jurisdiction where such distribution is prohibited by law or regulation.

Copyright JPMorgan Chase & Co. 2021. All rights reserved. J.P. Morgan is the marketing name for JPMorgan Chase & Co. and its subsidiaries and affiliates worldwide. The Index Sponsor owns all intellectual property rights in: (i) the development of and methodology for producing the Index, (ii) the Index Levels and (iii) these Index Rules. Third parties shall not use the Index Sponsor's intellectual property without the prior written consent of the Index Sponsor (including in situations where a third party performs certain functions in relation to the Index).

ANNEX C

J.P. Morgan Spread-Adjusted SOFR Index Series Index Rules

J.P.Morgan

November 23, 2021

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PART A

THE J.P. MORGAN SPREAD-ADJUSTED SOFR INDEX SERIES INDEX RULES

1. Introduction

This document comprises the rules (as may be supplemented, amended or restated from time to time, the “**Index Rules**”) of the J.P. Morgan Spread-Adjusted SOFR Index Series, a series of notional rules-based proprietary indices. These Index Rules are divided into Part A (which includes Schedule 1 and applies to every index comprised in the J.P. Morgan Spread-Adjusted SOFR Index Series and Part B (which contains individualized parameters for each index in the series).

Table A in Schedule 1 sets out each index in the J.P. Morgan Spread-Adjusted SOFR Index Series (each, an “**Index**” and together the “**Indices**”). The relevant parameters for each Index are provided in the Applicable Module (as defined in “*Definitions*”) in Part B for such Index. The Index Publisher may, in its discretion, publish or otherwise make available only the Index Rules applicable to one or more of the Indices by removing the Parts and Modules (each as specified herein) from this document that do not apply to such Indices and amending Schedule 1 of Part A of the Index Rules as necessary.

ALL PERSONS READING THIS DOCUMENT SHOULD REFER TO THE NOTICES, DISCLAIMERS AND CONFLICTS OF INTEREST SECTIONS BELOW AND CONSIDER THE INFORMATION CONTAINED IN THIS DOCUMENT IN LIGHT OF SUCH NOTICES, DISCLAIMERS AND CONFLICTS OF INTEREST.

NOTHING IN THE INDEX RULES CONSTITUTES AN OFFER TO BUY OR SELL ANY FINANCIAL PRODUCT, PARTICIPATE IN ANY TRANSACTION OR ADOPT ANY INVESTMENT STRATEGY. THE INDEX RULES DO NOT CONSTITUTE INVESTMENT, LEGAL, TAX, REGULATORY OR ACCOUNTING ADVICE.

This document is published by the Index Publisher, J.P. Morgan Securities LLC of 383 Madison Avenue, 5th Floor, New York, New York 10179, United States, in its capacity as such. Further information relating to the identity and role of third parties that are non-affiliates of JPMorgan, in respect of the Index is available upon request from the Index Publisher. The following further information is available at <https://www.jpmmorganindices.com>:

- (i) supplemental disclosure on the Index Publisher’s governance and oversight framework;
- (ii) information on complaints handling; and
- (iii) further information on conflicts of interest.

2. Index Publisher and Index Calculation Agent

2.1 Identity and responsibilities

As of the Live Date (as defined and specified in the applicable Schedule), J.P. Morgan Securities LLC (“**JPM**”) is the sponsor and the publisher of the Index (the “**Index Publisher**”, which term shall include any successor or assign of the Index Publisher). The Index Publisher may appoint a successor sponsor or publisher or assign, delegate or transfer any or all of its rights, obligations or responsibilities in its capacity as Index Publisher in connection with an Index to one or more entities (including an unrelated third party) that the Index Publisher determines appropriate. The Index Calculation Agent (unless the Index Calculation Agent is the same entity as the Index Publisher) must obtain written permission from the Index Publisher prior to any delegation or transfer of the Index Calculation Agent’s responsibilities or obligations in connection with the Index.

The initial Index Publisher is responsible for, among other things, the creation and design of each Index and the documentation of the Index Rules. The Index Publisher is responsible for the appointment of the calculation agent of the Index (the “**Index Calculation Agent**”), which may be the Index Publisher, an unrelated third party

or an affiliate or subsidiary of the Index Publisher. The Index Calculation Agent will (unless the Index Calculation Agent is the same entity as the Index Publisher) be an agent of the Index Publisher. As of the Live Date, the Index Publisher has appointed JPMS to be the initial Index Calculation Agent.

The Index Publisher may at any time and for any reason (i) appoint a successor Index Calculation Agent, if the Index Publisher is at that time the Index Calculation Agent or (ii) terminate the appointment of the Index Calculation Agent and appoint an alternative entity as a replacement Index Calculation Agent, if the Index Publisher is not at that time the Index Calculation Agent.

The Index Calculation Agent is responsible for (i) calculating the Index Level in respect of each Index Calculation Day (each as defined herein) in accordance with the Index Rules and (ii) determining (among other things and subject to the prior agreement of the Index Publisher or at the direction of the Index Publisher) if an Interest Rate Extraordinary Event (as defined herein) has occurred, whether any input necessary to perform any calculations under the Index Rules is not published or otherwise made available by the relevant data provider, sponsor of an Interest Rate (as defined herein), publisher of an Interest Rate, other input sponsor or other input publisher or exchange to the Index Calculation Agent, and any related consequences or adjustments in accordance with the Index Rules.

The Index Calculation Agent shall act in good faith and in a commercially reasonable manner in making determinations, interpretations and calculations pursuant to the Index Rules. Subject to the prior agreement of the Index Publisher, the Index Calculation Agent's determinations, and all calculations related to the Index and the Index Calculation Agent's interpretations of the Index Rules, shall be final.

None of the Index Publisher, the Index Calculation Agent, or any of their respective affiliates or subsidiaries or any of their respective directors, officers, employees, representatives, delegates or agents (each, a "**Relevant Person**") shall have any responsibility to any person (whether as a result of negligence or otherwise) for any determinations, interpretations or calculations made or anything done (or omitted to be determined or done) in connection with an Index or any use to which any person may put an Index or the Index Levels.

The Index Publisher may, in its discretion, at any time and without notice, terminate the calculation or publication of an Index, including, without limitation, subsequent to the occurrence of one of the events described in Section 7 (*Interest Rate Extraordinary Events*).

2.2 Index Publisher determinations and Index Calculation Agent determinations

The Index Calculation Agent's exercise of discretion or failure to exercise discretion in relation to an Index may have a detrimental effect on the Index Level and the volatility of the Index. The Index Publisher or the Index Calculation Agent may make certain determinations or calculations based on information obtained from publicly available sources without independently verifying such information.

Subject to the prior agreement of the Index Publisher, the Index Calculation Agent may make certain determinations, adjustments, amendments and interpretations related to the Index. All such determinations, adjustments, amendments and interpretations (in each case, subject to such prior agreement on the part of the Index Publisher) of the Index Calculation Agent related to an Index and all calculations performed by the Index Calculation Agent related to an Index shall be final, conclusive and binding and no person shall be entitled to make any claim against the Index Publisher, the Index Calculation Agent, or any of the Relevant Persons in respect thereof. Once a determination, adjustment, amendment or interpretation is made or action is taken by the Index Calculation Agent (in each case, as agreed in advance by the Index Publisher) in relation to an Index, or a calculation is performed by the Index Calculation Agent in relation to an Index, none of the Index Publisher, the Index Calculation Agent or any Relevant Person shall be under any obligation to revise any such determination, adjustment, amendment, interpretation or calculation made or anything done (or omitted to be determined, adjusted, amended, interpreted, calculated or done) for any reason.

3. Amendments

The Index Rules may be supplemented, amended or restated from time to time in the sole discretion of the Index Publisher. The Index Rules will be made available (in a manner determined by the Index Publisher from time to time) following such supplementation, amendment or restatement. Following any amendment, the Index Publisher will make available (as soon as practicable) the amended version of the Index Rules and will include the effective date of such amendment in the new version of the Index Rules. However, the Index Publisher is under no obligation to inform any person about any amendments to an Index (except as required by law or regulation).

Although the Index Rules are intended to be comprehensive and accurate, ambiguities may arise and errors or omissions may have been made. In such circumstances, the Index Publisher will resolve such ambiguities and, if necessary, amend the Index Rules to reflect such resolution. In the case of any inaccuracy, the Index Publisher may amend the Index Rules to address errors or omissions. The Index Publisher is under no obligation to inform any person of any amendments to the Index (except as may be required by law).

4. General Notes on the Indices

These general notes on the Index set forth in this Section 4 are qualified in their entirety by the remainder of the Index Rules.

Objective. The Index is designed to calculate the sum of a specified overnight financing rate plus a specified constant spread.

No assurance can be given that the methodology used to construct any Index will achieve its intended results or that any Index will be successful.

5. Publication of the Index Level

The level of the Index (the “**Index Level**”) will be calculated by the Index Calculation Agent in respect of each Index Calculation Day (as defined in “*Definitions*”) in accordance with the methodology set out in Section 6 (*Calculation of the Index Level*) below. The Index Calculation Agent will publish the Index Level in respect of each Index Calculation Day. The Index Level in respect of each Index Calculation Day may be obtained by reference to Bloomberg ticker specified in the Applicable Module or from a successor or alternate source as may be identified by the Index Calculation Agent from time to time.

The Index Calculation Agent may, at any time and without notice, change the frequency of publication of the Index Level, the means or place of publication of the Index Level or cease the calculation, publication or dissemination of the Index Level. The published level will be initially published to an accuracy of four decimal places; however, the Index Calculation Agent may calculate the Index to a greater degree of accuracy or specificity and may use any rounding convention it considers appropriate for any data used or calculations performed (which may include using data with a higher level of specificity than that which is published on any particular data source) to determine the Index Level.

6. Calculation of the Index Level

The Index Level of each Index will be calculated by the Index Calculation Agent in respect of each Index Calculation Day in accordance with the following formula:

$$\text{Index}_t = \text{Overnight}_t + \text{Spread}$$

where:

Index_t means the Index Level as of Index Calculation Day t .

Overnight_t means, in respect of each Index Calculation Day t , the level of the Overnight Rate published by the Interest Rate Publisher in respect of Index Calculation Day t .

Spread means the Spread specified in the Applicable Module in Part B.

Overnight Rate means the Secured Overnight Financing Rate (SOFR) as administered and published by the Interest Rate Publisher (Bloomberg ticker "SOFRRATE Index").

Interest Rate Publisher means the Federal Reserve Bank of New York (or its authorized successor, or if no such authorized successor is announced, an alternate source or provider as may be identified by the Index Calculation Agent).

7. Interest Rate Extraordinary Events

If either (a) the Overnight Rate is not calculated and announced by the relevant sponsor or the relevant publisher, but is calculated and announced by a successor sponsor or a successor publisher acceptable to the Index Calculation Agent, or (b) the Overnight Rate is replaced by a successor rate that, in the determination of the Index Calculation Agent, is the same or substantially similar to that relevant rate, then the Overnight Rate will be deemed to be the Overnight Rate so calculated and announced by that successor sponsor or that successor publisher or that successor rate, as the case may be, with effect from a date determined by the Index Calculation Agent.

If on or prior to any Index Calculation Day, an Interest Rate Extraordinary Event (as defined below) occurs, then the Index Calculation Agent shall do one of the following, as determined by the Index Calculation Agent in its sole discretion: (i) continue to use the original Overnight Rate in determining the Index Level (but only if the Overnight Rate has not been cancelled); (ii) cease calculation or publication of the Index on such date as is determined by the Index Calculation Agent; or (iii) select a replacement Overnight Rate that it determines possesses substantially similar characteristics to the Overnight Rate that is being replaced, with effect from a date determined by the Index Calculation Agent, provided that, if the Index Calculation Agent determines that there is no replacement Overnight Rate that possesses substantially similar characteristics to the original Overnight Rate, then the Index Calculation Agent may select a replacement Overnight Rate that it determines will be an appropriate replacement rate.

In connection with any of the changes described above, the Index Calculation Agent may make such adjustments to the Index Rules that it determines are appropriate to account for such change. Such adjustments to the Index Rules may include, without limitation, the addition or subtraction of a spread adjustment to such successor rate or replacement rate, giving due consideration to any industry-accepted spread adjustment or method for calculating or determining such spread adjustment for such successor rate or replacement rate and giving due consideration for each Index to the relevant Spread specified in the Applicable Module in Part B.

An "Interest Rate Extraordinary Event" occurs when one or more of the following events occurs, as determined by the Index Calculation Agent in its sole discretion (although, for the avoidance of doubt, the Index Calculation Agent has no obligation to monitor actively whether or not any of the following events has occurred): (a) the Interest Rate Publisher makes a material change in the formula for or the method of calculating the Overnight Rate or in any other way materially modifies the Overnight Rate (other than a modification prescribed in the formula or method for determining the Overnight Rate in the event of routine events), (b) the Overnight Rate is not published for ten (10) consecutive scheduled publication days for such Overnight Rate, (c), a relevant regulatory supervisor or regulatory authority (if any) with jurisdiction over the Index Publisher or the Index Publisher itself makes a public statement or publishes information indicating or announcing that the Index is not or will no longer be representative, (d) a relevant regulatory supervisor or regulatory authority (if any) with jurisdiction over the Interest Rate Publisher or the Overnight Rate or the Interest Rate Publisher itself makes a public statement or publishes information indicating or announcing that the Overnight Rate is not or will no longer be representative or (e) the Overnight Rate is cancelled.

8. Corrections

If the level of the Overnight Rate as of any date which is published or otherwise made available in respect of the Overnight Rate is subsequently corrected and such correction is published or otherwise made available; or (ii) the Index Calculation Agent identifies an error or omission in any of its calculations, determinations or interpretations in respect of an Index, then the Index Calculation Agent may, if practicable and if the Index Calculation Agent determines in good faith that such correction, error or omission (as the case may be) is material, adjust or correct the relevant calculation, determination or interpretation and/or the Index Level as of any Index Calculation Day to take into account such correction.

Definitions

Terms not otherwise defined herein, shall have the following meanings:

“Applicable Module”	means the module in Part B applicable to each Index.
“Base Date”	means the date specified as such in the Applicable Module in Part B with respect to each Index.
“Index Calculation Day”	means a weekday as of which the Overnight Rate is (or, but for the occurrence or continuation of an Interest Rate Extraordinary Event, would have been) scheduled to be calculated and published by the Interest Rate Publisher.
“Index Calculation Agent”	has the meaning given to such term in Section 2.1 (<i>Identity and responsibilities</i>).
“Index”	has the meaning given to such term in Section 1 (<i>Introduction</i>).
“Index Level”	has the meaning given to such term in Section 4 (<i>General Notes on the Indices</i>).
“Index Rules”	as defined in Section 1 (<i>Introduction</i>), means the rules of the J.P. Morgan Spread-Adjusted SOFR Index Series as set out in this document, as the same may be supplemented, amended or restated from time to time.
“Index Publisher”	has the meaning given to such term in Section 2.1 (<i>Identity and responsibilities</i>).
“Interest Rate Publisher”	has the meaning given to such term in Section 6 (<i>Calculation of the Index Level</i>).
“JPMS”	as defined in Section 1 (<i>Introduction</i>), means J.P. Morgan Securities LLC.
“Live Date”	means, for each Index, the date specified in the Applicable Module in Part B.
“Overnight Rate”	has the meaning given to such term in Section 6 (<i>Calculation of the Index Level</i>).

Schedule 1:**The indices composing the J.P. Morgan Spread-Adjusted SOFR Index Series:**

Table A below of this Schedule 1 sets out the name of each index in the J.P. Morgan Spread-Adjusted SOFR Index Series. The relevant parameters for each Index are provided in the Applicable Module in Part B.

Table A

Name
J.P. Morgan 2M Spread-Adjusted SOFR Index
J.P. Morgan 3M Spread-Adjusted SOFR Index

This table may be amended from time to time to add additional Indices.

Part B

PARAMETERS FOR EACH OF THE INDICES

MODULE B1: J.P. MORGAN 2M SPREAD-ADJUSTED SOFR INDEX

Index Name	J.P. Morgan 2M Spread-Adjusted SOFR Index
Bloomberg Ticker of Index	JPUS002M
Live Date	November 23, 2021
Base Date	April 2, 2018
Spread	0.0018456

MODULE B2: J.P. MORGAN 3M SPREAD-ADJUSTED SOFR INDEX

Index Name	J.P. Morgan 3M Spread-Adjusted SOFR Index
Bloomberg Ticker of Index	JPUS003M
Live Date	November 23, 2021
Base Date	April 2, 2018
Spread	0.0026161

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The Index Calculation Agent is under no obligation to continue the calculation, publication and dissemination of the Indices or the Index Levels.

During the course of their normal business, the Index Calculation Agent or any of the other Relevant Persons may enter into or promote, offer or sell transactions or investments (structured or otherwise) linked to the Indices. 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 Indices, or may invest or engage in transactions with other persons, or on behalf of such persons relating to any of these items. Such activity may or may not have an impact on the Index Levels but all persons reading this document should be aware that a conflict of interest could arise where anyone is acting in more than one capacity, and such conflict may have an impact, positive or negative, on the Index Levels. Neither the Index Calculation Agent nor any other Relevant Person has any duty to consider the circumstances of any person when participating in such transactions or to conduct themselves in a manner that is favorable to anyone with exposure to any Index.

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As mentioned above, the Indices are described as a notional cash position because there is no actual portfolio of assets to which any person is entitled or in which any person has any ownership interest. The Indices merely identify certain reference assets, the performance of which will be used as a reference point for calculating the Index Levels.

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