

**GS MOMENTUM BUILDER®  
MULTI-ASSET CLASS INDEX**

**METHODOLOGY**

**JANUARY 3, 2022**

## GS MOMENTUM BUILDER® MULTI-ASSET CLASS INDEX

### Overview

*The following overview of the GS Momentum Builder® Multi-Asset Class Index is a summary and, as such, is necessarily incomplete. This overview should be read in conjunction with, and is qualified in its entirety by, the more detailed description of the GS Momentum Builder® Multi-Asset Class Index and its operation that follows in this document.*

The GS Momentum Builder® Multi-Asset Class Index (the “**Index**”) represents a notional investment in the components of various indices (each an “**Underlying Index**” and together the “**Underlying Indices**”) and a hypothetical overnight cash investment (the “**Money Market Position**”), which constitute the underlying assets (each an “**Underlying Asset**” and together the “**Underlying Assets**”).

The Underlying Indices provide exposure to several asset classes as described below:

- *Developed Market Equities*, through indices comprised of futures contracts on U.S., Europe and Japanese equities
- *Developed Market Fixed Income Securities*, through indices comprised of futures contracts on U.S. Treasuries, German Government Bonds and Japanese Government Bonds
- *Commodities*, through indices based on futures contracts on Crude Oil and Gold

The Index is calculated on an excess return basis and the value of the Index (the “**Index Value**”) is calculated on each Index Business Day (as defined in the attached Annex) in U.S. dollars.

The Index Value is calculated by reference to the *excess* of the Total Return Index Value (as more specifically described under “Calculation of the Index” below) *over* the return that could be earned on a notional cash deposit at the “**Notional Interest Rate**” (which is the Federal Funds Rate, as specified in the Annex) and is adjusted by the “**Daily Index Cost**” of 0.50% per annum (this cost has the effect of reducing the Index Value).

On any given Index Business Day following the Index Base Date (any such day, a “**Total Return Index Rebalancing Day**”), the “**Total Return Index**” (as described under “*Calculation of the Total Return Index*”) may be partially rebalanced from the “**Base Index**” (as described under “*Calculation of the Base Index*”) into the Deleverage Position as a result of the volatility control feature. The value of the Total Return Index (the “**Total Return Index Value**”) is calculated on each Index Business Day by reference to the weighted performance (after rebalancing) of:

- (i) the Base Index (as more specifically described below) and
- (ii) the Deleverage Position.

The “**Deleverage Position**” means a hypothetical investment in the Money Market Position.

The value of the Base Index (the “**Base Index Value**”) is calculated on each Index Business Day. The Base Index seeks to provide exposure to price momentum of the Underlying Assets by

seeking to reflect the combination of Underlying Asset weightings that would have provided the highest historical total return (determined as described under “*Calculation of the Underlying Assets Target Weights*” below) on the first Index Business Day of each calendar month (the “**Base Index Observation Day**”), subject to constraints on maximum and minimum weights for each Underlying Asset along with volatility controls further described below. The Base Index is rebalanced monthly on the first Index Business Day of each calendar month (the “**Base Index Rebalancing Period**”). Each Index Business Day in a Base Index Rebalancing Period will be deemed a “**Base Index Rebalancing Day**” (for the avoidance of doubt the Base Index Rebalancing Period is comprised of one Base Index Rebalancing Day).

Goldman, Sachs & Co, the “**Index Sponsor**” has retained Solactive AG to serve as “**Calculation Agent**” for the Index. In the event the Index Sponsor appoints a replacement Calculation Agent a public announcement will be made via press release.

Unless otherwise indicated, any public announcement contemplated by this Methodology shall be made on the website of the Calculation Agent.

### **Additional Information about the Index, Including Risks**

Anyone considering an investment in securities or derivatives referencing the Index should read the appendix to the Methodology entitled “Additional Information about the Index, Including Risks.” Neither the Index Sponsor nor any of its affiliates (including Goldman, Sachs & Co.) makes any representation or warranty, express or implied, or accepts any liability or responsibility to the owner of any products referencing the Index or any member of the public regarding (i) the advisability of investing in securities generally, in the Index or in the Underlying Indices or (ii) the ability of the Index to generate positive results. If you consider acquiring any product referencing the Index you should consult your own accounting, tax, investment and legal advisors before doing so.

### **The Methodology**

#### *Overview*

At any given time, the Base Index tracks the weighted return of the Underlying Assets. Most of the Underlying Assets are indices, and the performance of the Underlying Indices reflect the total return of a hypothetical investment in the assets included in that Underlying Index. The respective weights of the Underlying Assets, which can be as low as zero, are rebalanced monthly over the relevant Base Index Rebalancing Period within a set of pre-determined investment and volatility constraints by applying the Methodology algorithm. On any Total Return Index Rebalancing Day, the Total Return Index may be rebalanced, with revised weights for the Base Index and the Deleverage Position as a result of the volatility control feature of the Methodology. Under certain limited circumstances described under “Delayed Rebalancing”, the Calculation Agent may delay any Base Index Rebalancing Day or Total Return Index Rebalancing Day in its sole discretion. In addition, the Index Committee intends to review the Methodology at least once a year, and may make changes to the Methodology from time to time (including after any such annual review) if it determines, in its sole discretion, that such changes are necessary or desirable in light of the goals of the Index. Any such changes to the

Methodology will be publicly announced at least 60 Index Business Days prior to their effective date. The Index is designed to be an investable index.

### *Base Index Rebalancing*

On each Base Index Observation Day, the Calculation Agent, pursuant to the Methodology and subject to the applicable constraints, seeks to select the combination of permitted Underlying Asset weights with the highest historical total return (as described under “*Calculation of the Underlying Assets Target Weights*” below). The Base Index will then be reweighted over the Base Index Rebalancing Period from the previous Underlying Asset weights to the newly determined Underlying Asset weights.

### *Total Return Index Rebalancing and Volatility Control Feature*

The Methodology has a volatility control feature applied on any Total Return Index Rebalancing Day. This has the effect of reducing the exposure of the Total Return Index to the performance of the Base Index (and subsequently the Underlying Assets) by rebalancing a portion of the Base Index into the Deleverage Position if the realized volatility of the Base Index exceeds the Volatility Cap (as defined under “*Total Return Index Rebalancing and Volatility Control*” below) on any Total Return Index Rebalancing Day.

### *Notional Interest Rate*

The Index is calculated on an excess return basis over the return that could be earned on a notional cash deposit at the Notional Interest Rate, compounded daily, and is adjusted by the Daily Index Cost (that cost having the effect of reducing the Index Value). The Notional Interest Rate will be reset daily, on each Index Business Day, starting from and including the Index Base Date. Each such date is referred to herein as an “**Interest Rate Reset Date**”.

## **Internal Currency Hedge**

### *Overview*

In respect of Underlying Indices denominated in currencies other than U.S. dollars, the Index has an internal simulated currency hedge, which, through a series of hypothetical currency hedging transactions entered into in respect of each Valuation Period (as further described below), seeks to mitigate the exposure to exchange rate fluctuations in such currencies on the values of the non-U.S. dollar denominated Underlying Indices. See “*Additional Information About the Index, Including Risks*” below.

### *Methodology*

In respect of a non-U.S. dollar denominated Underlying Index, on each Asset Business Day (an Asset Business Day for an Underlying Index as specified in the Annex), the performance of the given non-U.S. dollar-denominated Underlying Index for the period from the Asset Rebalancing Day (as specified in the Annex) immediately preceding such given Asset Business Day to such given Asset Business Day (the “**Valuation Period**”) is determined. The performance of each non-U.S. dollar-denominated Underlying Index for the relevant Valuation Period consists of two

types of components: the foreign Currency Borrowing Amount *plus* the adjusted change in the Underlying Index level as a result of the hedging transactions. The foreign Currency Borrowing Amount for the relevant Valuation Period is equal to the performance of a notional cash deposit in U.S. dollars accruing interest at the Notional Interest Rate *minus* the product of (i) the performance of such notional cash deposit accruing interest at the interest rate for such non-U.S. currency designated in the annex *times* (ii) the performance of the applicable Currency Exchange Rate (defined below). The Currency Borrowing Amount may be positive or negative. The change in the Underlying Index level for each non-U.S. dollar denominated Underlying Index is equal to the *product* of (a) the performance over such Valuation Period of an investment in the non-U.S. dollar-denominated Underlying Index *times* (b) the performance of the applicable currency exchange rate (the “**Currency Exchange Rate**”, as specified in the Annex). The internal currency hedge is further described in “*Calculation of the Underlying Asset Value*” below.

### **Publication of the Index**

Solactive AG (the “**Calculation Agent**”) calculates and publishes the value of the Index on each Index Business Day and publishes it on both Bloomberg and Reuters. The relevant tickers are specified in the Annex.

Neither Goldman, Sachs & Co. nor any of its affiliates (individually and collectively, “Goldman Sachs”) makes any representation or warranty, express or implied, regarding the advisability of investing in products that may be linked to the Index or the investment strategy underlying the Index, particularly, the ability of the GS Momentum Builder<sup>®</sup> Multi-Asset Class Index to perform as intended, the merit (if any) of obtaining exposure to the GS Momentum Builder<sup>®</sup> Multi-Asset Class Index, or the suitability of purchasing or holding interests in any product linked to the Index. Goldman Sachs does not have any obligation to take the needs of the holders of products linked to the Index into consideration in determining, composing or calculating the GS Momentum Builder<sup>®</sup> Multi-Asset Class Index. GOLDMAN SACHS DOES NOT GUARANTEE THE ACCURACY AND/OR COMPLETENESS OF GS MOMENTUM BUILDER<sup>®</sup> MULTI-ASSET CLASS INDEX OR OF THE METHODOLOGY UNDERLYING THE INDEX, THE CALCULATION OF THE INDEX OR ANY DATA SUPPLIED BY IT FOR USE IN CONNECTION WITH ANY PRODUCT LINKED TO THE INDEX. GOLDMAN SACHS EXPRESSLY DISCLAIMS ALL LIABILITY FOR ANY SPECIAL, PUNITIVE, INDIRECT OR CONSEQUENTIAL DAMAGE EVEN IF NOTIFIED OF THE POSSIBILITY OF SUCH DAMAGES.

### **Publication of Changes to the Index and to the Methodology**

Changes to the components of the Index made by the Calculation Agent or, in certain cases, the Index Committee will be publicly announced as promptly as is reasonably practicable and normally at least five Index Business Days prior to the effective date of the changes. Changes to the Methodology made by the Index Committee will be publicly announced at least 60 Index Business Days prior to their effective date. Adjustments made by the Calculation Agent in response to market adjustment events and potential adjustment events will be publicly announced as promptly as is reasonably practicable.

## **Index Committee**

An Index Committee is responsible for overseeing the Index and the Methodology, while the Calculation Agent is responsible for the day to day implementation of the Methodology, for the calculation of the Index, including responding to Market Disruption Events (as defined under “Market Disruption Events” below) and potential adjustment events, and for publication of the Index values and the Methodology. The Index Committee is committed to maintaining the Index as a liquid, tradable index. The Index Committee is currently comprised of three full-time employees of The Goldman Sachs Group, Inc. or one or more of its affiliates.

The Index Committee may exercise limited discretion with respect to the Index, as contemplated by the Methodology, including in the situations described under “Changes to the Index Components”. Any such changes or actions are publicly announced as promptly as is reasonably practicable and normally at least five Index Business Days prior to their effective date. The Calculation Agent may from time to time consult the Index Committee on matters of interpretation with respect to the Methodology.

Because the Index Committee considers information about changes to the Index and related matters that may be potentially market moving and material, all Index Committee discussions, including those with the Calculation Agent, are confidential. The Index Committee will determine the successor of any of its members.

## **Changes to the Index Components**

The designated Underlying Assets of the Index as well as the Currency Borrowing Amount Rates, Currency Exchange Rates and the Notional Interest Rate are not expected to be changed or replaced. However, if, for any reason any of the following events occur:

- the Underlying Index Sponsor of an Underlying Index announces that it will make a material change in the formula for or the method of calculating such Underlying Index (or the selection of the components thereof) or otherwise materially modifies such Underlying Index (or the selection of the components thereof) for the purpose of maintaining such Underlying Index;
- an Underlying Index is no longer published by its Underlying Index Sponsor or is no longer tradable (as determined by the Calculation Agent in consultation with the Index Committee) in light of regulatory or similar requirements;
- any third-party Underlying Index Sponsor of an Underlying Index terminates its license with the Index Sponsor and its affiliates such that neither the Index Sponsor nor any of its affiliates may use the Underlying Index or any related index in connection with any financial product or index;
- the applicable Currency Exchange Rate, related currency or Currency Borrowing Amount Rate ceases to exist; or
- the Notional Interest Rate ceases to exist,

then such Underlying Asset, Notional Interest Rate, Currency Exchange Rate or Currency Borrowing Amount Rate will be replaced by a successor index or rate that, in the determination of the Index Committee in its sole discretion, most closely replicates, in the case of an index, the constituents and method of calculation of the Underlying Index, provided that the Index Sponsor has rights to use such index as an Underlying Index, and in other cases, the relevant rate or currency. If the Index Committee determines in its sole discretion that no successor index exists, such Underlying Index will be removed from the Index.

Such deletions and substitutions may be undertaken during a rebalancing or in between rebalancing dates. Any such changes or actions taken with respect to the Index by the Index Committee are publicly announced as promptly as is reasonably practicable and normally at least five Index Business Days prior to the effective date of the changes or actions, and will be reflected in an updated version of this Methodology.

## **Underlying Asset Weights, Base Index Rebalancing and Total Return Index Rebalancing**

### *Overview*

The respective target weights of the Underlying Assets (each, an “**Underlying Asset Target Weight**” and together the “**Underlying Assets Target Weights**”), which can be as low as zero, are determined on each Base Index Observation Day, within the investment and volatility maximum constraints described in the attached Constraints Schedule and below, by applying the Methodology algorithm. The weights of the Underlying Assets (each an “**Underlying Asset Weight**” and together the “**Underlying Assets Weights**”) in the Base Index will then be adjusted gradually over the Base Index Rebalancing Period to meet the Underlying Assets Target Weights. The Calculation Agent is required to delay a Base Index Rebalancing Day under certain circumstances described below under “Delayed Rebalancing”.

### *Calculation of the Underlying Assets Target Weights*

The target weight attributed to each Underlying Asset pursuant to the Methodology on each Base Index Observation Day (regardless of whether a Market Disruption Event occurs or is occurring on that day) is intended to optimize the total return performance of the Underlying Assets based on an analysis of the historical returns of the Underlying Assets, subject to the constraints included in the Methodology.

For each Look-Back Period, the Methodology algorithm seeks to select — out of all the combinations of admissible Underlying Assets Target Weights within a set of investment constraints and volatility constraints described below — the combination with the highest Annualized Assets Combination Return. Among other things, this requires the Calculation Agent to calculate the Annualized Assets Combination Return and the Annualized Assets Combination Realized Volatility for each relevant Look-Back Period.

The Underlying Asset Target Weight for an Underlying Asset will be equal to the average of the target weights for that Underlying Asset determined in respect of each Look-Back Period (with rounding effects treated as described below under “Rounding Convention”). For the avoidance of doubt, rounding will be applied only when calculating the average of the target weights but not at the level of each individual Look-Back Period.

If on a Base Index Observation Day, for any Look-Back Period, no combination of Underlying Assets Target Weights complies with the pre-defined investment and volatility constraints, then the Methodology algorithm will select from all combinations of Underlying Assets Target Weights that comply with the investment constraints, the combination with the lowest Annualized Assets Combination Realized Volatility, regardless of that combination's Annualized Assets Combination Return. The particular combination so selected for such Look-Back Period will therefore exceed the volatility constraint.

The “**Look-Back Period**” on any given Index Business Day is the period from (and including) the day which falls respectively nine (9), six (6) or three (3) calendar months before the second Index Business Day prior to the given Index Business Day (or, if any such date is not an Index Business Day, the preceding Index Business Day) to (and including) the third Index Business Day prior to the given Index Business Day.

- Investment Constraints: Investment constraints set a minimum weight of 0% and maximum weight for each Underlying Asset. Negative weights (that is, short positions) are not permitted by the Methodology, but weights can be as low as zero so that the performance of zero-weighted Underlying Assets would not be reflected in the performance of the Base Index for the relevant periods. The sum of the weights of all Underlying Assets in the Base Index is always equal to 100% (with rounding effects treated as described below under “Rounding Convention”).

Where, among other situations described under “Changes to the Index Components”, the publication of an Underlying Index is discontinued and there is no successor index, it will be deemed to have been assigned a zero weight in the Base Index and will be replaced with a hypothetical position in the Money Market Position. At the next Base Index Observation Day, the target weights of the remaining Underlying Assets will be calculated pursuant to the Methodology except that any Underlying Index for which the publication is discontinued and there is no successor index will be assigned a zero weight.

The maximum weight per Underlying Asset (the “**Underlying Asset Maximum Weight**”) and the minimum weight per Underlying Asset (the “**Underlying Asset Minimum Weight**”) applicable to the Index are set out in the attached Constraints Schedule.

- Volatility Constraint: The volatility constraint of the Methodology sets a limit of 4.5% on the Annualized Assets Combination Realized Volatility within a Look-Back Period of any selected combination of Underlying Assets Target Weights.

Realized volatility is a historical calculation of the degree of movement based on prices or values of an asset observed periodically in the market over a specified period. The realized volatility of an asset is characterized by the frequency of the observations of the asset price used in the calculation and the period over which observations are made.

Rounding Convention: The target weight of each Underlying Asset computed at each Base Index Observation Day is rounded to the nearest three decimal places with 0.05% (0.0005) being rounded upward. For example, if the optimal weight is 12.36% (0.1236), it would be rounded up



to 12.4% (0.124). The effect of rounding is that the sum of the rounded weights may not add up to 100%. For this reason, at each Base Index Observation Day, the sum of the rounded target weights is deducted from 100%. If the resulting excess weight is positive, it is added to the Underlying Asset with the highest average historical return over the three Look-Back Periods regardless of whether this might cause the target weight of that Underlying Asset to exceed any of the constraints specified above. If the resulting excess weight is negative, its absolute value is subtracted from the target weight of the Underlying Asset that had the lowest average historical return over the three Look-Back Periods and a target weight higher than the absolute value of the excess amount being deducted regardless of whether this might cause the target weight of the Underlying Asset to exceed any of the constraints specified above.

#### *Calculation of the Underlying Asset Weights*

On each Base Index Rebalancing Day<sub>(t)</sub>, the Underlying Asset Weight<sub>(i)</sub> of an Underlying Asset<sub>(i)</sub> is calculated according to the following formula:

$$w_{i,t} = w_{i,BRt} + \frac{w_{i,BOt}^{Target} - w_{i,BRt}}{p}$$

Where:

*Subscript (t)* refers to the relevant Base Index Rebalancing Day

*Subscript (BRt)* refers to the Base Index Rebalancing Day immediately preceding Base Index Rebalancing Day<sub>(t)</sub>

$w_{i,t}$  is the Underlying Asset Weight<sub>(i)</sub> on calendar day<sub>(t)</sub>

$w_{i,BOt}^{Target}$  is the Underlying Asset Target Weight<sub>(i)</sub> that was determined (as set forth under “*Calculation of the Underlying Assets Target Weights*” above ) on the Base Index Observation Day on or immediately preceding Base Index Rebalancing Day<sub>(t)</sub>

$p$  is the number of remaining Base Index Rebalancing Days (and including such Base Index Rebalancing Day<sub>(t)</sub>) in the related Base Index Rebalancing Period

#### *Calculation of the Annualized Assets Combination Return*

The Annualized Assets Combination Return, during the relevant Look-Back Period, of each admissible combination of Underlying Assets Target Weights, with respect to any given Base Index Observation Day, is calculated according to the following formula:

$$AAC\_Return_{BOt} = \sum_{i=1}^n a_i \times AssetReturn_{i,BOt}$$

Where:

$AAC\_Return_{BOt}$  is the Annualized Assets Combination Return, during the relevant Look-Back Period, of the given combination of Underlying Assets Target Weights

$n$  is the number of Underlying Assets (9)

$a_i$  is the Underlying Asset Target Weight<sub>(i)</sub> in the given combination of Underlying Assets Target Weights

*Subscript*  $_{BOt}$  refers to the relevant Base Index Observation Day

$AssetReturn_{i,BOt}$  is the Annualized Asset Return of the Underlying Asset<sub>(i)</sub> as of the Base Index Observation Day<sub>(BOt)</sub>, and is calculated according to the following formula:

$$AssetReturn_{i,BOt} = \frac{252}{N_{BOt}} \times \sum_s \ln \left( \frac{A_{i,s+1}}{A_{i,s}} \right)$$

Where:

$AssetReturn_{i,BOt}$  is the Annualized Asset Return, during the relevant Look-Back Period, of the Underlying Asset<sub>(i)</sub>

$N_{BOt}$  is the actual number of Index Business Days within the relevant Look-Back Period

*Subscript*  $_{(BOt)}$  refers to the relevant Base Index Observation Day

*Subscript*  $_{(s)}$  refers to each Index Business Day within the relevant Look-Back Period

$A_{i,s}$  is the Underlying Asset Value<sub>(i)</sub> on Index Business Day<sub>(s)</sub>

$A_{i,s+1}$  is the Underlying Asset Value<sub>(i)</sub> on the Index Business Day immediately following Index Business Day<sub>(s)</sub>.

#### *Calculation of the Annualized Assets Combination Realized Volatility*

The Annualized Assets Combination Realized Volatility, during the relevant Look-Back Period, of each admissible combination of Underlying Assets Target Weights, with respect to any Base Index Observation Day, is calculated (subject to the impact of disruptions as described below) according to the following formula:

$$AAC\_Realized\_Volatility_{BOt} = \sqrt{\sum_{i,j=1}^n a_i \times a_j \times AssetCovariance_{i,j,BOt}}$$

Where:

$AAC\_Realized\_Volatility_{BOt}$  is the Annualized Assets Combination Realized Volatility, during the relevant Look-Back Period, of the given combination of Underlying Assets Target Weights  
 $n$  is the number of Underlying Assets (9)

$a_i$  is the Underlying Asset Target Weight<sub>(i)</sub> in the given combination of Underlying Assets Target Weights

$a_j$  is the Underlying Asset Target Weight<sub>(j)</sub> in the given combination of Underlying Assets Target Weights

*Subscript*  $_{BOt}$  refers to the relevant Base Index Observation Day

$AssetCovariance_{i,j,BOt}$  is the Annualized Asset Co-Variance between Underlying Asset<sub>(i)</sub> and Underlying Asset<sub>(j)</sub> during the relevant Look-Back Period, and is calculated according to the following formula:

$$AssetCovariance_{i,j,BOt} = \frac{252}{N_{BOt}} \times \sum_s \left[ \ln \left( \frac{A_{i,s+1}}{A_{i,s}} \right) \times \ln \left( \frac{A_{j,s+1}}{A_{j,s}} \right) \right]$$

Where:

*Subscript* <sub>(s)</sub> refers to each Index Business Day within the relevant Look-Back Period

*Subscript* <sub>BOt</sub> refers to the relevant Base Index Observation Day

*N*<sub>BOt</sub> is the actual number of Index Business Days within the relevant Look-Back Period

*A*<sub>i,s</sub> is the Underlying Asset Value<sub>(i)</sub> on Index Business Day<sub>(s)</sub>

*A*<sub>i,s+1</sub> is the Underlying Asset Value<sub>(i)</sub> on the Index Business Day immediately following Index Business Day<sub>(s)</sub>

*A*<sub>j,s</sub> is the Underlying Asset Value<sub>(j)</sub> on Index Business Day<sub>(s)</sub>

*A*<sub>j,s+1</sub> is the Underlying Asset Value<sub>(j)</sub> on the Index Business Day immediately following Index Business Day<sub>(s)</sub>.

#### *Calculation of the Underlying Asset Value*

The Underlying Asset Value of the Money Market Position is equal to the Money Market Position Value, which is calculated as set forth under “*The Money Market Position – Calculation of the Money Market Position Value*” below.

For Underlying Assets other than the Money Market Position, the Underlying Asset Value<sub>(i)</sub> of an Underlying Asset<sub>(i)</sub> on the Asset Base Date (as specified in the Annex) is equal to 100. On any Asset Business Day<sub>(t)</sub> (an Asset Business Day for an Underlying Asset as specified in the Annex) following the Asset Base Date, the Underlying Asset Value<sub>(i)</sub> of an Underlying Asset<sub>(i)</sub> is calculated according to the following formula:

If the Reference Level of the Underlying Asset is reported in U.S. dollars

$$A_{i,t} = A_{i,ART} \times \frac{I_{i,t}}{I_{i,ART}}$$

If the Reference Level of the Underlying Asset is reported in a currency other than U.S. dollars:

$$A_{i,t} = A_{i,ART} \times \left[ \frac{DEA_{i,t}^{USD}}{DEA_{i,ART}^{USD}} - \left( \frac{CBA_{i,t}^{CCY}}{CBA_{i,ART}^{CCY}} \times \frac{FX_{i,t}}{FX_{i,ART}} \right) + \left( \frac{I_{i,t}}{I_{i,ART}} \times \frac{FX_{i,t}}{FX_{i,ART}} \right) \right]$$

Where:

*Subscript* <sub>(t)</sub> refers to the given Asset Business Day

*Subscript* <sub>(ART)</sub> refers to the Asset Rebalancing Day (as specified in the Annex) immediately preceding Asset Business Day<sub>(t)</sub> with respect to Underlying Asset<sub>(i)</sub>

*Superscript* <sub>(CCY)</sub> refers to the relevant currency

$A_{i,ARt}$  means the Underlying Asset Value<sub>(i)</sub> as of date<sub>(ARt)</sub>

$I_{i,t}$  means the Reference Level of Underlying Asset<sub>(i)</sub> (determined as specified in the Annex) as of date<sub>(t)</sub>

$I_{i,ARt}$  means the Reference Level of Underlying Asset<sub>(i)</sub> (determined as specified in the Annex) as of date<sub>(ARt)</sub>

$FX_{i,t}$  means the applicable Currency Exchange Rate for Underlying Asset<sub>(i)</sub> as of date<sub>(t)</sub>

$FX_{i,ARt}$  means the applicable Currency Exchange Rate for Underlying Asset<sub>(i)</sub> as of date<sub>(ARt)</sub>

$DEA_{i,t}^{USD}$  means the U.S. dollar Earning Amount Level (determined as described under “Calculation of the U.S. dollar Earning Amount Level”) as of date<sub>(t)</sub>

$DEA_{ARt}^{USD}$  means the U.S. dollar Earning Amount Level (determined as described under “Calculation of the U.S. dollar Earning Amount Level”) as of date<sub>(ARt)</sub>

$CBA_{i,t}^{CCY}$  means the Currency Borrowing Amount Level (determined as described under “Calculation of the Currency Borrowing Amount Levels”) for the currency in which the non-U.S. dollar denominated Underlying Asset<sub>(i)</sub> is denominated as of date<sub>(t)</sub>

$CBA_{i,ARt}^{CCY}$  means the Currency Borrowing Amount Level determined as described under “Calculation of the Currency Borrowing Amount Levels”) for the currency in which the non-U.S. dollar denominated Underlying Asset<sub>(i)</sub> is denominated as of date<sub>(ARt)</sub>

#### *Calculation of the U.S. dollar Earning Amount Level*

The U.S. dollar Earning Amount Level has an initial value of 100 as of the U.S. dollar Earning Amount Base Date (as specified in the Annex).

On any calendar day<sub>(t)</sub> following the U.S. dollar Earning Amount Base Date, the U.S. dollar Earning Amount Level will be calculated according to the following formula:

$$DEA_t^{USD} = DEA_{NRt}^{USD} \times (1 + NIR_{NRt} \times DCF_{NRt,t})$$

Where:

*Subscript* <sub>(t)</sub> refers to the given calendar day

*Subscript* <sub>(NRt)</sub> refers to the Notional Interest Rate Reset Day (as specified in the Annex) immediately preceding calendar day<sub>(t)</sub>

$DEA_t^{USD}$  means the U.S. dollar Earning Amount Level as of date<sub>(t)</sub>

$DEA_{NRt}^{USD}$  means the U.S. dollar Earning Amount Level as of date<sub>(NRt)</sub>

$NIR_{NRt}$  means the Notional Interest Rate as of date<sub>(NRt)</sub>

$DCF_{NRt,t}$  is the day count fraction for the period from (but excluding) date<sub>(NRt)</sub> to (and including) date<sub>(t)</sub>, determined by using the Day Count Convention (as specified in the Annex)

#### *Calculation of the Currency Borrowing Amount Levels*

The Currency Borrowing Amount Level of each of the relevant currencies has an initial value of 100 as of the Currency Borrowing Amount Base Date (as specified in the Annex).

On any calendar day<sub>(t)</sub> following the Currency Borrowing Amount Base Date, the Currency Borrowing Amount Level for each of the relevant currencies will be calculated according to the following formula:

$$CBA_t^{CCY} = CBA_{CRt}^{CCY} \times (1 + R_{CRt}^{CCY} \times DCF_{CRt,t}^{CCY})$$

Where:

*Subscript*  $(t)$  refers to the given calendar day

*Subscript*  $(CRt)$  refers to the Currency Borrowing Amount Rate Reset Day (as specified in the Annex) immediately preceding calendar day $(t)$

*Superscript*  $(CCY)$  refers to the relevant currency

$CBA_t^{CCY}$  means the Currency Borrowing Amount Level of the relevant currency as of the date $(t)$

$CBA_{CRt}^{CCY}$  means the Currency Borrowing Amount Level of the relevant currency as of date $(CRt)$

$R_{CRt}^{CCY}$  means the Currency Borrowing Amount Rate of the relevant currency as of date $(CRt)$

$DCF_{CRt,t}^{CCY}$  is the day count fraction for the period from (but excluding) date $(CRt)$  to (and including) date $(t)$ , determined by using the Currency Borrowing Amount Rate Day Count Convention of the relevant currency (as specified in the Annex)

#### *Total Return Index Rebalancing and Volatility Control*

The Methodology has a volatility control feature applied on any Total Return Index Rebalancing Day. This has the effect of reducing the exposure of the Total Return Index to the performance of the Base Index (and subsequently the Underlying Indices) by rebalancing a portion of the Base Index into the Deleverage Position if the realized volatility of the Base Index exceeds the Volatility Cap of 5% (the “**Volatility Cap**”) on any Total Return Index Rebalancing Day.

To operate the volatility control, the annualized historical realized volatility of the Base Index (the “**Annualized Base Index Realized Volatility**”) is calculated (subject to the impact of disruptions as described below) over the relevant Volatility Cap Period (as described below) on each Total Return Index Rebalancing Day. As long as on any given Total Return Index Rebalancing Day such calculated volatility is equal to or less than the Volatility Cap, the weight of the Base Index in the Total Return Index will be set to 100% on that Total Return Index Rebalancing Day. However, if on any given Total Return Index Rebalancing Day such calculated volatility exceeds the Volatility Cap, the exposure of the Total Return Index to the Base Index will be partially rebalanced into the Deleverage Position for that Total Return Index Rebalancing Day, effected through a reduction of the Base Index weight (the “**Base Index Weight**”) determined as described under “*Calculation of the Total Return Index*”) to the percentage that is equal to the Volatility Cap divided by such calculated volatility. As a result, the respective Underlying Index weights within the Index will be ratably reduced.

With respect to any given Total Return Index Rebalancing Day, the “**Volatility Cap Period**” is the period from (and including) the day which falls three (3) calendar months (or, if any such date is not an Index Business Day, the preceding Index Business Day) before the second Index Business Day prior to the given Total Return Index Rebalancing Day to (and including) the third Index Business Day prior to the given Total Return Index Rebalancing Day

#### *Calculation of the Annualized Base Index Realized Volatility*

The Annualized Base Index Realized Volatility over the relevant Volatility Cap Period with respect to a given Total Return Index Rebalancing Day $(t)$  is calculated according to the following

formula:

$$Base\_Index\_Realized\_Volatility_{TRRt} = \sqrt{\frac{252}{N_{TRRt}} \times \sum_s \left[ \ln \left( \frac{B_{s+1}}{B_s} \right) \right]^2}$$

Where:

*Subscript*  $(TRRt)$  refers to the given Total Return Index Rebalancing Day

*Base\_Index\_Realized\_Volatility* $_{TRRt}$  is the Annualized Base Index Realized Volatility during the Volatility Cap Period as of the given Total Return Index Rebalancing Day

*Subscript*  $(s)$  refers to each Index Business Day within the relevant Volatility Cap Period

*Subscript*  $(s+1)$  refers to the Index Business Day immediately following each Index Business Day  $(s)$

$N_{TRRt}$  is the actual number of Index Business Days within the relevant Volatility Cap Period;

$B_s$  is the Base Index Value on date $(s)$

$B_{s+1}$  is the Base Index Value on the date $(s+1)$

#### *Delayed Rebalancing; Impact of Disruptions*

If a Base Index Rebalancing Day or a Total Return Index Rebalancing Day must be effected on an Index Business Day on which a Market Disruption Event (as defined in “Market Disruption Events”) occurs and is continuing with respect to any Underlying Asset included in the Index, the Calculation Agent shall postpone such Base Index Rebalancing Day or Total Return Index Rebalancing Day, as applicable, to the next Index Business Day on which no Market Disruption Event occurs or is continuing with respect to any Underlying Asset. The Calculation Agent shall then rebalance the Index as if (i) for each Underlying Asset that had not been affected by such Market Disruption Event, the Base Index Rebalancing Day (if applicable) and Total Return Index Rebalancing Day, respectively, occurred on the first day on which such Market Disruption Event occurred and (ii) for each Underlying Asset that had been affected by such Market Disruption Event, the Base Index Rebalancing Day (if applicable) and Total Return Index Rebalancing Day, respectively, occurred on the first day on which there was no Market Disruption Event occurring or continuing.

On the sixth Index Business Day following the occurrence of a Market Disruption Event with respect to any Underlying Asset included in the Index, if such Market Disruption Event is continuing, the Index Committee may determine in its sole discretion to instruct the Calculation Agent to rebalance the Index using a specified price. In the event the Index Committee determines on such sixth Business Day, in its sole discretion, that no such instructions should be given to the Calculation Agent, the Index Committee may revisit such determination on any Index Business Day thereafter on which the Market Disruption Event is continuing.

Solely for purposes of calculating Annualized Assets Combination Realized Volatility and Base Index Realized Volatility, for an Underlying Asset for which a Market Disruption Event has

occurred and is continuing on an Index Business Day, the Underlying Asset Value or the Base Index Value, as applicable, will (i) be calculated, in the event of a Trading Disruption related to movements in price that exceed limits established by the relevant exchange, by assuming the Reference Level of the affected Underlying Asset is equal to such price limit on such Index Business Day, (ii) be calculated, in the event of a Trading Disruption not related to movements in price that exceed limits established by the relevant exchange, by multiplying the Reference Level of the affected Underlying Asset on the immediately preceding relevant Index Business Day by the percentage change (whether positive or negative) of the Underlying Asset having the largest absolute change in Underlying Asset Value from the immediately preceding relevant Index Business Day to the relevant Index Business Day; *provided*, that if a Market Disruption Event has occurred and is continuing with respect to more than one Underlying Asset on an Index Business Day, then the Calculation Agent shall consult with the Index Committee to determine the values to be used for such disrupted Underlying Assets for purposes of calculating Annualized Assets Combination Realized Volatility and the Base Index Realized Volatility, such determination to be made by the Index Committee in its sole discretion based on its review of such market and other information as it believes relevant to such determination.

### Calculation of the Index

The Index Value on the Index Base Date is equal to 100. On any given Index Business Day<sub>(t)</sub> following the Index Base Date, the Index Value is calculated according to the following formula:

$$Index_t = Index_{IRt} \times \left[ \frac{TRV_t}{TRV_{IRt}} - Max(0, Interest\_Rate_{IRt}) \times DCF_{IRt,t} \right] \times e^{(-Deduction\_Rate \times DCF_{IRt,t})}$$

Where:

*Subscript* <sub>(t)</sub> refers to the given Index Business Day<sub>(t)</sub>;

*Subscript* <sub>(IRt)</sub> refers to the Interest Rate Reset Date immediately preceding (but not including) Index Business Day<sub>(t)</sub>

*Index*<sub>t</sub> means the Index Value as of date<sub>(t)</sub>

*Index*<sub>IRt</sub> means the Index Value as of date<sub>(IRt)</sub>

*TRV*<sub>t</sub> means the Total Return Index Value as of date<sub>(t)</sub>

*TRV*<sub>IRt</sub> means the Total Return Index Value as of date<sub>(IRt)</sub>

*Interest\_Rate*<sub>IRt</sub> means the Notional Interest Rate as of date<sub>(IRt)</sub>

*Deduction\_Rate* means the Daily Index Cost of 0.50% per annum

*DCF*<sub>IRt,t</sub> is the day count fraction for the period from (but excluding) date<sub>(IRt)</sub> to (and including) the given Index Business Day<sub>(t)</sub>, determined by using the Day Count Convention (as specified in the Annex)

*e* means the exponential function

### Calculation of the Total Return Index

The Total Return Index Value on the Total Return Index Base Date is equal to 100. On any given Index Business Day<sub>(t)</sub> following the Total Return Index Base Date, the Total Return Index Value is calculated according to the following formula:

$$TRV_t = TRV_{TRRt} \times \left[ \frac{B_t}{B_{TRRt}} \times w_{TRRt}^B + \frac{DP_t}{DP_{TRRt}} \times (1 - w_{TRRt}^B) \right]$$

Where:

*Subscript* <sub>(t)</sub> refers to the given Index Business Day<sub>(t)</sub>

*Subscript* <sub>(TRRt)</sub> refers to the Total Return Index Rebalancing Day immediately preceding (but not including) Index Business Day<sub>(t)</sub>

*TRV*<sub>t</sub> means the Total Return Index Value as of date<sub>(t)</sub>

*TRV*<sub>TRRt</sub> means the Total Return Index Value as of date<sub>(TRRt)</sub>

*B*<sub>t</sub> means the Base Index Value as of date<sub>(t)</sub>

*B*<sub>TRRt</sub> means the Base Index Value as of date<sub>(TRRt)</sub>

*DP*<sub>t</sub> means the Deleverage Position Value as of date<sub>(t)</sub>

*DP*<sub>TRRt</sub> means the Deleverage Position Value as of date<sub>(TRRt)</sub>

*w*<sub>TRRt</sub><sup>B</sup> means the Base Index Weight as of date<sub>(TRRt)</sub> and is calculated according to the following formula

$$w_{TRRt}^B = \min \left( 100\%, \frac{VolatilityCap}{Base\_Index\_Realized\_Volatility_{TRRt}} \right)$$

Where:

*VolatilityCap* means the Volatility Cap (as defined under “*Total Return Index Rebalancing and Volatility Control*” above)

*Base\_Index\_Realized\_Volatility*<sub>TRRt</sub> means the Annualized Base Index Realized Volatility as of date<sub>(TRRt)</sub>.

#### *Deleverage Position Value*

On any Index Business Day<sub>(t)</sub> following the Total Return Index Base Date, the Deleverage Position Value is equal to the Money Market Position Value (defined below) on that Index Business Day<sub>(t)</sub>.

#### *Calculation of the Base Index*

The Base Index Value on the Base Index Base Date is equal to 100. On any given Index Business Day<sub>(t)</sub> following the Base Index Base Date, the Base Index Value is calculated according to the following formula:

$$B_t = B_{BRt} \times \left[ 1 + \sum_{i=1}^n w_{i,BRt} \times \left( \frac{A_{i,t}}{A_{i,BRt}} - 1 \right) \right]$$

Where:

*Subscript* <sub>(t)</sub> refers to the given Index Business Day<sub>(t)</sub>



*Subscript* <sub>(BRt)</sub> refers to the Base Index Rebalancing Day immediately preceding (but not including) Index Business Day<sub>(t)</sub>

*n* is the number of Underlying Assets (9)

*B<sub>t</sub>* means the Base Index Value as of date<sub>(t)</sub>

*B<sub>BRt</sub>* means the Base Index Value as of date<sub>(BRt)</sub>

*w<sub>i,BRt</sub>* is the Underlying Asset Weight<sub>(i)</sub> of Underlying Asset<sub>(i)</sub> as of date<sub>(BRt)</sub>

*A<sub>i,t</sub>* means the Underlying Asset Value<sub>(i)</sub> of Underlying Asset<sub>(i)</sub> as of date<sub>(t)</sub>

*A<sub>i,BRt</sub>* means the Underlying Asset Value<sub>(i)</sub> of Underlying Asset<sub>(i)</sub> as of date<sub>(BRt)</sub>

## The Money Market Position

### Overview

The Money Market Position is intended to express the notional returns accruing to a hypothetical investor from an investment in a notional overnight money account denominated in U.S. dollars that accrues interest at a rate determined by reference to the Notional Interest Rate (the Federal Funds Rate, determined as specified in the Annex). The Money Market Position will have a positive notional return if the Notional Interest Rate is positive.

### Calculation of the Money Market Position Value

The value of the Money Market Position (the “**Money Market Position Value**”) is equal to 100 on the Asset Base Date of the Money Market Position. On any calendar day<sub>(t)</sub> following the Index Base Date, the Money Market Position Value will be calculated according to the following formula:

$$MMPV_t = MMPV_{NRt} \times (1 + NIR_{NRt} \times DCF_{NRt,t})$$

Where:

*Subscript* <sub>(t)</sub> refers to the given calendar day

*Subscript* <sub>(NRt)</sub> refers to the Notional Interest Rate Reset Day (as specified in the Annex) immediately preceding calendar day<sub>(t)</sub>

*MMPV<sub>t</sub>* means the Money Market Position Value as of date<sub>(t)</sub>

*MMPV<sub>NRt</sub>* means the Money Market Position Value as of date<sub>(NRt)</sub>

*NIR<sub>NRt</sub>* means the Notional Interest Rate as of date<sub>(NRt)</sub>

*DCF<sub>NRt,t</sub>* is the day count fraction for the period from (but excluding) date<sub>(NRt)</sub> to (and including) date<sub>(t)</sub>, determined by using the Day Count Convention (as specified in the Annex)

## Historical Data

The “**Launch Date**” for the Index, which is the date the Calculation Agent began calculating the Index, is specified in the Annex. Therefore, historical information provided for the period from the Index Base Date until the Launch Date, is hypothetical and is provided as an illustration of how the Index would have performed during the period had the Calculation Agent begun calculating the Index on the Index Base Date using the Methodology. This data does not reflect

actual performance, nor was a contemporaneous investment model run of the Index. Historical information for the period from and after the Launch Date is based on the actual performance of the Index.

Historical levels of the Index are calculated with reference to the Reference Level of each Underlying Index determined based on the latest available data published by the relevant Underlying Index Sponsor (as specified in the Annex).

### **Market Disruption Events**

A “**Market Disruption Event**” will have occurred in any of the following situations:

- (i) The official closing price, level, rate or other measure of any Underlying Asset is unavailable on any relevant day on which such measure is scheduled to be published (including cases where a member of the Goldman Sachs Group is the Underlying Index Sponsor of an Underlying Index);
- (ii) a relevant Exchange is not open for trading during its regular trading session, or closes prior to its scheduled closing time, on any relevant day or there is a material Exchange Disruption (as determined by the Calculation Agent);
- (iii) upon the occurrence or existence of a Trading Disruption, for more than two hours of trading, or at any time during the one-hour period that ends at the scheduled closing time of the relevant Exchange;
- (iv) upon the occurrence or existence of an Index Dislocation;
- (v) upon the occurrence or existence of a Force Majeure Event;
- (vi) a Currency Exchange Rate Disruption Event; or
- (vii) an Interest Rate Disruption Event.

A “**Trading Disruption**” means any suspension of or limitation imposed on trading by the relevant Exchange, and whether by reason of movements in price exceeding limits permitted by the relevant reference exchange or otherwise, relating to any component of an Underlying Index.

An “**Exchange Disruption**” means any event that disrupts or impairs (as determined by the Calculation Agent in consultation with the Index Committee) the ability of market participants in general to effect transactions in, materially increases the costs of transacting in, or obtain market values for, any Underlying Index or its underlying constituents on the relevant Exchange.

“**Exchange**” means the relevant exchanges on which the components of the Underlying Indices are traded as set forth in the Annex.

An “**Index Dislocation**” means the Calculation Agent (in consultation with the Index Committee) determines that a market participant, as a result of a market-wide condition relating to the Index or any Underlying Asset would (i) be unable, after using commercially reasonable

efforts, to acquire, establish, re-establish, substitute, maintain, unwind, or dispose of all or a material portion of any hedge position relating to the Index or an Underlying Asset, or (ii) incur a materially increased cost in doing so, including due to any capital requirements or other law or regulation.

A “**Force Majeure Event**” means the Calculation Agent determines that there has been the occurrence of a systems failure, natural or man-made disaster, act of God, armed conflict, act of terrorism, riot or labor disruption or any similar intervening circumstance that is beyond the reasonable control of the Index Sponsor, Calculation Agent or any of their respective affiliates that Calculation Agent determines is likely to have a material effect on an Underlying Asset, or on its ability to perform its role in respect of the Index.

“**Currency Exchange Rate Disruption Event**” means (and a Currency Exchange Rate Disruption Event shall be deemed to have occurred if),

- (i) in respect of a Currency Exchange Rate and a relevant day:
  - a) such currency exchange rate splits into dual or multiple currency exchange rates;
  - b) the currency exchange rate specified in the Annex is not published on a date on which it is scheduled for publication and the Calculation Agent is unable to determine (after consultation with the Index Committee) any commercially reasonable substitute;
  - c) event has occurred in or affecting any relevant jurisdiction that generally makes it impossible to deliver (1) a relevant currency (as specified in the Annex) from accounts inside such jurisdiction to accounts outside such jurisdiction, or (2) a relevant currency (as specified in the Annex) between accounts inside such jurisdiction for the applicable reference currency or to a party that is a non resident of such jurisdiction; or
  - d) the applicable reference currency ceases to exist and has not been replaced by a new currency; and
- (ii) in respect of a Currency Borrowing Amount Rate and a relevant day:
  - a) such Currency Borrowing Amount Rate is not published on a date on which it is scheduled for publication; or
  - b) such Currency Borrowing Amount Rate is no longer published.

“**Interest Rate Disruption Event**” means (and an Interest Rate Disruption Event shall be deemed to have occurred if), in respect of the Notional Interest Rate and a relevant day:

- (a) such Notional Interest Rate is not published on a date on which it is scheduled for publication; or
- (b) such Notional Interest Rate is no longer published.

On any Index Business Day on which a Market Disruption Event occurs or is continuing with respect to any non-zero weighted Underlying Assets included in the Index, the Calculation Agent shall postpone calculation of the Index Value to the next Index Business Day on which no Market Disruption Event occurs or is continuing with respect to any Underlying Assets, and an indicative level for the Index will be published. Such level will be identified as a “disrupted indicative level”. The Calculation Agent shall resume calculating the Index Value on the first Index Business Day on which no Market Disruption Event is occurring or continuing with respect to any Underlying Asset by using (i) for the weight of each Underlying Asset that had not been affected by such Market Disruption Event, the weight that would have been used as if the Base Index Rebalancing Day (if applicable) and Total Return Index Rebalancing Day, respectively, occurred on the first day on which such Market Disruption Event occurred and (ii) for the weight of each Underlying Asset that had been affected by such Market Disruption Event, the weight of the Index Business Day immediately preceding the first day of such Market Disruption Event. The Calculation Agent, in consultation with the Index Committee, may use the Currency Borrowing Amount Rate or Notional Interest Rate in effect prior to such market disruption during the period of any market disruption event with respect to a Currency Borrowing Amount Rate.

On the sixth Index Business Day following the occurrence of a Market Disruption Event with respect to any Underlying Assets included in the Index, if such Market Disruption Event is continuing and such Underlying Assets have not been removed from the Index, the Index Committee may determine in its sole discretion to instruct the Calculation Agent to calculate the Index, using a price for such Underlying Assets as determined by the Index Committee in its sole discretion. In the event the Index Committee determines on such sixth Business Day, in its sole discretion, that no such instructions should be given to the Calculation Agent, the Index Committee may revisit such determination on any Index Business Day thereafter on which the Market Disruption Event is continuing.

Notwithstanding the foregoing, in the event of a Force Majeure Event in which all Underlying Assets are affected, the calculation and publication of the Index will be postponed until, in the determination of the Calculation Agent, such Force Majeure Event has been resolved.

### **Revision to Index Values in the Event of Data Error**

If the Calculation Agent determines that the price made available for an Underlying Index with a non-zero weighting in the Index (or the published level of a Notional Interest Rate, Currency Exchange Rate or Currency Borrowing Amount Rate) reflects a manifest error, the calculation of the Index shall be delayed until such time as a corrected price or level is made available. In the event a corrected price or level is not made available on a timely basis, or in the event that the price made available for an Underlying Index (or the published level of a Notional Interest Rate, Currency Exchange Rate or Currency Borrowing Amount Rate) is subsequently corrected and such correction is published, then the Calculation Agent may, if practicable and if the Calculation Agent determines acting in good faith that such error is material, adjust or correct the relevant calculation or determination, including the level of the Underlying Index, as of any Index Business Day to take into account such correction.

On any Base Index Observation Day or Total Return Index Rebalancing Day, respectively, during which the price for an Underlying Index reflects such an error (and such error has not been corrected), the Underlying Assets Target Weights, respectively the Base Index Weight, will be calculated using the price made available by the relevant Underlying Index Sponsor (notwithstanding any manifest error). If the Calculation Agent determines that any such error is material (as described above) and if the relevant Underlying Index Sponsor subsequently corrects the price it has made available, the Index Value may be calculated using such corrected price, but the quantities of the Underlying Assets implied by the Underlying Assets Target Weights and the Base Index Weight (prior to the error being corrected) will not be adjusted.

## **Licensing Information**

Goldman, Sachs & Co. is the sole licensing agent for the Index. Questions about licensing the Index can be directed to the individuals listed under “Contact Information” below.

## **Contact Information**

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## **Calculation Agent Website**

<http://www.solactive.com/>

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## ANNEX

Index Base Date	December 21, 2001*
Total Return Index Base Date	December 21, 2001
Base Index Base Date	September 4, 2001
Launch Date	July 25, 2014
Index Bloomberg Ticker	GSMBMAC Index
Index Reuters Ticker	.GSMBMAC
Index Business Day	Each day which is an Asset Business Day for all of the Underlying Assets
Asset Rebalancing Day	Each day that is an Asset Business Day for all of the Underlying Assets.
Notional Interest Rate	<p>USD-FEDERAL-FUNDS-H15 (as provided by Reuters on page FEDFUNDS1 or by another recognized source used for the purpose of displaying such rate).</p> <p>For any given calendar day which is not a scheduled publication day for the Notional Interest Rate, the Calculation Agent will use for such calendar day the Notional Interest Rate for the scheduled publication day immediately preceding such calendar day.</p>
Notional Interest Rate Reset Day	Each day which is a New York business day
Day Count Convention	Actual/360, meaning the number of days in the relevant period divided by 360.

\* The Index, including the Base Index and the Total Return Index, launched on the Launch Date. Each of the Underlying Indices also had a launch date that is different from the Asset Base Date shown below. Performance indicated before the relevant launch date is hypothetical and has been calculated back to the relevant base date using the methodology and assumptions about certain of the components and decisions the Calculation Agent of the Index or the Underlying Indices may have made. Index values calculated for periods in which the Index or any Underlying Index did not yet exist may not reflect the actual Index Value or Underlying Index level that would have been calculated on that date if, in fact, such index had existed at that point in time.

Currency Borrowing Amount Rates and Business Days	<b>Currency</b>	<b>Currency Borrowing Amount Rate</b>	<b>Currency Borrowing Amount Rate Business Days</b>	<b>Currency Borrowing Amount Rate Day Count Convention</b>
	EUR	On or before December 31, 2021, EUR-EONIA (as provided by Reuters on EONIA RSF.REC.EONIA=.NaE or another recognized source, as determined by the Calculation Agent, used for the purpose of displaying such rate). On or after January 3, 2022, 8.5bps + €STR (as provided by Reuters on EUROSTR= or another recognized source, as determined by the Calculation Agent, used for the purpose of displaying such rate).	Business days as per TARGET system	Actual/360, meaning the number of days in the relevant period divided by 360
	JPY	JPY-BOJ-TONAT (as provided by Reuters on RSF.REC.JPONMU=RR.NaE or another recognized source, as determined by the Calculation Agent, used for the purpose of displaying such rate)	Business days in Tokyo	Actual/365 Fixed, meaning the number of days in the relevant period divided by 365
	For any given calendar day which is not Currency Borrowing Amount Rate Business Day, the Calculation Agent will use the level of such Currency Borrowing Amount Rate published for the Currency Borrowing Amount Rate Business Day immediately preceding such calendar day.			
Currency Borrowing Amount Rate Reset Day	In respect of a Currency Borrowing Amount Rate, each day which is a Currency Borrowing Amount Rate Business Day			
U.S. dollar Earning Amount Base Date:	November 1, 2000			
Currency Borrowing Amount Base Date:	November 1, 2000			
Currency Exchange Rate	<p><b>One JPY into USD:</b> The 4 p.m. LDN closing spot mid rate for converting one unit of Japanese yen into US dollar as published by WM Performance Services or any successor company.</p> <p><b>One EUR into USD:</b> The 4 p.m. LDN closing spot mid rate for</p>			



	<p>converting one unit of Euro into US dollar as published by WM Performance Services or any successor company.</p> <p>The days on which the Currency Exchange Rates are usually fixed and published, as determined by the Calculation Agent, by WM Performance Services or any successor company are referred to herein as “<b>Fixing Days</b>”.</p> <p>If any calendar day is not a Fixing Day, the Calculation Agent will use the level of the relevant Currency Exchange Rate published for the applicable Fixing Day immediately preceding such calendar day.</p> <p>If any calendar day is a Fixing Day but the applicable Currency Exchange Rate is not available on such day at the applicable time indicated above, the Calculation Agent (after consultation with the Index Committee) shall determine the Currency Exchange Rate in a commercially reasonable manner.</p>
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### Overview of Underlying Assets

Underlying Asset	Asset Base Date*	Bloomberg Ticker	Currency	Asset Business Day	Exchange(s)	Reference Level	Underlying Index Sponsor	Additional Information
US Equity Futures Rolling Strategy Index	November 1, 2000	FRSIUSE Index	USD	Each day on which the Chicago Mercantile Exchange and the New York Stock Exchange are open for their regular trading session	Chicago Mercantile Exchange	The closing level as published by S&P, the index's calculation agent, or as reported by a third party vendor	Goldman Sachs International	<a href="http://www.goldmansachs.com/index-methodologies">http://www.goldmansachs.com/index-methodologies</a>
European Equity Futures Rolling Strategy Index	November 1, 2000	FRSIEUE Index	EUR	Each day on which the Eurex is open for its regular trading session	Eurex	The closing level as published by STOXX Limited, the index's calculation agent, or as reported by a third party vendor	Goldman Sachs International	<a href="http://www.goldmansachs.com/index-methodologies">http://www.goldmansachs.com/index-methodologies</a>
Japanese Equity Futures Rolling Strategy Index	November 1, 2000	FRSIJPE Index	JPY	Each day on which the Tokyo Stock Exchange is open for its regular trading session	Tokyo Stock Exchange	The closing level as published by S&P, the index's calculation agent, or as reported by a third party vendor	Goldman Sachs International	<a href="http://www.goldmansachs.com/index-methodologies">http://www.goldmansachs.com/index-methodologies</a>
US Government Bond Futures Rolling Strategy Index	November 1, 2000	FRSIUSB Index	USD	Each day on which the Chicago Board of Trade is open for its regular trading session and such day is not denoted as "Recommended Close" or as "Recommended Early Close" for the U.S. by the Securities Industry and Financial Markets Association on <a href="http://www.sifma.org/Services/Holiday-Schedule/">http://www.sifma.org/Services/Holiday-Schedule/</a> (or any successor page)	Chicago Board of Trade	The closing level as published by S&P, the index's calculation agent, or as reported by a third party vendor	Goldman Sachs International	<a href="http://www.goldmansachs.com/index-methodologies">http://www.goldmansachs.com/index-methodologies</a>

European Government Bond Futures Rolling Strategy Index	November 1, 2000	FRSIEUB Index	EUR	Each day on which the Eurex is open for its regular trading session	Eurex	The closing level as published by S&P, the index's calculation agent, or as reported by a third party vendor	Goldman Sachs International	<a href="http://www.goldmansachs.com/index-methodologies">http://www.goldmansachs.com/index-methodologies</a>
Japanese Government Bond Futures Rolling Strategy Index	November 1, 2000	FRSIJPB Index	JPY	Each day on which the Tokyo Stock Exchange is open for its regular trading session	Tokyo Stock Exchange	The closing level as published by S&P, the index's calculation agent, or as reported by a third party vendor	Goldman Sachs International	<a href="http://www.goldmansachs.com/index-methodologies">http://www.goldmansachs.com/index-methodologies</a>
Bloomberg WTI Crude Oil Subindex Total Return	November 1, 2000	BCOMCLTR Index	USD	Each day on which the New York Mercantile Exchange is open for its regular trading session	New York Mercantile Exchange	The closing level as published by Bloomberg, the index's calculation agent, or as reported by a third party vendor	Bloomberg	<a href="http://www.bloombergindexes.com/content/uploads/sites/3/content/uploads/sites/3/2014/06/Bloomberg-Commodity-Index-Methodology.pdf">http://www.bloombergindexes.com/content/uploads/sites/3/content/uploads/sites/3/2014/06/Bloomberg-Commodity-Index-Methodology.pdf</a>
Bloomberg Gold Subindex Total Return	November 1, 2000	BCOMGCTR Index	USD	Each day on which the COMEX is open for its regular trading session	COMEX	The closing level as published by Bloomberg, the index's calculation agent, or as reported by a third party vendor	Bloomberg	<a href="http://www.bloombergindexes.com/content/uploads/sites/3/content/uploads/sites/3/2014/06/Bloomberg-Commodity-Index-Methodology.pdf">http://www.bloombergindexes.com/content/uploads/sites/3/content/uploads/sites/3/2014/06/Bloomberg-Commodity-Index-Methodology.pdf</a>
Money Market Position	November 1, 2000	Not applicable	USD	New York business days	Not applicable	Money Market Position Value (as defined in the Methodology)	N/A	N/A

\* Each of the Underlying Indices had a launch date that is different from the Asset Base Date shown above. Performance indicated before the relevant launch date is hypothetical and has been calculated back to the relevant base date using the methodology and assumptions about certain of the components and decisions the Calculation Agents of the Underlying Indices may have made. Values calculated for periods in which any Underlying Index did not yet exist may not reflect the actual Underlying Index level that would have been calculated on that date if, in fact, such index had existed at that point in time.

## CONSTRAINTS SCHEDULE

### Investment Constraints

Underlying Asset	Underlying Asset Minimum Weight	Underlying Asset Maximum Weight
US Equity Futures Rolling Strategy Index	0%	30%
European Equity Futures Rolling Strategy Index	0%	30%
Japanese Equity Futures Rolling Strategy Index	0%	30%
US Government Bond Futures Rolling Strategy Index	0%	100%
European Government Bond Futures Rolling Strategy Index	0%	30%
Japanese Government Bond Futures Rolling Strategy Index	0%	30%
Bloomberg WTI Crude Oil Subindex Total Return	0%	25%
Bloomberg Gold Subindex Total Return	0%	25%
Money Market Position*	0%	100%

\*As described in the Methodology.

## ADDITIONAL INFORMATION ABOUT THE INDEX, INCLUDING RISKS

*Please note: Capitalized terms used but not defined in this Additional Information section have the meanings given to them in the methodology.*

The value of the Index from time to time depends on the values of the Underlying Assets, each of which may increase or decrease in value over time. Neither the Index nor any of the Underlying Assets includes any element of downside protection or guaranteed return. The value of any Underlying Asset, or the Index itself, may fall substantially below its value at the Launch Date or on any particular day and may fall to or below zero. If the value of the Index should fall to or below zero in respect of an Index Business Day, then the Index Value in respect of such Index Business Day and all following Index Business Days shall be zero.

Past performance of the Index is no guide to future performance. The Index was designed based on historical performance of certain assets and aims to capture trends in the market by using historical data over a pre-defined period. However, the actual performance of the Index in the future may bear little relation to the historical performance of the Index. In a market environment in which the price of a given Underlying Asset moves in the opposite direction to its past performance or a market environment in which the movement of an Underlying Asset is otherwise not consistent with its past performance, the Index may under-perform a static or managed allocation into the relevant Underlying Assets. Among other things, this is because the Index could be over-weighted in an Underlying Asset that suffers a significant decline in performance or be under-weighted in an Underlying Asset that experiences a major rise in performance as compared to its historical performance.

The Calculation Agent employs commercially available computer software that determines mathematical solutions to predefined mathematical problems (a “solver”) which uses a pre-defined set of optimization formulae to select the relevant asset weights for each Look-Back Period. If the Calculation Agent employed a different “solver”, the final set of weights selected might be different and possibly materially so. As such, the performance of the Index could be materially different. References in this Index description to the algorithm selecting a combination of Underlying Assets with “the highest historical return over the relevant Look-Back Period” should be understood to mean the highest return that can be computed using the “solver” employed by the Calculation Agent in administering the Index algorithm. There is no guarantee that this solver will determine the optimal set of weights and it is possible that there exists on any Base Index Observation Day a combination of weights with a higher return over the relevant Look-Back Period.

The weight attributed to each Underlying Asset at each Base Index Observation Day is intended to optimize the total return performance of the Underlying Assets based on an analysis of the historical returns of various combinations of exposures to the Underlying Assets, subject to certain constraints. As the possible weights are a continuous function, there is no simple function to test the various combinations of exposures and achieve the optimal set of weights. As a result, it is necessary to use approximations contained in computation routines.

The respective weights of the Underlying Assets are rebalanced periodically within the Index by applying an algorithm operating within pre-determined rules.

The Index has an internal currency hedge described further under “*Internal Currency Hedge*”. Underlying Indices that are denominated in U.S. dollars are not exposed to currency risks. Underlying Indices that are denominated in currencies other than U.S. dollars are fully exposed to currency risks to the extent of any gain or loss in the level of such Underlying Index on each Index Business Day. In addition, the Index’s currency hedge will decrease the Index level if and to the extent that the performance of the relevant currencies and of the non-U.S. dollar denominated Underlying Assets move in opposite directions. As a result of such movements, you will still be subject to the risk of currency fluctuations affecting the value of the Index on a daily basis. In addition, the Currency Borrowing Amounts included as part of the internal currency hedge will decrease the level of the Index.

The Index has only been calculated since the Launch Date and as such there is no historical performance data available in respect of it prior to that time. Additionally, there may be only limited historical performance data with respect to certain Underlying Assets. As a result, any investment the return of which is linked to the Index or such

Underlying Assets may involve greater risk than an exposure linked to indices or strategies with a longer term track record.

The absence of a long term track record with respect to certain Underlying Assets is particularly significant because the algorithm underlying the Index is based on historical trends in returns that may or may not be repeated in the future.

The Index, including the Base Index and the Total Return Index, launched on the Launch Date. Each of the Underlying Indices also had a launch date that is different from the Asset Base Date shown above. Performance indicated before the relevant launch date is hypothetical and has been calculated back to the relevant base date using the methodology and assumptions about certain of the components and decisions the Index Committee or Calculation Agent of the Index or the Underlying Indices may have made. Index values calculated for periods in which the Index or any Underlying Index did not yet exist may not reflect the actual Index Value or Underlying Index level that would have been calculated on that date if, in fact, such index had existed at that point in time.

Goldman Sachs Group members are sponsors of many of the Underlying Assets. In that capacity, each of them has the power to make determinations that could materially affect the value of those Underlying Assets and, in turn, the Index Value.

Goldman Sachs Group is a full service financial services firm engaged in a range of market activities. Goldman Sachs Group may issue, arrange for the issue of, or enter into financial instruments or derivatives linked to, the Index, other indices that are based on some or all of the Underlying Assets, or any of the Underlying Indices and arrange for the distribution of these financial instruments or derivatives, including the payment of distribution fees and commissions to any intermediaries. These activities could adversely affect the Index Value and any of the Underlying Assets.

With respect to any Underlying Index not sponsored by any member of the Goldman Sachs Group, the Index methodology relies on information from third-party sponsors of such Underlying Index or their calculation agents and other public sources. If you are considering acquiring or making an investment in a product linked to the Index, you should carefully read and understand the information about those Underlying Indices, which can be found using the links indicated therefor under Additional Information of the “Overview of Underlying Assets”. However, Goldman Sachs Group makes no warranty as to the correctness of that information and takes no responsibility for the accuracy of such data or the impact of any inaccuracy of such data on the Index.

The futures markets occasionally experience disruptions in trading (including temporary distortions or other disruptions due to various factors, such as the lack of liquidity in markets, the participation of speculators and governmental regulation and intervention). These disruptions include the cessation, for a material time, of trading in the futures contracts underlying an Underlying Index or the imposition by the futures exchange on which one or more such futures contracts are traded of a “limit price,” a range outside of which these futures contracts are not permitted to trade. In addition, a futures exchange may replace or delist a futures contract included in the Underlying Index. There can be no assurance that a disruption, replacement or delisting of a futures contract, or any other event, will not have an adverse or distortive effect on the value of an Underlying Index or the manner in which it is calculated.

The Underlying Indices are composed of futures contracts rather than securities or physical commodities. Futures contracts normally specify a certain date for settlement of a financial future (such as a futures contract on a securities index) or delivery of the underlying physical commodity. As the exchange-traded futures contracts that comprise each Underlying Index approach expiration, they are replaced by similar contracts that have a later expiration. Thus, for example, a futures contract purchased and held in August may specify an October expiration. As time passes, the contract expiring in October may be replaced by a contract for delivery in December. This process is referred to as “rolling”. Because of the potential effects of negative roll yields, it is possible for the value of an Underlying Index to decrease significantly over time even when the relevant securities indices or near-term or spot prices of underlying commodities are stable or increasing. It is also possible, when the relevant securities indices or the near-term or spot prices of the underlying commodities are decreasing, for the value of the Underlying Index to decrease significantly over time.

Some of the Underlying Indices consist of futures contracts on commodities. The Dodd-Frank Wall Street Reform and Consumer Protection Act (“Dodd-Frank”), which effected substantial changes to the regulation of the futures and over-the-counter (OTC) derivative markets, was enacted in July 2010. Dodd-Frank requires regulators, including the Commodity Futures Trading Commission (the “CFTC”), to adopt regulations to implement many of the requirements of the legislation. While the CFTC has adopted many of the required regulations, a number of them have only recently become effective, and certain requirements remain to be finalized. The ultimate impact of the regulatory scheme, therefore, cannot yet be fully determined. Under Dodd-Frank, the CFTC approved a final rule to impose limits on the size of positions that can be held by market participants in futures and OTC derivatives on physical commodities. Those rules were challenged in federal court by industry groups and were vacated by a decision of the court in September 2012. While the CFTC subsequently proposed a new rule on position limits, its ultimate scope and impact, as well as the content, scope or impact of other CFTC rules, cannot be conclusively determined at present, and these limits will likely restrict the ability of certain market participants to participate in the commodity, future and swap markets and markets for other OTC derivatives on physical commodities to the extent and at the levels that they have in the past. These factors may also have the effect of reducing liquidity and increasing costs in these markets as well as affecting the structure of the markets in other ways. In addition, these legislative and regulatory changes have increased, and will continue to increase, the level of regulation of markets and market participants, and therefore the costs of participating in the commodities, futures and OTC derivative markets. Without limitation, these changes require many OTC derivative transactions to be executed on regulated exchanges or trading platforms and cleared through regulated clearing houses. Swap dealers (as defined by the CFTC) are also required to be registered and are or will be subject to various regulatory requirements, including, but not limited to, proposed capital and margin requirements, record keeping and reporting requirements and various business conduct requirements. These legislative and regulatory changes, and the resulting increased costs and regulatory oversight requirements, could result in market participants being required to, or deciding to, limit their trading activities, which could cause reductions in market liquidity and increases in market volatility. In addition, transaction costs incurred by market participants are likely to be higher than in the past, reflecting the costs of compliance with the new regulations. These consequences could adversely affect the level of the Underlying Indices, which could in turn adversely affect the level of the Index.

In addition, other regulatory bodies have proposed or may propose in the future legislation similar to that proposed by Dodd-Frank or other legislation containing other restrictions that could adversely impact the liquidity of and increase costs of participating in the commodities markets. For example, in October 2011 the European Commission published a proposal to replace the Markets in Financial Instruments Directive (2004/39/EC) with a new Markets in Financial Instruments Regulation and an amended Markets in Financial Instruments Directive (together, “MiFID II”), which was adopted in April 2014. MiFID II provides for the establishment of position limits on the size of positions in commodity derivatives which a person may hold over a specified period of time. By way of further example, the European Market Infrastructure Regulation (Regulation (EU) No 648/2012) (“EMIR”) will require mandatory clearing of certain OTC derivative contracts, reporting of derivatives and risk mitigation techniques (including margin requirements) for uncleared OTC derivative contracts. EMIR will likely impact a number of market participants and is expected to increase the cost of transacting derivatives.

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