

**GOLDMAN SACHS INTERNATIONAL – RATES BENCHMARK FAMILY STATEMENT
(EXTERNAL DATA)**

Publication Date: 12 July 2019
Last Update: 22 December 2022

A. Definitions

- **Adjustment Events:** Business, market, legal, regulatory, judicial, financial, fiscal or other circumstances that may arise that could necessitate or make desirable a modification or change to a GSI Benchmark's methodology.
- **Administrator:** GSI acting as the "administrator" as defined in Article 3.1(6) of the EUBMR.
- **Benchmark:** A benchmark pursuant to Article 3.1(3) of the EUBMR.
- **Index Committee:** Oversight Function of GSI pursuant Article 5.1 of the EUBMR.
- **Calculation Agent:** GSI or a third party, when tasked with the determination of a GSI Benchmark.
- **Control Framework:** GSI's Policy and Control Framework, governing its benchmark administration activities.
- **EUBMR:** Regulation 2016/1011 of the European Parliament and of the Council of 8 June 2016 on indices used as benchmarks in financial instruments and financial contracts or to measure the performance of investment funds and amending Directives 2008/48/EC and 2014/17/EU and Regulation (EU) No 596/2014.
- **Expert Judgment:** The exercise of discretion by GSI, including, but not limited to, extrapolating values from prior or related transactions, adjusting values for factors that might influence the quality of data and weighting firm bids or offers greater than a particular concluded transaction.
- **GSI:** Goldman Sachs International.
- **GSI Benchmark:** A GSI administered Benchmark administered pursuant to Article 3.1(6) of the EUBMR or, an index that GSI may treat as if it is a benchmark under Article 3.1(3) EUBMR that GSI has grouped within the Rates Benchmark Family (External Data). GSI may consider certain indices that do not fall within the scope of the EUBMR, as if they are GSI Benchmarks for the purposes of applying the requirements of the EUBMR, but shall not be obliged to do so.
- **Incidents:** Input data or calculation errors or anomalies affecting the published level of the GSI Benchmarks.
- **Index:** An index pursuant to Article 3.1(1) of the EUBMR.
- **Internal Input Data:** Data already available in the Goldman Sachs Group prior to the provision of the GSI Benchmarks, which was created for purposes other than the determination of GSI Benchmarks.
- **Investor Disclosures:** Documentation outlining the methodology for each GSI Benchmark that is made available to counterparties to, or investors in, financial instruments referencing the GSI Benchmarks.

- **Input Data:** The data in respect of the value of one or more underliers used by GSI to determine an Index.
- **Non-significant benchmark:** A benchmark categorised as a non-significant benchmark following the provisions of Article 3.1(27) of the EUBMR.
- **Published Level:** The closing level of a benchmark as defined the relevant Investor Disclosures.
- **Restatement Event:** An incident that results in the restatement of the published level of a GSI Benchmark.
- **Statement:** The benchmark statement published by GSI pursuant Article 27 EUBMR.
- **Third Party Calculation Agent:** A third party to GSI involved in certain determinations and calculations in respect of a GSI Benchmark.
- **Third Party Data:** Combination of Third Party Transactional Data and Third Party Non-Transactional Data.
- **Third Party Non-Transactional Data:** Input data consisting of estimated prices, actual or estimated interest rates, quotes and committed quotes, or other values or surveys provided by third parties to GSI.
- **Third Party Transactional Data:** Input data in the form of observable prices, rates, indices or values representing transactions in third party trading venues or other market places where GSI may or may not participate.
- **Underliers:** Interest rates instruments and interest rates derivatives, including but not limited to bonds, bond futures, inflation, mortgages and swaps.

B. Statement Overview

The Global Banking & Markets business of GSI creates and sponsors a number of Benchmarks that it considers to be within the scope of the EUBMR.

This Statement is being published in accordance with Article 27 of the EUBMR. GSI classifies the GSI Benchmarks it administers into Benchmark Families for the purposes of the publication of the Statements.

This Statement intends to define the economic reality measured by the GSI Rates Benchmark Family (External Data) and the circumstances in which such measurement may become unreliable. The Statements also highlights, where applicable, any elements of the calculation of the GSI Benchmarks where GSI may apply discretion or expert judgment. The statement also

provides an overview of those internal or external factors which may require changes to the methodology of the GSI Benchmarks and the potential impact on the value of financial instruments referencing such GSI Benchmarks.

Information about the GSI Benchmarks' methodologies is available to counterparties to, or investors in, financial instruments referencing the GSI Benchmarks via the Investor Disclosures. Counterparties and investors should carefully read the relevant Investor Disclosures prior to making any investment decision on the GSI Benchmarks.

C. GSI Benchmarks' ISINs

The GSI Benchmarks do not have ISIN codes allocated to them at the time of publication of this Statement.

D. Contributions

The GSI Benchmarks are not determined using contributions of input data, as defined in Article 3.1(8) of the EUBMR.

E. Category of GSI Benchmarks

The GSI Benchmarks are non-significant benchmarks as set out in Article 3.1(27) of the EUBMR.

F. Market or economic reality measured by the GSI Rates Benchmark Family (External Data)

The GSI Benchmarks are based on synthetic rule based GSI proprietary strategies which aim to notionally replicate the realized performance of a systematic investment process referencing Underliers.

The indices may also include various types of computation steps which reference market data outside of the interest rates market including but not limited to a simulated currency hedge or a volatility target mechanism. Such computation steps referencing market data outside of the interest rates market are not expected to be the primary driver of the performance of the indices, and would be added to hedge foreign exchange exposure of the index underlying assets or target a particular level for the volatility of the GSI Benchmark.

In certain cases, the Underliers may be selected from one or more designated country (i.e. "US", "Germany"), and / or based on a set of criteria established by the Investor Disclosures.

G. GSI Benchmarks' Methodology

The methodologies of the GSI Benchmarks are developed by GSI to establish a set of rules, aiming to achieve a defined objective through replicating the performance of a basket of the Underliers. Detailed information related to the methodologies of the GSI Benchmarks, including calculation arrangements and parameters applied, input data used and a detailed description, can be found in the Investor Disclosures.

GSI Benchmarks are determined using prices of the Underliers, based on their relative weight or quantity determined as per the defined methodology, and relying on a combination of:

- (i) Third Party Transactional Data;
- (ii) Third Party Non-Transactional Data.

Changes in the value of the Underliers may impact their weighting in the Index and the value of the GSI Benchmarks. The value of the GSI Benchmarks may be reduced by the deduction of rebalancing costs, asset servicing costs and/or other types of deductions, each as specified in the Investor Disclosure.

Prior to being launched, new GSI Benchmarks are subject to a defined approval process including but not limited to approval by the Index Committee. The Index Committee:

- Reviews and approves new GSI Benchmarks;
- Periodically reviews and provides challenges on aspects of the provision of the GSI Benchmarks, including the GSI Benchmarks' methodologies, the expected or known usage of the GSI Benchmarks and the materiality of existing or potential conflicts of interests identified in respect of the GSI Benchmarks; and
- Oversees the implementation and control infrastructure as well as the continuous operation of GSI Benchmarks.

GSI is entitled to make modification or changes to the methodologies of the GSI Benchmarks, under circumstances defined in the Investor Disclosures, and subject to the oversight of the Index Committee. Circumstances may include correction of manifest or proven error, correction of contradictory or defective provisions, necessary changes to the calculation frequency, changes to allow the calculation and determination of weights and value in case of market, legal, regulatory, judicial or other changes. The changes may only result in methodologies that are consistent with the Investor Disclosures.

Changes to a GSI Benchmark's methodology may have an impact on financial instruments that reference the GSI Benchmark or the measurement of the performance of investment funds directly or indirectly linked to the GSI Benchmark. Specific processes related to review of and changes to the methodologies of the GSI Benchmarks and cessation of GSI Benchmarks are defined in the Investor Disclosures.

H. Input Data

Input data for the GSI Benchmarks is a combination of Third Party Data.

Input Data are subject to quality controls prior to being used in the determination of the GSI Benchmarks. Multiple different data sources may be used, where readily available to GSI or its appointed Third Party Calculation Agent, depending on the type of Input Data. GSI has controls in place to ensure completeness and accuracy of the input data used.

GSI uses multiple sources of input data for the determination of Benchmarks. In the event of a discrepancy between the data obtained from the different sources, GSI will strive to find alternative sources of data to corroborate the previously available input data. In limited circumstances, GSI may define different hierarchies for input data, depending on their precision in terms of the number of decimal places. The input data with the higher precision would be used by GSI for the determination of a Benchmark in those circumstances.

GSI may change the Input Data on which the GSI Benchmarks are determined and/or change the frequency of publication of the GSI Benchmarks following the provisions of the Investor Disclosures.

I. Discretion and Expert Judgment

GSI may apply discretion and/or Expert Judgment in limited circumstances, for example where GSI is required or entitled to make a determination in relation to a GSI Benchmark and that determination involves the exercise of Expert Judgment or discretion. Such, expert judgement or discretion is exercised in good faith and in a commercially reasonable manner, and subject to the GSI's Control Framework. This includes but is not limited to when a restatement of the GSI Benchmark is required or when dealing with errors in input data or disruption events including but not limited to market disruption events, asset substitution event and adjustment events.

J. Cessation of GSI Benchmarks

GSI may discontinue or terminate the determination and publication of the GSI Benchmarks, in accordance with the provision of the Investor Disclosures. The Index Committee may, prior to the discontinuation or cessation of a GSI Benchmark, assess the potential impact of the cessation. GSI will strive to inform stakeholders about the possibility of discontinuation and timeliness for discontinuation and will apply best efforts to offer alternative solutions to counterparties to, and investors in financial instruments referencing the GSI Benchmark to ensure an orderly transition out of the discontinued GSI Benchmark.

K. Incidents and Adjustment Events

From time to time Adjustment Events may arise that could necessitate or make desirable a modification or change to the GSI Benchmarks. The Index Committee approves all changes to the methodologies of GSI Benchmarks as a consequence of Adjustment Events.

Additionally, GSI maintains controls and processes to identify and correct Incidents. All Incidents, attributable to GSI or to a third-party are subject to internal policies and procedures for handling potential Restatement Events.

Unless otherwise specified, GSI may make adjustments to the GSI Benchmark as a result of Adjustment Events and Incidents. Adjustment Events and Incidents are subject to the oversight of the Index Committee and to the provisions of the Investor Disclosures. Those adjustments are announced, where necessary, to counterparties to, and investors in financial instruments referencing the GSI Benchmarks.

L. Limitations to the determination of GSI Benchmarks

GSI identifies as the main potential limitations to the determination of the GSI Benchmarks the following situations:

- Compromise of input data

The GSI Benchmarks' input data is generally available via third party data providers, which may be inaccessible and/or be compromised in certain circumstances. If the input data is compromised (for example as a result of an Adjustment Event), the Published Level could stop being a reliable representation of the market or economic reality the GSI Benchmarks intend to measure.

In those situations, GSI may lack alternative input data to determine the GSI Benchmarks in accordance with their methodologies. The Investor Disclosures document specifies provisions for the use of

alternative input data, including the possibility to use Internal Input Data in certain circumstances under the oversight of the Index Committee.

- Limitations in methodologies of the Benchmarks

Some methodologies may show constraints and limitations which, in certain events (for example in illiquid or fragmented markets or in the case of concentrated input data), may cause the GSI Benchmarks to not accurately capture the market or economic reality they intend to measure. These constraints and limitations could be a result of assumptions used in the design of the methodology or implementation complexities.

In addition, and as set out in the Investor Disclosures, trading activity on the Underliers, carried out by GSI or other market participants, could affect the Published Level of the GSI Benchmarks as well as the fundamental assumptions of the GSI Benchmarks' methodologies.