

Risk Signal Family Benchmark Statement¹

Date of publication	18/12/2019
Date of last update	15/05/2020
Calculation Frequency	Daily
Geographic boundaries of underlying market	Global

Non-significance of benchmarks

The Risk Signal family of Indices are non-significant indices (each index referred herein either as "Index" or as "benchmark" and the family of indices as "Indices" or as "benchmarks") and Deutsche Bank Index Quant ("DBIQ"), a research unit within Deutsche Bank AG, acts as the administrator for this family of Indices. The Indices qualify as non-significant benchmarks [pursuant to Article 3(1)(27) of Regulation (EU) No 2016/1011] because:

- a. None of them are used directly or indirectly within a combination of indices as a reference for financial instruments or financial contracts or for measuring the performance of investment funds, having a total value of at least EUR 50 billion on the basis of all the range of maturities or tenors of the Index, where applicable;
- b. None of them are based on submissions by contributors the majority of which are located in one European Member State and are recognised as being critical in that Member State in accordance with the procedure laid down in paragraphs 2, 3, 4 and 5 of Article 20 of Regulation (EU) No 2016/1011;
- c. In the event any of these Indices cease to be provided, or are provided on the basis of input data no longer fully representative of the underlying market or economic reality or on the basis of unreliable input data, there would be no significant and adverse impacts on market integrity, financial stability, consumers, the real economy, or the financing of households and businesses in one or more Member States.

ESG Disclosure

None of the benchmarks in this Risk Signal family of Indices pursue any environmental, social and governance ("ESG") objectives or take into account any ESG factors.

Index Summary

The DBIQ Risk Signal Family of indices are intended to act as barometers of risk. The level of perceived risk is calculated by observing recent and historic market data for one or more assets across asset classes. Each Index Description describes the range of possible signals and specific inputs.

Input Data Overview

The primary input data for the indices are publicly observed instrument market data. Exact details of the instruments and rates referenced are found if applicable in the Index Methodology;

¹ Capitalised terms not otherwise defined in this statement shall have the same meaning given to them in Regulation (EU) No 2016/1011.

DBIQ Benchmark Statement

Primary input data	3rd party indices – MSCI and VIX Interest rate curves and implied interest rate swaption volatility surfaces Interest rate data FX option implied volatility and FX rates Credit CDS Index Spreads
Primary input data classification	Non EU Regulated
Secondary input data	Not applicable
Secondary input data classification	Not applicable
Data quality checks applied	3rd party indices - standard data checks Interest rate curves - standard data checks + POA Interest rate implied volatility - standard data checks + POA Interest rate data - standard data checks + POA FX rates - standard data checks FX option implied volatility - standard data checks + POA DBIQ Indices - standard data checks Credit CDS Index Spreads - standard data checks + POA
Overall EU BMR Input Data Classification	Input Data

Governance Procedures

Each Index is a Deutsche Bank AG proprietary index. Each Index is the intellectual property of Deutsche Bank AG (“Deutsche Bank AG” or the “Index Owner” or the “Index Sponsor”, which expression shall include any successor in such capacity). The Index Owner owns the copyright and all other intellectual property rights to each Index and related documents. Each Index will be governed by the Index Administrator Deutsche Bank AG operating through Deutsche Bank Index Quant (“DBIQ”), a research unit within Deutsche Bank AG via its internal processes and the “Index Administrator” shall mean Deutsche Bank AG acting in such capacity or any successor thereto. The Index Administrator controls the creation and operation of the index administrative process, including all stages and processes involved in the production and dissemination the Indices. The Index Administrator has implemented and maintains the DBIQ User Guidance and Administrator Handbook Overview (the “Overview”), which sets out a summary of the policies, procedures and controls implemented by the management of the Index Administrator to promote sound business practices for the lifecycle management of the Index Owner’s proprietary Indices by the Index Administrator. In particular, the benchmark development process sets out standards which promote the required practices for creation and launch of new benchmarks within the DBIQ platform. It covers the formal steps that must be completed during the development process including best practice guidelines for design and back testing. The development of new benchmark products is completed in a methodical and accurate manner. In order to achieve this there are a number of controls in place to ensure that, prior to starting the development phase of a new benchmark the appropriate stakeholders have been engaged in the design process and the proposed product will deliver the desired benchmark to the end client. The Overview also includes the Index Administrator’s policy related to quality of Indices and input Indices, input data management and management of errors. Additional issues related to governance, controls, Index classification and risk controls, periodic reviews and conflicts of interest are also addressed. DBIQ conducts quarterly reviews of its benchmark universe to maintain accurate and updated records. This process aims to highlight any market data issues, errors, challenges, or concerns about the benchmark, underlying data or security prices. Benchmarks that are highlighted through this review are subject to a thorough methodology review to assess the potential ongoing suitability of the benchmark and if any changes should be made. The results of any such

DBIQ Benchmark Statement

reviews are reviewed by the BICG and when applicable are subject to the Benchmark Change or Retirement policies.

Oversight Framework

The DBIQ Oversight Framework has been developed to provide oversight of the DBIQ administration functions. The Benchmark and Index Control Group (“BICG”) undertake primary oversight of the index lifecycle. BICG organise the Index Oversight Council (“IOC”) which is made up of employees from across the bank. The structure and function of this council is designed to provide oversight of the benchmark administration operational effectiveness.

Expert Judgement

During normal market circumstances, the Index Methodologies are fully rules based and do not require discretionary decisions. Following a rapid change in the market or situations where a data source is cancelled, a discretionary decision could be required; these are governed by the “Expert Judgement policy” set out in the overview. The Overview sets out the process for making changes to its Indices as a general matter and the internal oversight and approval processes, which DBIQ will go through. It also sets out DBIQ’s procedures for consulting on and notifying changes. Any such modification or change in methodology described in this Statement in accordance with the below shall be made in accordance with “Change to an Index”. In the course of benchmark life cycle management, there may be instances in which DBIQ need to exercise expert judgment with respect to the input data and/or methodology of a benchmark. These instances may be driven by changes in the market, or come to light in the process of correcting benchmark calculations. Expert judgement is defined as the application of a benchmark owner and/or DBIQ Head experience, knowledge and expertise in their sector to make a choice with respect to input data for or methodology for benchmark calculation keeping in mind the purpose of the benchmark and the objective of the end user. Expert judgements are made in accordance with both the letter and spirit of the benchmark rules. If the expert judgement is not prescribed in the rules the decision is documented. Changes to benchmark methodology or data based on expert judgement require approval from DBIQ Head before changes are implemented and are managed via the Change to and Index process. The BICG and or IOC are consulted on cases when the expert judgement may have a significant impact to the benchmark. All cases of expert judgement must be reported to the IOC as part of the quarterly oversight report. All instances in which expert judgement is applied to change the calculation of a benchmark, whether in terms of methodology or input data are documented. Information on expert judgements is available to users on request.

Change to and Cessation of Index

A variety of factors, including external factors beyond the control of DBIQ, may necessitate changes to, or the cessation of the indices. Prior to making a change or retiring a benchmark, DBIQ follows a process to consider the proposal and its impact. At a minimum this proposal is ratified by DBIQ management and for all material changes by the BICG. Further, all changes to benchmarks are presented to the IOC on a quarterly basis. The impact of the proposal to both the benchmark and known users is considered. DBIQ aims to provide a consultation period on the proposals and or current benchmark methodology for the benchmark users before a change decision is made. DBIQ aims to make a notice of the change at least one month prior to a change. This period maybe shortened if market events necessitate an immediate change. Where a benchmark is designed for a single end user, changes may be made based on a mutual agreement with the users.

Error Management

DBIQ processes and procedures are designed to ensure benchmark calculations are accurate and reliable. On occasion, when calculation errors are made DBIQ follows a defined procedure to analyse the error and if necessary restate the benchmark. An error can be discovered by either DBIQ internal verification procedures or a user challenge. Each error is logged, along with the underlying reason. The

DBIQ Benchmark Statement

process is reviewed and when possible the system or process that caused the error is rectified. Overviews of errors are reported to the IOC. Each error is analysed and a restatement decision is informed on predefined thresholds and the scope of the error. The thresholds are defined based on the volatility of the benchmark and time since the error occurred, and are applicable to all DBIQ benchmarks irrespective of their risk classification or benchmark use classification. Depending on the severity of error, DBIQ publishes a restatement notice on its website.

Limitations of the Methodology

The Administrator endeavours to determine the Index as per the frequency defined for each Index. The primary input data for the index are exchange settlement prices for the futures. These have been observed to be consistently available during the full backtesting and live period for the Indices.

The Administrator expects to be able to calculate the Index on all index business days and all market events where input data is available. In the event the market undergoes a rapid change or a data source is cancelled the Index Administrator may exercise its discretion on whether it is necessary to retire (or change) the benchmark on short notice as summarised in the Expert Judgement and Change to Index sections of this document. Should data be unavailable a Disruption Event is triggered, the index rule book describes the processes in such an event.

Changes to, or the retirement of an Index may have an impact upon: (i) financial contracts that reference such Index; (ii) financial instruments that reference such Index; and/ or (iii) the measurement of the performance of investment funds.

Review and Update

DBIQ will update this Statement if the information herein is no longer accurate or up to date and in any event at least every two years. In particular:

- a. If there is a change in the type of any of the Indices;
- b. If there is a material change to the methodology of any of the Indices

Further Information

For further information within the meaning of Article 1 (8) of Commission Delegated Regulation (EU) 2016/1011 ("Further Information") on the methodology of the indices please contact DBIQ at index.data@db.com or where available refer to the Index Description published on the DBIQ homepage under the following URL (the "DBIQ Website"): <https://index.db.com>

For Further Information on the Governance Procedures please refer to the Overview available on the DBIQ Website.

Glossary

Additional Information is information which go beyond what is required to be included in the Benchmark Statement itself but may provide users of the benchmark and other interested parties with further details.

An **Administrator** is a natural or legal person that has control over the provision of a Benchmark. With regard to the Benchmarks referred to in this Benchmark Statement, Deutsche Bank AG operating through DBIQ via its internal processes functions as Administrator.

A **Benchmark** is any Index by reference to which the amount payable under a financial instrument or a financial contract, or the value of a financial instrument, is determined, or an Index that is used to measure the performance of an investment fund with the purpose of tracking the return of such Index or of defining the asset allocation of a portfolio or of computing the performance fees.

The **Benchmark Statement** is a document intended to enable users to understand the relevant Benchmarks the associated risks in a uniform manner pursuant to Article 27 of the BMR.

DBIQ Benchmark Statement

BICG refers to the Benchmark and Index Control Group which is an independent function within Non-Financial Risk (NFR) responsible for Benchmark-related controls across DB Group. The BICG maintains an effective risk management framework comprising standards and policies, control execution and monitoring as well as analysis and reporting, building on an interaction with the business divisions (1st Line) and other control functions (2nd Line). The BICG strengthens the controls and transparency of DB's Benchmark activity and, as part of the 2nd LoD, provides independent oversight and monitoring of Benchmark activities globally across all asset classes/business lines.

BMR refers to Regulation (EU) 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.

The term **Constituents** refers to the components of an index whose values are used to calculate the Index Value according to the applicable formulae.

Contribution of Input Data means providing any Input Data not readily available to an Administrator, or to another person for the purposes of passing to an Administrator that is required in connection with the determination of a Benchmark, and is provided for that purpose.

A Contributor is any natural or legal person Contributing Input Data.

DBIQ refers to Deutsche Bank Index Quant, a function within DB Research, in turn, within the Corporate & Investment Bank (CIB).

The **DBIQ Website** is accessible under the following URL: <https://Index.db.com>.

Expert Judgement is the application of a Benchmark owner's and/or DBIQ Head's experience, knowledge and expertise in their sector to make a choice with respect to the Input Data or the Methodology of a Benchmark keeping in mind the purpose of the Benchmark and the objective of the end user.

An **Index** is any figure that is published or made available to the public and that is regularly determined entirely or partially by the application of a formula or any other method of calculation, or by an assessment, on the basis of the value of one or more underlying assets or prices, actual or estimated interest rates, quotes and committed quotes, or other values or surveys.

An **Index Description** is the central document describing the Methodology of an Index pursuant to Article 13 BMR.

The terms **Index Owner** and **Index Sponsor** are used interchangeably and refer to the ownership of the intellectual property and other property rights in an Index or Benchmark. With regard to the Benchmarks referred to in this Benchmark Statement, Deutsche Bank AG is the Index Owner.

Input Data are the data in respect of the value of one or more underlying assets, or prices, including estimated prices, quotes, committed quotes or other values, used by an Administrator to determine a Benchmark.

IOC refers to the Index Oversight Council which is meeting on a quarterly basis. Its mandate is to oversee all aspects of provision of Indices and Benchmarks administrated by Deutsche Bank.

A Material Change will constitute a change in one or more of the following when disclosed in publicly available documents:

- Index identifier(s)
- Methodology – for e.g. change in algorithm used for calculation of the index,

DBIQ Benchmark Statement

- Input data – for e.g. if a rate or a curve is proposed to be used for the calculation of an index which is different from the one mentioned in the index documentation,
- selection & rebalancing rules,
- reduction in transparency of the index.

The **Methodology** is the cumulative set of rules, formulae and criteria used to determine a Benchmark. In accordance with Article 13 BMR, the Methodology is described in detail in separate documents.

The **Overview** refers to the DBIQ User Guidance and Administrator Handbook Overview available on the DBIQ Website.

The **Provision of a Benchmark** entails administering the arrangements for determining a Benchmark, collecting, analysing or processing Input Data for the purpose of determining a Benchmark and determining a Benchmark through the application of a formula or other method of calculation or by an assessment of Input Data provided for that purpose.

Disclaimers

This document is intended for information only and does not create any legally binding obligations on the part of Deutsche Bank AG and/or its affiliates ("DB"). This document is intended to provide a summary of the index it purports to describe. No warranty or representation is made as to the correctness, completeness and accuracy of the information.

Without limitation, this document does not constitute an offer, an invitation to offer or a recommendation to enter into any transaction. When making an investment decision, you should rely solely on the final documentation relating to the transaction. Products based on the index or indices described in this document may not be appropriate for all investors and before entering into any transaction you should take steps to ensure that you fully understand the transaction and have made an independent assessment of the appropriateness of the transaction in the light of your own objectives and circumstances, including the possible risks and benefits of entering into such transaction. Refer to your DB Sales person for product related information. For general information regarding the nature and risks of the proposed transaction and types of financial instruments please go to <https://db.com/riskdisclosures>. You should also consider seeking advice from your own advisers in making this assessment. If you decide to enter into a transaction with DB, you do so in reliance on your own judgment. Past performance is no indication of future results.

This material was prepared by DBIQ. It is not investment research, and has not been prepared in accordance with legal requirements designed to promote the independence of such. Any opinions expressed herein may differ from the opinions expressed by other DB departments including the Research Department. DB may engage in transactions in a manner inconsistent with any views discussed herein. DB trades or may trade as principal in instruments (or related derivatives) linked to the index or indices described in this document, and may have proprietary positions in the instruments (or related derivatives). DB may make a market in such instruments (or related derivatives), which may in extreme circumstances affect the levels of the index or indices described.

The Index Administrator makes no express or implied representations or warranties as to (a) the advisability of purchasing or assuming any risk in connection with any transaction which references or is otherwise linked to this Index, (b) the levels at which the Index stands at any particular time on any particular date, (c) the results to be obtained by any party from the use of the Index or any data included in it for the purposes of issuing securities or carrying out any financial transaction or (d) any other matter. Calculations may be based on information obtained from various publicly available sources. The Index Administrator has relied on these sources and has not independently verified the information extracted from these sources and accepts no responsibility or liability in respect thereof. If there is a calculation error the Index Administrator may restate the Index Level.

Conflicts of interest may exist between DB, when acting as administrator to a benchmark through DBIQ and (i) in conducting one or more other roles that are linked to or otherwise reference a benchmark (including, but not limited to, calculation agent, index owner, index sponsor, index user, index product issuer and/or data provider) and (ii) another affiliate of DB (and together with DB, each a "Deutsche Bank Entity"). A Deutsche Bank Entity may also act as the issuer of, or an obligor under, financial products which are linked to or otherwise reference the benchmark and/or the constituent indices and as a dealer, calculation agent or hedge provider in relation to such financial products. Various conflicts of interest may arise as a result of these different roles as well as from the overall activities of Deutsche Bank Entities with other entities, including investors in financial products. In performing any service in relation to an index and/or any constituent index, Deutsche Bank Entities do not act on behalf of, or accept any duty of care or any fiduciary duty to, any investor in a financial product or any other person. Each relevant Deutsche Bank Entity will pursue actions and take steps that it deems necessary or appropriate to protect its interests.

Further details of conflicts of interests may also be provided in the relevant trade specific documentation such as the base prospectus or other relevant trade documentation. These conflicts of interest will be managed in accordance with DB's established policies and procedures and the enhanced control framework. Deutsche Bank's Conflicts of Interest Policy sets out Deutsche Bank's approach to conflict

DBIQ Benchmark Statement

management and is available on the following website: <https://www.db.com/company/en/media/Conflicts-of-Interest-Policy.pdf>

Without prejudice to the Index Owner or Index Administrator's obligations under any regulatory system, and without limiting any of the foregoing, in no event shall DB have any liability (whether in negligence or otherwise) to any person in connection with such person's use of the Index, unless such use is pursuant to a transaction between that party and DB relating to the Index and such liability results from wilful default and/or gross negligence on the part of DB.

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Additional information relative to securities, other financial products or issuers discussed in this document is available upon request.

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