DBIQ User Guidance and Administrator Handbook
Overview
Deutsche Bank Research
May 2024

Table of Contents

1   Introduction

Deutsche Bank AG ("DB"), operating through Deutsche Bank Index Quant ("DBIQ"), is registered with the German Federal Financial Supervisory Authority (BaFin) as a benchmark administrator under the EU Benchmarks Regulation ("EU BMR").

DBIQ is an independent function within Deutsche Bank Research ("DB Research") which operates within the Investment Bank (IB) division of DB. It is responsible for launching, daily calculation, rebalancing and retiring of proprietary DB benchmarks. As at Q2 2023, DBIQ maintains over 4700 benchmarks and approximately 400 strategies. These tradable proprietary benchmarks are referenced in benchmark-linked products such as total return swaps, certificates and index linked funds.

This DBIQ User Guidance and Administrator Handbook Overview ("Handbook") sets out a summary of the policies, procedures and controls implemented by DBIQ Management (as described below) to promote sound business practices for the lifecycle management of DB's proprietary benchmarks as carried out by the people working in DBIQ (the "DBIQ Team"). The benchmark lifecycle includes benchmark creation, daily management – including selection and rebalancing events, modifications to a benchmark, discovery and correction of errors and benchmark retirement. This Handbook also includes DBIQ policy related to quality of benchmarks, input data management. Additional issues related to governance, controls, benchmark classification and risk controls, and conflicts of interest are also addressed.

This Handbook shall be updated from time to time and published on the DBIQ website, https://index.db.com.

DBIQ also provides other services to DB including, but not limited to, calculation agent of some of the information only indices and other private strategies not made available to the public. Information on the responsibilities for each index is available on request.

1.1   Key Indexing Principles

DBIQ believes the importance of benchmarks within financial markets requires that the highest standards are upheld during all aspects of the benchmark lifecycle. The DBIQ Team are expected to behave with integrity and diligence. DBIQ has implemented policies, procedures and controls to manage the quality of benchmarks. Any concerns or suspicions of an infringement of any DBIQ policy or about the quality of a benchmark, can be escalated to either DBIQ Management, compliance or raised via the DB Whistleblower process[1].

DBIQ consider the below three key principles during the benchmark lifecycle management:

1. **Customers are our highest priority**

   The focus of the DBIQ Team is to provide the best possible service to all benchmark users by upholding the highest possible standards of integrity and diligence when calculating benchmarks. These standards are applied for benchmark design, back testing and ongoing maintenance. User queries are answered in a timely manner.

2. **Accuracy of calculations and documentation**

   Benchmarks are based on a defined set of rules. All efforts are made to ensure benchmark calculations accurately follow these rules. Any discovered breach is reported via the relevant processes. Before benchmark launch, all documentation is reviewed by the relevant parties to ensure it accurately reflects the calculations implemented in DBIQ systems.

3. **Timeliness of calculations**

   Index levels and values are required for the smooth operation of financial markets and the valuation of financial products. Every effort is made for all relevant benchmark information to be provided to users in a timely fashion. This is typically as soon as possible after all relevant market data is available.

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[1] https://www.bkms-system.net/bkwebanon/report/clientInfo?cin=4deba1&c=uk&language=eng

Prior to publication of index levels, there are systematic checks to make sure correct index levels are published. If these checks fail, the index levels publication will be halted to investigate the reason for the failure of these checks. DBIQ will resume the publication of levels as soon as practically possible once the investigation is completed and any issues discovered are remedied.

2   User Information

DBIQ is committed to providing high quality benchmarks to its clients and benchmark users. We aim to offer a transparent index maintenance process, welcoming inputs and feedback. Defined processes are observed for benchmark challenges, changes or retirements.

2.1   DB Complaints Policy

Any issues that do not qualify as a "Challenge" as described in the section below, can be submitted as a complaint and raised via the following link: Complaint management – Corporates and Institutions (db.com). This link provides further information on the complaints process.

All unresolved complaints from previous quarters and any new complaints (outstanding and resolved) each quarter are discussed on a quarterly basis at a meeting held by DB's Index Oversight Council (IOC).

2.2   DBIQ Benchmark Challenges Policy

DBIQ aims to ensure that it runs a high quality business with transparency and accuracy in the benchmark creation and management process and this involves providing a mechanism for benchmark users to raise any concerns about a benchmark. DBIQ is committed to giving consideration to every concern raised and to being open in discussions around these concerns to achieve a satisfactory resolution, while simultaneously being cognisant of client needs, conflicts of interest and regulatory requirements during the process.

2.2.1   What qualifies as a Challenge?

Challenges about a benchmark will comprise incidents where a benchmark user challenges any inputs to a benchmark, the benchmark calculation methodology, the resulting benchmark level or the efficiency and timeliness of the benchmark publication process. In this context "Challenges" cover benchmark-specific concerns, but exclude issues relating to benchmark-linked products. Set out below is further guidance as to what does and does not qualify as a Challenge.

Matters that qualify as Challenges

Challenges can be raised with regard to errors resulting from regular or periodic updates to:

- Any DBIQ benchmark;
- The source or value of input data into a benchmark calculation. The source of input data must be that specified in the relevant index documentation. Value of input data if challenged will be escalated to the corresponding data source for verification;
- Metadata. For example, security setup including corporate actions and holiday calendars;
- Calculation errors resulting from errors in codes, templates or manual errors; and
- Errors in benchmark selection or benchmark rebalancing events including incorrect selection date, incorrect rebalance date or incorrect list of securities chosen.

Matters that do not qualify as Challenges

- Challenges do not cover: benchmark recalculation resulting from official exchanges (e.g. LSE): republishing prices after benchmark levels have been published; data feed errors from external vendors (e.g. Reuters) where issues in data feeds result in delays or republishing of an index because accurate input data was not received on time. Subsequent to such

external vendor related data issues, affected DBIQ benchmark levels will be corrected in line with section 10 (Restatement and Calculation of Error Management)of this Handbook.

- Repricing issues relating to benchmark-linked products. For such matters, clients should approach their client representative, sales person, or structurer.
- Complaints against individual DBIQ team employees cannot be made using the Challenges process.
- Questions about whether the benchmark is representative of the underlying objective or whether the methodology is appropriate for the purpose envisaged should be agreed at the time of the benchmark launch and should be reviewed regularly for relevance.

Matters that do not qualify as Challenges can be raised as a complaint via the link set out in section 1.1 above.

2.2.2 Raising a Challenge

A benchmark Challenge can be raised by sending an email to the "index data" group email (index.data@db.com) or to any member of the DBIQ Team, specifying the following information: Ticker, benchmark name, description and details of the issue (benchmark level, input levels, calculations or methodology), date of issue / incident, and frequency of occurrence, if relevant.

2.2.3 Handling of the Challenge Process

All benchmark Challenges will be reviewed by DBIQ. DBIQ aims to provide at least initial feedback within one business day of receiving the Challenge. If the Challenge is considered valid, DBIQ will endeavour to resolve the immediate issue underlying the Challenge within one business day. However, the root cause and the long-term fix (where applicable) will be identified within one week of the Challenge being received, but may in exceptional cases take longer. DBIQ will aim to implement the required fix that addresses the Challenge as soon as practicable, and typically within one week of identifying the fix. Challenges that result in the discovery of systemic issues may take longer to fix. In this case the challenger will be informed and appropriate notifications will be made either on DBIQ's website or via email.

2.3 Managing Changes to and Retirements of Benchmarks

The DBIQ design and launch process is designed to ensure new benchmarks are sustainable. A key requirement is that benchmarks can follow the rules on an ongoing basis with a minimal need for changes.

Occasionally changes in the underlying markets or dynamics may necessitate a review and potentially a change to the benchmark. DBIQ will consider retiring a benchmark if either the underlying market dynamics no longer allow for accurate calculation or DBIQ understands the benchmark is no longer used and is unlikely to be used in the future.

The DBIQ team periodically review a number of factors concerning input data, calculations and if relevant user Challenges, to determine whether a benchmark should be subject to a detailed review and potentially a material change or retirement.

In such instances, DBIQ endeavours to engage users in a consultation process whereby users will be provided with reasonable notice to react to the change. DBIQ encourages clients to monitor for announcements concerning benchmarks they reference. When considering a retirement, as may be necessary DBIQ will consult with known users to provide a suitable transition period and where possible, a replacement benchmark.

DBIQ encourages all users to implement the following measures to allow a transition between benchmarks in the event that (i) DBIQ retires a benchmark, or (ii) makes a change to a benchmark that results in it   no longer being suitable for the user.

- When selecting and reviewing the suitability of a benchmark, consider potential alternative benchmarks so that in the event of a change or retirement the alternative may be used as a fall-back.
- Inform DBIQ of any DBIQ benchmarks used so that effective consultation on potential changes and retirements can occur.
- Ensure contracts linked to DBIQ benchmarks have suitable fall-back provisions.

2.4 Further Information

More information about DBIQ's policies and procedures can be obtained by email (index.data@db.com) or by calling DBIQ at the following numbers: UK +44-20-7545-0505 and US +1-212-250-8998.

3 Conflicts of Interest

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 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.

Below is a non-exhaustive list of the identified conflicts of interests. Conflicts of interest may arise where DB is:

- engaging in transactions for its proprietary accounts and for accounts under its management;
- acting in more than one capacity within the overall benchmark process;
- providing price or other market data used in the benchmark determination process;
- issuing other, and in some cases competing, derivative instruments in respect of the underlying securities;
- conducting hedging transactions;
- applying additional fees;
- entering into distribution agreements with various financial institutions and other intermediaries;
- acting as market-maker for the securities;
- acting as swap counterparty;
- acting as market-maker for the underlying reference product(s) and or securities;
- acting in another capacity for the underlying reference product(s) and or securities such as underwriter or in a commercial banking capacity for such issuer; and
- receiving non-public information with respect to the underlying securities subject to its Information Barriers Policy for handling such information.

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 management and is available on the following website:

https://www.db.com/legal-resources/Conflicts-of-Interest-Policy

Any conflicts of interest that cannot be adequately managed, will be disclosed in a timely manner to the regulator.

DBIQ will publish or disclose any changes to existing conflicts of interest and new conflicts of interest to users of a benchmark, to the relevant competent authority and where relevant to contributors. Such publication or disclosure will be reflected in DBIQ policies including this Handbook and made available on the DBIQ website.

4 Governance

4.1 Organisational Structure Outline

The DBIQ Team sits in the DB Research department.

The DB Research department operates within the IB. It has physical barriers, reporting and supervision lines and compensation arrangements such that they are also separated from other areas of the bank such as Corporate Bank (CB), IB Fixed Income & Currencies (FIC), Private Bank (PB) and DWS Group GmbH & Co. KGaA asset management (AM).

DBIQ Reporting Structure

The head of the DBIQ Team (DBIQ Head) takes responsibility for all aspects of running the benchmark administration platform. He reports into the COO of DB Research, who in turn reports into the Global Head of DB Research who is a member of the CIB Executive Committee. The entire benchmark development research team (split between London and New York) reports directly to the DBIQ Head.

The DBIQ IT team have their own IT reporting structure and report to the Head of Global Technology which is independent of the CB, FIC and PB divisions. The DBIQ IT team is dedicated to benchmark development and has a dotted reporting line into the DBIQ Head with no reporting lines into any other DB business unit.

Third-party outsourcing service vendors provide both IT and business process services. The IT outsourcing teams report to the Global Technology IT team as well as their own internal reporting structures. Some members of the IT outsourcing teams also report into DBIQ Head. These members are responsible for index development and maintenance, but do not have access to production environment. Similarly the business process teams, in addition to their company's reporting structure, report directly to DBIQ Head and DBIQ Research Analysts and are only permitted to take instructions from either DBIQ Head or DBIQ Research Analysts with respect to DBIQ Benchmark Administrator functions. The business process teams are organised into asset-class specific teams which report to their respective team Leads, who in turn report to the country team lead.

The **DBIQ Management Team** is made up of teams from three divisions within DB, DB Research, IT Development and IT Production Management. The DBIQ Management Team will hold periodic meetings to discuss all aspects of DBIQ management and inform decisions for the respective sub teams.

Decisions related to index management will be made by DB Research team members from the DBIQ Management Team. The DBIQ Head will have the casting vote in case of split decisions. The DB Research team members will become responsible for all expert judgements. Individual senior team members have the authority to make expert judgements when they consider appropriate. These are subject to review by the DBIQ Management Team.

Decisions on IT infrastructure projects and maintenance are the responsibility of all DBIQ Management Team members. The IT Development Manager is responsible for producing maintenance plans, taking input from DB Research and IT Production Management team members.

It is the responsibility of the DBIQ Management Team to provide reports to the IOC and validate that the DBIQ Team operates in accordance with its policies, procedures and controls.

4.2 Governance Framework

The DBIQ governance framework has been developed to provide oversight of the DBIQ platform. The DBIQ governance structure is set out in Figure 1 below. The first level of governance is covered by the DBIQ Head and DBIQ Management Team with escalations being made to Level 2 - Benchmark and Index Control Group ("BICG") and DB Compliance as necessary. The next level of governance is provided by the 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 index administration function. The membership and mandate of this council is outlined in the Terms of Reference of the IOC.

Any material changes in regards to the governance framework, such as organisational, staff and/or remuneration structure will be notified by DB to the regulator. For such purpose, a change in the governance structure, the function and position of BICG, IOC and BIC or a change in remuneration policy will be considered a material change.

Figure 1 – DBIQ Governance Structure
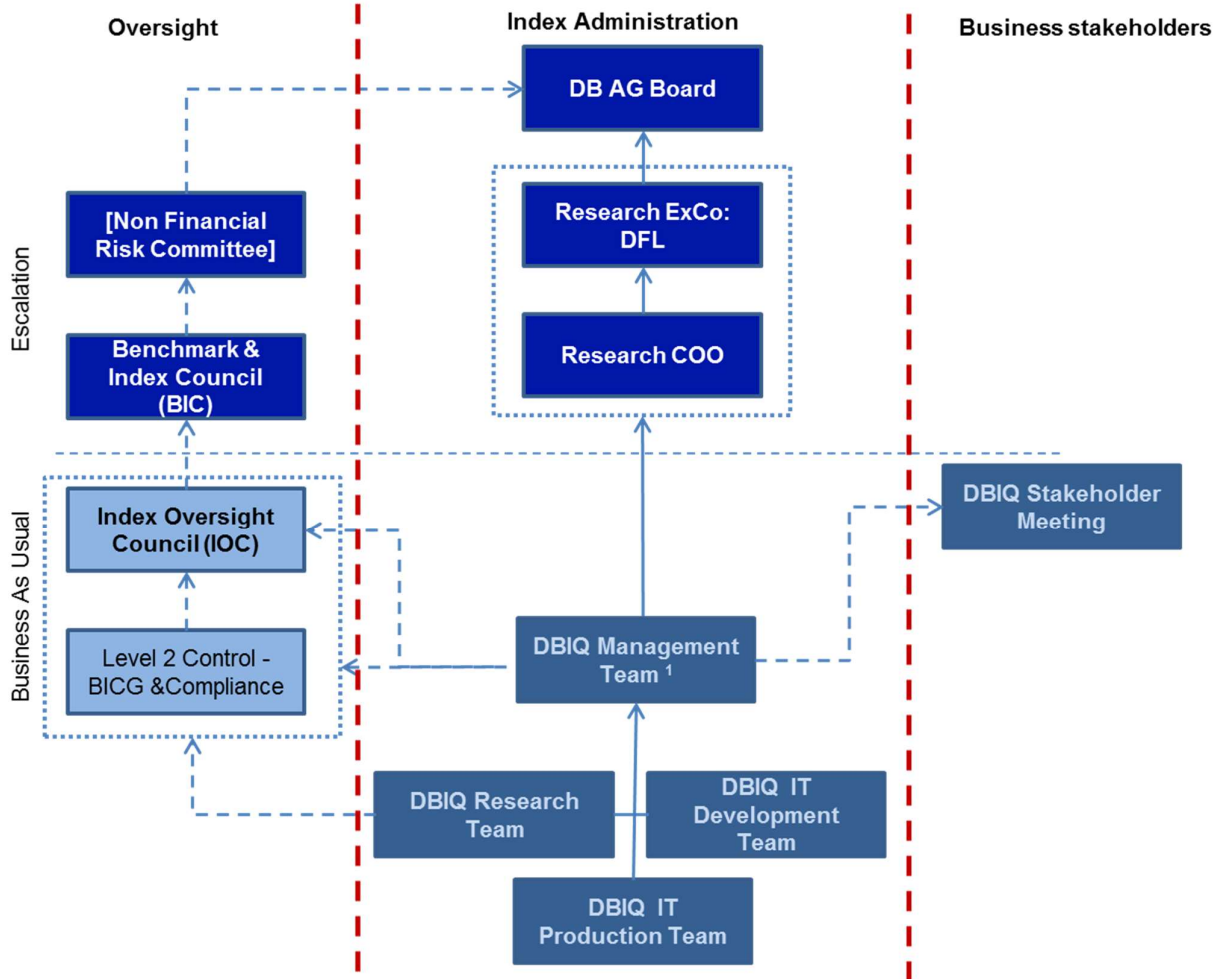
1. DBIQ Management Team includes senior staff from Research and IT Development and Production. It is charged with making all Index Administration related decisions. This has no impact on divisional reporting lines.

BICG

BICG is an independent function within Non-Financial Risk (NFR) responsible for benchmark-related controls across DB. 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 (first line of defence) and other control functions (second line of defence). BICG strengthens the controls and transparency of DB's benchmark activity and, as part of the second line of defence, it provides independent oversight and monitoring of benchmark activities globally across all asset classes / business lines.

IOC

BICG is responsible for organising the IOC meeting on a quarterly basis. Its mandate is to oversee all aspects of provision of indices and benchmarks administered by DB.
MIS about administration-related activities by DBIQ and BICG is reported to the IOC. IOC also is the forum for DBIQ or BICG to raise any issues and seek IOC's opinion.

9

Detailed terms of reference for the IOC are available from BICG on request.

5 Management and Quality of Benchmark

This Handbook outlines the standards and principles applied across the benchmark administrator platform. These are designed to ensure the quality of benchmarks produced by DBIQ and a framework by which core controls can be implemented and managed.

Beyond the platform specific controls, every benchmark published by DBIQ is expected to meet a number of standards to ensure its quality. These cover the core aspects of benchmarking best practices.

All DBIQ benchmarks are designed to be rules based. The rules, as summarised below, describe all aspects of the benchmark methodology:

Core calculation formula and logic – defined standards for benchmark calculation that cover the economics of calculating various benchmark styles.

Methods for security selection and weight determination – benchmark rules for selection and rebalancing must reflect the theory and spirit of the benchmark as provided in the summaries. The benchmark design includes elements to manage the risk profile of the portfolio.

Price and other data sources – these policies and processes promote the use of high quality data in DBIQ.

Discretion within the benchmark – DBIQ should not exercise discretion when calculating benchmarks. Any benchmarks with ambiguous rules that require the exercise of discretion will need the prior approval of BICG.

Documentation – All benchmarks must have full documentation covering all aspects of the benchmark calculation lifecycle. Documentation covers both benchmark methodology and specific benchmark calculation procedures carried out by the DBIQ Team.

Transparency of benchmarks – at a minimum all users must be able to access relevant documentation and constituent information. This information is made publicly available for widely used benchmarks.

Sustainability of benchmark maintenance – practicality of daily maintenance is reviewed during design phase. Periodic reviews of benchmarks focus on management concerns and data issues, flagging benchmarks that may require adjustments.

Publication requirements – benchmarks are made available as soon as practical following the availability of relevant market data.

5.1 Benchmark Creation

The index 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 benchmarks 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. All new benchmarks must meet the quality requirements. A full back test of each benchmark is created, incorporating all relevant rules.

All data is verified to ensure it meets the DBIQ data standards outlined in section 9 (Input Data Management). For each benchmark, consideration is given to the use of backup data sources and if relevant a data hierarchy. The data hierarchy determines fallback sources should the primary source not be available or of a sufficient quality. Data is considered of sufficient quality if it meets the Price Quality Assurance checks (as described below). The data source preferences are applied in the hierarchy design.

Consideration of the likelihood of availability of data during periods of market volatility, turmoil and inactivity is made. In the event that service is likely to be interrupted, appropriate backups are sought and documented.

It is expected that all data used in benchmarks is available to users either directly from DBIQ or from the relevant source or provider via a licence.

Further, BICG performs a review of Benchmark methodologies before every launch.

5.2 Benchmark Maintenance

DBIQ has robust processes and procedures to aid the daily benchmark lifecycle. Specific benchmark documents cover both rules and processes to manage the maintenance of the benchmarks. Benchmarks are subject to automated checks requiring various sign offs. Appropriate checks are triggered prior to and post each benchmark calculation stage. When deemed appropriate secondary verifications are performed on the benchmark level or benchmark lifecycle events. Benchmarks are published as soon as practical after the time all market data is available.

Additional diligence is applied during selection and rebalancing events. These checks are benchmark specific and typically cover aspects such as:

- Verification of joiners and leavers;
- Review of weight changes;
- Four eyes review of event; and
- Review of pricing inputs

5.3 Expert Judgement

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 or may arise in cases where benchmarks have discretionary elements.

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 judgement is made in accordance with both the written and spirit of the benchmark rules. If the expert judgement is not prescribed in the rules, the decision is documented. An expert judgement leading to changes in benchmark methodology or data require approval from DBIQ Management. The 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.

5.4 Benchmark Statements

DBIQ publishes benchmark statements for each family of benchmarks which are administered under the EU BMR. Any new benchmarks launched will be mapped to an existing list of family of benchmarks or a new benchmark family statement will be published as per the requirements of EU BMR.

5.5 Periodic Review of Benchmarks

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 reviews are reviewed by the BICG and when applicable are subject to the process defined in Section 11 (Changes to and Retiring a Benchmark)

In addition, BICG & DBIQ conduct annual reviews of benchmark families which include methodology reviews. The results are discussed with DBIQ and appropriate action is then taken by DBIQ.

5.6   Succession Planning & Knowledge Control

DBIQ ensure business continuity and the integrity of intellectual property with respect to its benchmark universe via its organisational structure, controls and documentation. Each benchmark has a DBIQ Benchmark owner as the primary contact for the benchmark. A DBIQ secondary owner acts as a backup and has an understanding of the methodology and calculations for the benchmark. DBIQ requires minimum documentation for each benchmark that covers benchmark model construction, calculation methodology and daily processes

6   ESG Benchmarks

6.1   Background

Understanding, identifying and mitigating Environmental, Social and Governance (ESG) risks and factors in our business and across our financial products, and compliance with the applicable regulatory framework and good market practice, is a priority for Deutsche Bank and the wider financial industry. The DBIQ management team believe that when acting as an Index Administrator, DBIQ should promote the inclusion of robust ESG features in index design for relevant indices. This is necessary to ensure DBIQ continues to be a responsible, relevant and cutting edge index provider, along with promoting long-term benefits to the society.

6.2   Types of ESG Benchmarks

The mechanics of including ESG factors in the design of an index are the same as any other metric in the index rules. The index can use the metrics as a primary, secondary, tertiary or even lower factor. The importance of the metric in the rules determines how it features in the index materials and name. The EU BMR rules require DBIQ to consider every ESG aspect carefully to ensure the importance (whether high or low) and impact (whether positive or negative) is accurately and transparently represented in the name, documentation and disclosures.

Depending on how the ESG factors are used in the indices, DBIQ anticipates the following types of benchmarks:

1. No use of ESG data in any aspect of index – these will not be ESG benchmarks
2. No direct use of ESG data or methodology but one or more components have ESG features
3. ESG Screening benchmarks where a filter is applied to the universe of eligible underlyings of the index and typically remove the worst ESG scores/ratings
4. ESG Tilting actively adjusts the weighting of the benchmark to reduce exposure to underlyings with the lowest ESG scores and/or increase the exposure to underlyings with the strongest ESG scores
5. ESG Targeting benchmarks will set a defined ESG score which the selection process must meet or exceed.

Due to the rapidly changing ESG regulatory landscape the ESG indices framework may not cater for some specific cases. Such cases will be subject to an enhanced review and approval process to align the classification to one of the above categories.

6.3   ESG Disclosures

The EU BMR (and supplementary statutory instruments created pursuant to the EU BMR) contains certain disclosure requirements in relation to all benchmarks both in relation to disclosure at the index level in respect of the methodology of the index and also the index administrator's benchmark statement.

DBIQ will publish the necessary disclosures on its website for all the ESG benchmarks. The methodology disclosure will be published in one consolidated document for all the ESG benchmark families and the benchmark statement disclosures will be included in the benchmark family statement of ESG benchmark family.

These will be available on DBIQ website.

7 Controls Framework

DBIQ Management has implemented a controls framework in order to ensure relevant policies and procedures are implemented. This is achieved by identifying key benchmark lifecycle management areas and designing control processes to allow effective monitoring of these key areas of benchmark management.

These controls cover system wide processes and functions. Additional benchmark specific controls may also be implemented.

Each control must meet certain measures to ensure its efficiency. It must:
- provide clear objective measure of compliance with policy/procedure;
- be performed on a pre-defined periodic basis; and
- have a suitable escalation path if controls indicate failure or are not completed.

Controls are divided between major benchmark lifecycle events, daily events and periodic events.

7.1 Major Life Cycle Controls

Major events cover significant actions such as launch, retirements or change and include:

- Benchmark design and use;
- Benchmark documentation and classification;
- Verification of correct configuration for benchmark launch;
- Introduction of new data;
- Changes or adjustments to benchmark rules; and
- Appropriate retirement of a benchmark.

7.2 Daily Life Cycle Controls

Daily events cover key aspects to ensure the smooth running of the platform, such as:

- Timeliness of benchmark calculation;
- Completion of benchmark related tasks as defined in daily procedure trackers;
- Access management;
- Data change management;
- Holiday calendar management; and
- Data quality.

7.3 Periodic Controls

This includes:
- Benchmark recertification and reviews; and
- Expert Judgement Error and challenge management.

7.4 Record Retention

All data records pertaining to benchmark controls should be retained while a benchmark is in use and post-retirement, records should be retained for a minimum of 5 years. This includes the retention of the tools used to implement the controls, results of any testing, any correspondence related to escalating a breach of control and subsequent actions taken. Email correspondence should be archived in DB's email system or in line with DB's internal policies and procedures.

8 Benchmark Classification

DBIQ classifies benchmarks based on use, input data and how benchmark data will be distributed. Classifications determine rules on how the benchmark should be managed. Presently, all benchmarks

administered by DBIQ are non-significant (as defined in the EU Benchmark Regulations)[2]. DBIQ will conduct a periodic survey of its benchmarks to determine if any of the benchmarks can no longer be considered as non-significant and will notify the regulators in such cases.

The benchmark use classification is based on the type of users and format of products the benchmark is designed to be used by.

Data classifications determine the source and type of data, differentiating between data providers and contributors. Further classifications between exchange and OTC data are made.

8.1   Implications of Ratings

All DBIQ benchmarks are subject to the standard minimum policies and controls. The classification and rating of a benchmark determine the scope of the requirements. Key implications are:

Transparency

The benchmark use rating can trigger transparency requirements. Benchmarks forming the basis of widely used products have core rules and constituent information made available publicly.

Private benchmarks that are bespoke in nature or private strategies are restricted to the specific users.

Data quality assurance

The input data rating (for each data source rather than the benchmark) will determine the level of data quality assurance applied. Data is classified as either:

- Exchange data and other regulated data which are subject to standard value checks; or
- OTC data is subject to standard value checks and verification against alternative sources.

Distribution of selection and rebalancing information

DBIQ determines the availability of selection and rebalancing information in respect of an index by reference to the following categories:

- **No Distribution** - Selection information is not distributed, or otherwise made available, prior to a rebalancing event (defined as the point at which all market data is available for the rebalancing calculation on the rebalancing date in respect of an index);
- **Public Distribution** - Selection information is made publicly available after the selection event as defined in the index rules. DBIQ reserves the right to stipulate such access terms and conditions as it deems appropriate;
- **Subscriber Distribution** - Selection and rebalancing information is made available to the persons registered with the DBIQ, upon their written request and subject to conditions from time to time, and entered on a relevant distribution list (such person a "**Subscriber**").

Subscriber Distribution intends to make available selection information to Subscribers who have requested, and DBIQ accepted, to receive data relating to specific indices. Subject to internal legal and compliance approvals, DBIQ considers a prospective Subscriber being a person who:

- Is a "user" of a benchmark, within the meaning of the EU Benchmark Regulations;
- Is licenced to use a benchmark; or
- Has an economic interest in an index by virtue of being a party to a relevant financial product (as confirmed by the product manufacturer and user of the relevant benchmark).

Persons who wish to subscribe to receive the selection information should contact DBIQ or DB representative. Selection information is made available to Subscribers via SFTP file transfer. DBIQ

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[2] Regulation (EU) No. 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 as amended by Regulation (EU) 2019/2089 on 27 November 2019 as regards EU Climate Transition Benchmarks, EU Paris-aligned Benchmarks and sustainability-related disclosures for benchmarks.

reserves the right to review and authorise Subscribers on a case by case basis, in order to comply with the regulatory requirements and internal policies.

Restatement

Upon the need for a restatement, the benchmark use rating should be considered when making the notification.

Methodology changes

The benchmark use rating has a direct influence on how a change in methodology is treated. Widely used benchmarks are subject to published notifications whilst private benchmarks are subject to specific user notifications.

9   Input Data Management

DBIQ undertakes a number of processes and controls to ensure the adequacy of data used in benchmark calculations.

Input data covers any information DBIQ obtains for the use of benchmark calculation and is classified in the following three ways:

- Source - is the person or legal entity that produces and is responsible for the data.
  - Contributor - A contributor is a Source that provides data to DBIQ exclusively or near exclusively for use in DBIQ benchmarks.
- Data Provider - is a system or legal entity that consolidates and delivers data to DBIQ.
- Data rating – the type of source of data.

New data must go through the on-boarding process which is designed to ensure that suitable levels of service are in place and all data used in DBIQ benchmark calculations will be provided consistently in a timely manner. The on-boarding process reviews the proposed Source and / or Data Provider verses the data quality management requirements to verify that these will be met. Each Contributor has its own code of conduct that it must adhere to.

9.1   Data Vetting and Verification

This section sets out standards which promote the use of accurate high quality data in DB proprietary benchmarks produced by the DBIQ Team. This creates a framework which DBIQ will follow to ensure minimum quality, accuracy and reliability of input data used to produce DBIQ proprietary benchmarks.

Input data is subject to quality controls and the Source or provider must be responsive to challenges and queries associated with the data. Data Sources should have backup processes to ensure the benchmark can be calculated if data provision from a specific source or provider is to cease.

When considering pricing data, DBIQ has a strong preference to use market data from regulated venues such as exchanges. Where such data is not available (and OTC markets are used for pricing data) efforts are made to ensure that market data is formed in a reliable fashion. When practical the preference is to use arms-length transactional data or firm quotes as a second alternative.

Failing this a Source is selected that forms data from market information that is built on the competitive forces of supply and demand. This Source is typically one that is used in the price discovery process for market participants. DBIQ also uses pricing providers whose business service is to produce price fixings for various markets. In such cases, the services provided are reviewed to ensure the standard of the data.

Data Sources and providers are reviewed on a continuous basis. Any degradation of service is noted and where relevant escalated. In the event the quality no longer meets the required standards, alternative sources are sought or changes to the benchmark a made.

Price Quality Assurance

There are Price Quality Assurance tests for each asset class and security group that are designed to verify the data quality. These tests are described as follows:

- OTC Input price data is checked systematically for quality and accuracy daily. The checks vary by asset class but at a minimum they compare the price source to alternative market quotes. Prices beyond defined tolerances are verified and when relevant escalated[3].

- All price data, including exchange traded prices, are subject to a minimum price movement checks. Large moves are verified against other data, either by using different data sources or by evaluating versus comparable securities.

Price Quality Assurance testing is applied continuously, including during periods of market volatility, turmoil and inactivity. In these cases the DBIQ Team will make best efforts to run daily price checks to the standard specified by DBIQ policy.

Inadequate Quality or Quantity of Input Data

In the event that it may not be possible to determine a benchmark accurately due to quality or quantity of data falling below the standards as required by the methodology of the document, it will be deemed a disruption event and DBIQ will take actions as described in the "Disruption Events" section of the index methodology.

In cases where DBIQ determines that a data source is consistently falling below the required standards, alternative sources will be sought. The Index change process is followed to make the necessary changes. In some circumstances, DBIQ may cease such benchmarks where no suitable alternative data sources can be determined.

Oversight

DBIQ, Compliance and the IOC are, when deemed necessary involved in monitoring and reviewing corrected input prices.

During the data vetting and verification process if there is any suspicion regarding potential exceptions, breaches or irregularities on the part of the Source / Contributor, such suspicions are reported to the DBIQ Head and investigated by them in coordination with DB Compliance. Based on their observations, Compliance, and if needed the IOC, advise on process or policy improvements and ensure these are implemented. Any infringements where DBIQ or BICG suspect any conduct which may involve manipulation or attempted manipulation of benchmark will be reported to the regulator by the DBIQ management team or BICG in a timely manner.

10 Restatement and Calculation 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 rectify and restate the benchmark.

The restatement rules below apply when DBIQ is acting as an Administrator. When acting as a calculation agent, the thresholds will be based on the owners / administrators request.

The rules are expected to come into effect in Q3 2022[4]. Prior to this date, the rules follow the below procedure with the exception that any recalculated value is also republished.

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[3] The following applies only to the bond input universe for DBIQ indices administered in the New York office. Since 5% is the legal threshold to which fund managers and custodians are held when providing valuations, this will also be the DBIQ threshold for these indices. It is also the threshold for which Interactive Data (underlying price source for the bond input data) will open a formal investigation of a provided price. While DBIQ will escalate all outliers to Interactive Data in the interest of an improved pricing, index restatements will only be requested for errors in excess of 5% change in constituent bond levels.
[4] The date will be announced on DBIQ website in due course

Correction of errors in index calculations may lead to restatement of those indices. This section outlines the rules to be followed for all index restatements.

Thresholds have been set to determine whether the restatement of an index will be required. The thresholds are defined based on the volatility of the index and time since the error first occurred. These are applicable to all DBIQ indices.

This section outlines the process of index restatements and defines the cases in which restatements will occur.

10.1.1 How are Errors Identified?

Errors are identified by a DBIQ team member as part of their index maintenance work or following the review of an Index Challenge. In accordance with section 2.2 , any client can raise an Index Challenge in relation to any aspect of the index determination or publication process.

Once an error has been identified, the index restatement process is undertaken by DBIQ in its capacity as index administrator.

10.1.2 Parties to be Involved in Case of Index Restatements

- DBIQ

- If required, Asset Class lawyer, Platform lawyer and Compliance will be informed about any potential impact to a connected product.

- Structuring and sales should be notified when applicable of the error so they may determine any potential impact to index linked products.

10.1.3 Thresholds Table

The following table is used to determine recalculation and restatement decisions based on the volatility of the index.

Thresholds Table			
Index Category	**Less than 7 days**	**Error start date between 7 days and 3 months**	**Error start date between 3 months and 1 year**
Low Vol (≤3%)	0% (always recalculate/restate)	0.01%	0.03%
Medium Vol (>3% & ≤ 10%)	0% (recalculate/always restate)	0.025%	0.05%
High Vol (>10%)	0% (recalculate/always restate)	0.05%	0.15%

10.1.4 Index Restatement Process

1. Error is identified by DBIQ or escalated to DBIQ via a challenge

2. DBIQ identifies whether it is a **one-off error** or **persistent error** – this determines the source of the error and importantly the date from which a recalculation is to be made "Recalculation Assessment Date" or "RAD". The decision tree is different between these. An example of persistent errors is errors in an historic rebalancing. An example of one-off errors is errors due to erroneous input data.

   I.   **Decision Tree for Persistent Errors**

The earliest possible RAD is the first date of a rebalancing period in which the error first arose. In case, the first date of a rebalancing period precedes the error identification date by more than a year, it will be considered a possible RAD if the last date in the rebalancing period is within a year of error identification date.

The Relevant Period is the date from the possible RAD up to and including the next Rebalancing Date. DBIQ recalculates each day's level for that period and the whole of that rebalancing period.

a. A valid RAD is determined using the following:

Index Category	Valid RAD
Relevant Period <= 7 days	Start of the most recent rebalancing period
Relevant Period >7 days but <= 1 year	Start of the rebalancing period in which any recalculated indices breach[5] the applicable threshold (see "Thresholds Table")
Relevant Period >1 year	Not applicable as no recalculation should be done

If the RAD is not valid, the process above is repeated for the next rebalancing date up to the most recent one.

b. Check for dependent indices and repeat the above for each dependent index
c. The earliest valid RAD for all indices (including dependent indices) is identified.
d. If no valid RAD is identified, no recalculation will occur
e. DBIQ recalculates the index level(s) in respect of the earliest valid RAD.
f. On the days the recalculated levels of an index have breached the thresholds (see "Thresholds Table"), that index is republished for the days the threshold is breached
g. Notices are published for affected index/indices

II. **Decision Tree for One-off Error that has occurred within the last year**
a. The error start date is the possible RAD. DBIQ recalculates each day's level from this possible RAD. A valid RAD is determined if any recalculated indices breach[6] the applicable threshold (see "Thresholds Table")
b. Check for dependent indices and repeat the above for each dependent index
c. The earliest valid RAD for all indices (including dependent indices) is identified.
d. If no valid RAD is identified, no recalculation will occur
e. DBIQ recalculates the index level(s) in respect of the earliest valid RAD.
f. On the days the recalculated levels of an index have breached the thresholds, that index is republished for the days the threshold is breached
g. Notices are published for affected index/indices

10.1.5 Additional Process for Restatement of Indices with Memory

Indices with memory are indices where the current index level depends in some systematic and defined way on previous index levels. Current index levels for indices with memory may depend on a rolling window of past index levels (e.g. moving average or momentum indices) or may depend on the entire past history of index levels (e.g. where the exponential moving average of the index level is an input).

For indices with memory, when an error is identified that does not breach the Thresholds, a further review is made. Some examples of such cases could be:

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[5] The difference between the original level and the recalculated level must be greater than the threshold to be considered a breach
[6] The difference between the original level and the recalculated level must be greater than the threshold to be considered a breach

- When a security fixing is incorrect but did not lead to any index levels breaching the Thresholds .

- When a component index level is incorrect but did not breaching the Thresholds.

In both such cases, there is a risk that future index levels may breach the Index Restatement Thresholds because of the nature of these indices (i.e. indices have memory). In such cases, a decision to recalculate levels, that would not normally be recalculated based on the restatement rules, can be made. This will follow the expert judgement procedures and recorded as such.

10.1.6 Additional Process for Restatement of Indices Impacted by Historical Calendar Changes

Historical changes in holiday calendars (addition or removal of a holiday) may impact index weights, participation factors, index levels and future selection and rebalancing dates. DBIQ will restate impacted indices if the change to a holiday calendar is discovered within one calendar week. The impact of historical changes to a holiday calendar that come to light outside of the one calendar week window will be treated on a case-by-case basis and a determination will be made by DBIQ Research Analysts or Head on whether to restate or not. This will follow the expert judgement procedures and recorded as such.

10.1.7 Index Calculation and Publication during Restatement Reviews

Index calculation and publication will continue as per schedule during the review period. If a decision to restate is made, index levels will be corrected, restated and clients notified.

DBIQ will aim to fix index errors within one business day of discovery. In the event of a error that may take longer to fix, it may be deemed necessary to put index calculations on hold. In this case, index clients, and if required, Compliance and the IOC must be notified. The notification for index clients will typically be made via an announcement on the DBIQ web site.

10.1.8 Notification Requirements

For restatements with a large impact in terms of levels or history, a restatement notice will be published on the DBIQ website.

11 Changes to and Retiring a Benchmark

11.1 Material Change

A material change will constitute a change in one or more of the following where disclosed in publicly available documents:
- external index identifier(s);
- methodology – for e.g. change in algorithm used for calculation of the index;
- 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; and
- reduction in transparency of index.

11.2 Change to a Benchmark

Prior to making a change or retiring a benchmark, DBIQ follows a process to consider the proposal and its impact. Prior to making a change, at a minimum this proposal is ratified by DBIQ Management and the BICG. The impact of the proposal to both the benchmark and known users is considered.

Prior to the announcement of any change, DBIQ aims to provide a feedback period on the proposals and or current benchmark methodology for the benchmark users. DBIQ aims to provide notice of the change at least 1 month prior to implementing the change. This period maybe shortened if market events necessitate an immediate change. Where a benchmark is designed for a single client, changes may be made based on a mutual agreement with the client.

The process for considering a change to a benchmark is based on the following steps:

1. Check framework for changes – review benchmark rules, documentation and known benchmark users to identify DBIQ's capacity to make a change[7].
2. Prepare proposal – complete analysis of reasons and impact of change. Consider likely impact on benchmark and if it will result in change in suitability for known users. Document proposal and when applicable request feedback on proposal. Feedback should be considered and if appropriate the proposal amended. Where possible and applicable, the feedback received will be provided in any relevant change notice (typically on an anonymous basis).
3. Ratify change – DBIQ Management and BICG approve all material changes to a benchmark[8].
4. Initiate change of benchmark – Finalise documentation provide relevant notices.

11.3 Benchmark Retirement

The benchmark retirement process sets out standards which promote the required practices for retirement or cessation of benchmarks within the DBIQ platform. Careful consideration is given as to the reasons to retire a benchmark and potential client implications of this. Factors including benchmark usage, data inputs and future potential use are included in the process. All retirements are approved by a member of the DBIQ Management Team.

During the review process DBIQ will attempt to identify known benchmark users. Depending on the results of the analysis different procedures are followed.

Unused Benchmark Retirement

In the event DBIQ fails to identify any users DBIQ will initiate the retirement process. DBIQ will provide a notice on its website where appropriate. In the event a user or users are identified the "In Use Benchmark Retirement" process below will be followed.

In Use Benchmark Retirement

An in-use benchmark can be defined as a benchmark which if retired will cause the disruption of the index product linked to it. Typically, in use benchmarks may only be considered for retirement when:

- Underlying market data is unavailable or the quality is considered insufficient for use in a benchmark;
- The effective maintenance of the benchmark is no longer possible; and
- Commercial reasons make the cost of maintaining the benchmark economically unsustainable compared to the uses.

Known users are consulted about the proposed retirement. Their views are consolidated and considered. A final decision is dependent on the DBIQ Management team and/or the IOC being satisfied that all relevant benchmark users can, within reason, be transferred to another benchmark or the relevant products may be cancelled.

If a decision is made to retire the benchmark a notice period of 3 months will be given before calculations are ceased if the cessation of the benchmark will lead to a disruption event. In other cases, the duration of the notice period will depend on the nature of benchmark and the extent of its usage.

Market Disruption or Data Issues and Retirement

In the event a market undergoes a rapid change or a data source is cancelled, it may be necessary to retire (or change) a benchmark with short notice. DBIQ undertakes retirement as a last resort and is only undertaken if the benchmark data sources or methodology cannot be modified or adapted to be accurate and reflective of the underlying benchmark principles. For a benchmark to be retired in these cases all known stakeholders are informed as soon as practical after the underlying issue has arisen. Their views

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[7] DBIQ does not retrospectively make changes to index methodology or restate index levels. If a change in methodology is required for any reason then the due consultation process with the client and legal will be undertaken before making the change.
[8] Non-material changes, such as correction of typos in the documentation or changes in internal procedures, can be made with the approval of DBIQ management.

are sought and may be discussed with the IOC before final decision is taken by DBIQ Team on whether the benchmark should be retired or how the benchmark should be calculated on an ongoing basis.

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