



CME Overnight Repo-Backed Benchmarks Methodology

RepoFunds Rate Euro “RFR Euro”
RepoFunds Rate Sterling “RFR Sterling”
RepoFunds Rate JBOND “RFR JBOND”

CME Group Benchmark Administration Limited

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Version Control

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1.0	Creation of the “benchmark family”	December 16 th , 2020
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1. Introduction

CME Overnight Repo-Backed Benchmarks is a suite of benchmarks administered by CME Group Benchmark Administration Limited (“CBA” or the “Administrator”) and intended to measure the cost of secured one-day repo funding of sovereign bonds issued by a sub-set of Eurozone Countries, the United Kingdom and Japan.

These benchmarks, are registered as a “Benchmark Family”:

- RepoFunds Rate Euro (“RFR EUR”)
- RepoFunds Rate Sterling (“RFR Sterling”)
- RepoFunds Rate JBOND (“RFR JBOND”)

1.1. CME Group and CME Group Benchmark Administration Limited

As a leading and diverse derivatives market operator, CME Group is the parent of four U.S.-based designated contract markets (“DCMs”): Chicago Mercantile Exchange Inc. (“CME”), Board of Trade of the City of Chicago, Inc. (“CBOT”), New York Mercantile Exchange, Inc. (“NYMEX”), and the Commodity Exchange, Inc. (“COMEX”) (collectively, the “CME Group Exchanges”). These exchanges offer a wide range of products available across all major asset classes, including futures and options based on interest rates, equity indexes, foreign exchange, energy, metals, and agricultural commodities. CME Group offers futures trading through the CME Globex® electronic trading platform (“Globex”), fixed income trading via BrokerTec, foreign exchange trading on the EBS platform, and central counterparty clearing services through CME Clearing, a division of CME.

CBA capitalizes on CME Group’s wealth of electronic transaction-based data in the calculation of its indices and benchmarks. CME Group Benchmark Administration Limited (CBA) is authorized and supervised by the UK Financial Conduct Authority (FCA). CBA is the Benchmark Administrator of the CME Overnight Repo-Backed Family of Benchmarks, with Chicago Mercantile Exchange Inc. providing calculation agent and distribution services.

1.2. Regulatory and IOSCO Compliance

CME Overnight Repo-Backed Benchmarks are a family of benchmarks, designed on the basis of industry best practices and the IOSCO Principles for Financial Benchmarks.

CME Overnight Repo-Backed Benchmarks are available for use under the UK Benchmark Regulation (BMR)¹.

¹ <https://www.fca.org.uk/markets/benchmarks/regulation>

2. Description of Benchmarks

2.1. RepoFunds Rate Euro Benchmarks (“RFR Euro”)

RFR Euro Benchmarks are one-day, secured Euro repo benchmarks, created with the intent to measure the effective cost of overnight funding of sovereign collateral. Benchmarks are calculated from repo trades that use Euro area sovereign government bonds denominated in EUR as the underlying collateral and are executed on the BrokerTec EU Regulated Market operated by CME Amsterdam B.V.² and BondVision multilateral trading facility (“MTF”)³ EuroMTS Limited⁴.

RFR Euro is calculated on an Act/360 day-count convention and its publication follow the [BrokerTec EU Repo Holiday Calendar](#).

The RFR Euro Benchmarks consists of the following benchmarks:

- RepoFunds Rate Austria (“RFR Austria”)
- RepoFunds Rate Belgium (“RFR Belgium”)
- RepoFunds Rate Finland (“RFR Finland”)
- RepoFunds Rate France (“RFR France”)
- RepoFunds Rate Germany (“RFR Germany”)
- RepoFunds Rate Italy (“RFR Italy”)
- RepoFunds Rate Ireland (“RFR Ireland”)
- RepoFunds Rate Netherlands (“RFR Netherlands”)
- RepoFunds Rate Portugal (“RFR Portugal”)
- RepoFunds Rate Spain (“RFR Spain”)
- RepoFunds Rate Euro (“RFR Euro”): based on the combination of the above ten (10) individual countries.

For the avoidance of doubt, additional analytics, such as ISIN specific VWAPs or the General Collateral or Specific Collateral rates are not classified as Benchmarks.

2.2. RepoFunds Rate Sterling (“RFR Sterling”)

RepoFunds Rate Sterling (“RFR Sterling”) is a one-day, secured Sterling repo benchmark. The benchmark is calculated from repo trades that use UK sovereign government bonds denominated in Sterling as the underlying collateral, executed on the BrokerTec central limit order book (“CLOB”) on the BrokerTec EU MTF operated by BrokerTec Europe Limited⁵ and centrally cleared. Underlying collateral includes DBV⁶, general collateral and specific collateral trades.

RFR Sterling is reported on an ACT/ACT day-count convention and its publication follows the [BrokerTec UK Gilt Repo Holiday Calendar](#).

For the avoidance of doubt, additional analytics, such as ISIN specific VWAPs or the General Collateral or Specific Collateral rates are not classified as Benchmarks.

² <https://www.cmegroup.com/markets/brokertec/regulatory-documents.html#all-documentation>

³ Article 4(1)(22) of MiFID

⁴ <https://www.mtsmarkets.com/products/mts-bondvision>

⁵ <https://www.cmegroup.com/trading/market-tech-and-data-services/brokertec.html>

⁶ Delivery by Value

2.3. RepoFunds Rate JBOND (“RFR JBOND”)

RepoFunds Rate JBOND is a one day, secured Japanese Yen repo index, calculated from eligible repo trades that use Japanese sovereign government bonds denominated in Japanese Yen as the underlying collateral, executed on the JBOND Repo Trading System⁷ electronic trading platform, and centrally cleared through the Japan Securities Clearing Corporation.⁸ JBond Totan Securities Co., Ltd. is headquartered in Tokyo, Japan and operates the JBOND Repo System under the relevant PTS license.⁹

RFR JBOND is reported on an ACT/365 day-count convention and its publication follow the [Japanese settlement calendar](#)¹⁰.

For the avoidance of doubt, additional analytics, such as ISIN specific VWAPs or the General Collateral or Specific Collateral rates are not classified as Benchmarks.

2.4. Trading Venues

BrokerTec Europe Limited and EuroMTS Limited are MTFs and are regulated in accordance with the laws applicable in the UK or EEA respectively.

CME Amsterdam B.V. operates the BrokerTec EU Regulated Market, and is regulated by the AFM.

JBond Totan Securities Co., Ltd. is regulated in accordance with the laws of Japan.

⁷ https://jbond.co.jp/_us/index.html

⁸ <https://www.jpx.co.jp/jscc/en/>

⁹ https://www.jbond.co.jp/_us/profile.html

¹⁰ <https://www.boj.or.jp/en/about/outline/holi.htm/>

3. Eligible Repo Transactions

The Benchmarks are calculated on transactions executed on regulated trading venues.

3.1. RFR EUR, RFR Sterling

Repo transactions eligible for inclusion in the calculation of the Benchmarks must be executed on one of the regulated trading venues relevant to their respective markets (operated by BrokerTec Europe Limited, CME Amsterdam B.V. and EuroMTS Limited) within nominated market hours.

- Quotes must be available to all dealers on the relevant market prior to being executed (no bilateral or off-platform trades);
- Trades must be centrally cleared;
- Repo term, from settlement date to maturity date, of one business day;
- Trades must be conducted at a fixed rate;
- Settle on the day for which the Benchmark is being calculated (“Common Settlement”);
- Repo collateral to be any bill, bond, floating-rate note, or inflation-linked bond issued by the sovereign government of the relevant country or, in the case of RFR Euro, by the sovereign government of the Eurozone countries listed in [RepoFunds Rate Euro \(“RFR Euro”\)](#);
- Collateral must be denominated in the respective domestic currencies;
- Repo trade must be DBV, general collateral or special collateral.

The set of eligible trades is the aggregation of Overnight, Tom-Next and Spot-Next trades with the same start and end value dates, executed within the specified market hours:

- Spot-Next and Tom-Next trades:
 - Trading venues operated by BrokerTec Europe Limited, CME Amsterdam B.V. and EuroMTS Limited: 6:45am to 5:15pm (GMT/BST)
- Overnight trades
 - All trades executed from market opening until the relevant clearing house deadline.

3.2. RFR JBOND

Repo transactions eligible for inclusion in the RFR JBOND calculation must be executed on the JBOND Repo System within nominated market hours.

- Quotes must be available to all dealers on the relevant market prior to being executed (no bilateral or off-platform trades);
- Trades must be centrally cleared;
- Repo term, from settlement date to maturity date, of one business day;
- Trades must be conducted at a fixed rate;
- Settle on the day for which the Benchmark is being calculated (“Common Settlement”);
- Repo collateral to be any bill, bond, floating-rate note, or inflation-linked bond issued by the sovereign government of Japan



- Collateral must be denominated in the respective domestic currencies;
- Repo trade must be general collateral or special collateral.
- As made available to CBA by JBOND Totan.

The set of eligible trades is the aggregation of Overnight, Tom-Next and Spot-Next trades with the same trade date as calculation date, executed within the specified market hours:

- Spot-Next and Tom-Next trades:
 - JBOND Repo System: 7:30am to 6:00pm (JST)
- Overnight trades
 - All trades executed from market opening until the relevant clearing house deadline.

4. Special Collateral Filtering Algorithm

Repo markets execute a mix of trade types, usually described as “general collateral” or “special collateral”.

Unlike “general collateral”, special collateral trades (special trades) precisely identify the ISIN of the security to be used as collateral. Normally it happens when a special security is in high demand and the transacted repo rate tends to be below typical market levels, often by a significant spread.

In order to calculate benchmarks that best represent the one-day cost of funding, the calculation filters out all special collateral trades below a given threshold prior to undertaking the final VWAR calculation.

All repo trades labelled as special collateral are combined by settlement date and by individual benchmark, and are sorted by descending rate. Then, the bottom 25% of trades are removed from the population. The remaining filtered set of special collateral trades are combined with the general collateral trades, for the final VWAR calculation.

The same filtering process is also applied to the calculation of RFR Euro as a whole; the entire set of special repo trades executed in the ten (10) individual Eurozone countries listed above, is aggregated in a single set and the filtering algorithm described above is applied.

5. Use of Expert Judgement

Expert judgement is not used in the ordinary day to day determination of the CME Overnight Repo-Backed Benchmarks. The benchmark calculation methodology is rules-based and designed to consistently produce robust and reliable values which do not rely on expert judgement. However, CBA, in its capacity as Administrator of the CME Overnight Repo-Backed Benchmarks, may exercise such expert judgement in unforeseen and extraordinary circumstances when deemed necessary to maintain the integrity, accuracy and reliability of the benchmark. These circumstances can include, but are not limited to: index restatements, periods of market stress or disruptions, or periods where data sources may be absent or become unreliable. Where such circumstances arise, a notice will be published on the [CBA Notice Page](#).

The elements of the calculation of the benchmark in relation to which expert judgement may be exercised, can include, but are not restricted to, the following: (i) excluding certain input data from the calculation; (ii) adjusting/varying any component of the benchmark calculation; or (iii) delaying/estimating the value of input data.

Any exercise of expert judgement by the Administrator can only be carried out by suitably experienced, qualified staff members who have the authority to exercise such judgement as part of their function. The exercise of expert judgement by the Administrator will be reported to the relevant Oversight Committee to ensure that it has been applied consistently and in accordance with the applicable benchmark administration standards and benchmark methodology. The Administrator will retain all internal records detailing the use of expert judgement and the rationale for its use to allow for any ex-post review.

6. Calculation Methodology

The Calculation Methodology has been designed to measure the cost of secured one-day repo funding of sovereign bonds, including considerations about the size and liquidity of the market as well as its dynamics.

Input data are transactions only, as contributed entirely and directly from the relevant trading venues.

6.1. RFR EUR, RFR Sterling, RFR JBOND

After the special filtering process is applied and 25% of special trades have been removed, the remaining set is combined with repo trades labelled as GC (general collateral) to form the set of trades eligible for calculation.

Each benchmark is the volume-weighted average rate of eligible repo trades (general collateral and filtered specials), and is calculated as follows:

$$RFR = \frac{\sum_i rate(i) \times quantity(i)}{\sum_i quantity(i)}$$

where $rate(i)$ and $quantity(i)$ are the repo rate and nominal size of repo trade i , and the sum is the total of all repo trades in the defined set of eligible repo trades for that day's benchmark.



Benchmark values are calculated and published up to 3 (three), rounded decimal places.

7. Data Sufficiency and Validations Checks

7.1. Data Sufficiency and Integrity

The input data used for the calculation of the benchmarks are checked by the Calculation Agent for anomalies once received from each Trading Venue.

Each benchmark will be calculated and published as long as there is at least one (1) eligible transaction in the observation period. If there are no eligible transactions available to calculate the benchmark, the previous day values will be re-used and published.

Specifically, for RFR EUR, the benchmarks are calculated only if both sets of input data (from CME Amsterdam B.V. and EuroMTS Limited) are available. If one or both sets of input data are unavailable, the previous day values will be re-used and published.

The Administrator regularly reviews the underlying markets and reports to the Oversight Committee any concern caused by persistent lack of transactional activity in a specific benchmark.

If the previous day value is re-used for more than three consecutive business days, the Administrator must promptly convene the Oversight Committee to assess available remedial actions.

7.2. Pre-publication Validations

Prior to publication, calculated rates for all benchmarks must pass a validation check. The validation check is performed by the Calculation Agent immediately after calculation of the benchmarks and prior to their dissemination.

Validation checks aim to identify unusual input data volumes (missing or duplicated data) comparing volumes for the day to historical parameters.

The Administrator periodically reviews the validation parameters, according to market conditions, and informs the Calculation Agent of any changes.

The Calculation Agent will have in place procedures to:

- investigate and correct the anomaly
- promptly escalate to the Administrator in the event of persisting anomalies
- report monthly to the Administrator the results of the pre-publication validation checks

The Administrator provides a full report of Validation Checks to the Oversight Committee.

8. Publication and Restatement Policy

8.1. Publication

The Calculation Agent performs calculations and post-calculation checks immediately after input data have been received; benchmarks are published shortly after calculation and validation checks, according to the following approximate schedule:

Times GMT/BST unless specified	SFTP	Bloomberg	Administrator Website
RFR EUR	4:15pm	4:30pm	5:00pm (T+1)
RFR Sterling	4:15pm	4:30pm (T+1)	5:00pm (T+1)
RFR JBOND	6:30pm (JST)	6:30pm (JST)	6:30pm (JST)

Each publication includes the following:

- Date & Time of publication
- Index Value
- Index Volume
- Initial Volume

The RFR Euro publication follows the [BrokerTec EU Repo Holiday Calendar](#).

The RFR Sterling publication follows the [BrokerTec UK Gilt Repo Holiday Calendar](#).

The RFR JBOND publication follows the [Japanese settlement calendar](#).

In addition, CBA may, with advance notice, choose not to publish the RFR benchmarks on any given business day.

8.2. Restatement Policy

The Administrator takes the utmost care to ensure that input data and calculations are accurate. During the calculation process and prior to publication, the Administrator performs additional validation checks (as in [Pre-publication Validations](#)) to identify possible inaccuracy, and if required, will swiftly recalculate and revalidate the benchmarks prior to publication.

All exceptions or warning alerts are reviewed and analysed by the Administrator. In the event that an alert is raised by a data or process error, and is identified before publication, benchmark analysts will correct the error before official publication.

In the instance an inaccuracy is not identified and resolved before benchmark calculation and publication, or if input data received is revised retrospectively, the Administrator will review the impact on any affected benchmark and determine if the inaccuracy is material and whether it warrants a re-publication of the benchmark value.

In the event that there is a material inaccuracy in the publication of the benchmark that requires a re-publication of the benchmark value, users will be informed via the CME Globex system utilising the [GCC System Alerts](#) and via the publication of a notice to the [CBA Notice Page](#).

The Administrator will take into consideration, without limitation, the below criteria when determining whether a restatement is warranted:

- The time elapsed between the initial publication and the identification of the inaccuracy;
- The number of benchmark levels affected;
- Whether the impacted benchmarks have tradable products referencing them;
- The magnitude of the inaccuracy;
- The impact of restatement on clients relative to the magnitude of the inaccuracy.

Any decisions to amend and/or republish a benchmark value by the Administrator can only be carried out by suitably experienced, qualified staff members who have the authority to make such decision as part of their function. Instances of restatements will be reported to the relevant Oversight Committee for review retrospectively and will also be reported to the Board of the Administrator. The Administrator will retain all internal records detailing instances of restatement and the rationale for its decision to allow for any ex-post review.

8.3. Publication Alerts

In the event of disruptions to the standard CME Overnight Repo-Backed Benchmarks' publication process, CBA, where it deems necessary, will release publication alerts with respect to issues impacting the availability of the index. Publication alerts will be made available via the CME Globex system utilising the [GCC System Alerts](#).

8.4. Consultations and Notices

CBA will inform the users and stakeholders of any announcements relating to republication, restatements or consultations via the [CBA Notice Page](#).

In addition, CBA may, at its discretion and on a best effort basis, release information notices with respect to issues impacting the availability of RFR Euro, RFR Sterling or RFR JBOND, via the [CBA Notice Page](#).

9. Governance

The Administrator operates under a comprehensive Risk and Control Framework, providing clear policies on Governance, Oversight, Benchmark Design and Calculation, Outsourcing, Operations, Reporting of Infringements and Business Continuity.

CBA has in place a "Three Lines of Defence" model, enabling close cross-monitoring of the governance process - this being business, compliance and audit who all have a key role in ensuring that CBA meets its regulatory requirements.

9.1. Oversight Committee

An Oversight Committee is appointed by the Administrator to review the integrity of the benchmark, in accordance with the CBA Terms of Reference for Oversight Committees.

The Oversight Committee will provide independent oversight of, and challenge to the Administrator on all aspects of the Benchmark determination process.

9.2. Review of the Methodology

The Administrator constantly monitors the Benchmark Methodology and its consistency with the stated objectives. The Benchmark Methodology is reviewed and approved annually by the Administrator and is reviewed annually by the Oversight Committee.

The Oversight Committee approves proposed changes to the Benchmark Methodology including, but not limited to, the structure of the Benchmarks, input data used and all aspects of the Calculation Methodology.

The Oversight Committee may request the Administrator to consult on any changes to the methodology with Stakeholders and the wider market.

9.3. Consultation Process

Where material changes to the Benchmarks become necessary, the Administrator will engage stakeholders and users by way of a public consultation.

Changes to the Methodology are deemed material on the basis of an assessment conducted by the Administrator and submitted to the Oversight Committee for advice and feedback.

The Administrator will publish notice of the consultation on its website, inviting feedback from stakeholders and the wider market. Where practicable, notice of a consultation will be posted at least 1 (one) month prior to the deadline for responses. The notice will include the details of the proposed material change, the timeline and the rationale for the change.

Findings of the consultation process and proposed changes to the Benchmark Methodology, recommended as a result of the consultation, will be presented by the Administrator to the Oversight Committee for its consideration.

Feedback to a consultation is considered confidential, however the Administrator will publish an anonymized summary with its conclusions, as soon as is practical, but before implementation of any changes.

9.4. Cessation

The Administrator constantly monitors the representativeness of the Benchmark. If the Benchmark is deemed to be unrepresentative of the underlying economic reality due to paucity of input data or systemic changes in the related markets, the Administrator will engage the Oversight Committee at the earliest opportunity. These cessation arrangements are designed to mitigate cessation and transition risks.

The Oversight Committee is responsible for reviewing and approving procedures for cessation of the benchmark, to the extent required under BMR, based on the type, complexity, use and vulnerability of the benchmark.

The Oversight Committee may request the Administrator to consult with Stakeholders as described in the [Consultation Process](#) section of this document.

As a last resort, if no alternative arrangements are feasible, the Oversight Committee may advise the Administrator to discontinue the Benchmark, providing Stakeholders reasonable notice and assistance to explore alternative reference instruments.

The Administrator will endeavour to identify alternative benchmarks; however, this might not always be possible due to Regulations, market conditions or suitable alternatives.

Users of the benchmark are recommended to ensure that they have adequate fallback policies and procedures in the event of the Benchmark becoming unrepresentative of its economic interest.

9.5. Record Retention

The Administrator has in place policies for the retention of any relevant evidence and documentation related to the determination and dissemination of the Benchmark, either in paper or in electronic format, for at least the mandatory term of 5 (five) years.

9.6. Auditing

An audit process is undertaken regularly, to ensure adherence to the stated Methodology, the IOSCO principles and regulatory requirements.

External audits can be requested at any time by the Administrator's Board, the Oversight Committee or the internal audit function.

9.7. Data Licensing and Distribution

The Benchmark is made available subject to execution of an Information License Agreement (ILA) with CME Inc together with the appropriate Schedules. Market participants that intend to subscribe to the benchmark should contact the Administrator at the following email address: CMEDataSales@cmegroup.com

9.8. Complaints Procedures

[The CBA Complaints Procedures](#) set out the procedure according to which a complaint will be dealt with by a senior member of staff not directly involved with the benchmark calculation and dissemination. Information related to complaints will be stored in a restricted access area and kept for a period of at least 5 (five) years following the date when the complaint was first lodged. Complaints can be submitted at internationalcompliance@cmegroup.com.

10. Appendix I – Key Terms & Definitions

TERM	DESCRIPTION
Administrator	CME Group Benchmark Administration Limited
BMR	UK Benchmark Regulation (Regulation (EU) 2016/2011, as retained in UK law under the European Union (Withdrawal) Act 2018, as amended from time to time)
CBA	CME Group Benchmark Administration Limited
GC	General Collateral
SC	Special Collateral
OC	Oversight Committee
RFR	RepoFunds Rate
VWAR	Volume Weighted Average Rate
AFM	The Dutch Authority for the Financial Markets

11. Appendix II – ESG Disclosures

Explanation of how ESG Factors are Reflected in the Key Elements of the Benchmark Methodology		
Item 1	Name of the benchmark administrator.	CME Group Benchmark Administration Limited
Item 2	Type of benchmark or family of benchmarks.	Sovereign Debt
Item 3	Name of the benchmark or family of benchmarks.	CME Overnight Repo-Backed Benchmark
Item 4	Does the benchmark methodology for the benchmark or family of benchmarks take into account ESG factors?	No

