

# FTSE Goldman Sachs ESG-Enhanced Euro Investment-Grade Corporate Bond Index

v2.2

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## Section 1

# Introduction

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## 1. Introduction

### 1.1 FTSE Goldman Sachs ESG-Enhanced Euro Investment-Grade Corporate Index

1.2 The FTSE Goldman Sachs ESG-Enhanced Euro Investment-Grade Corporate Bond Index (the index) is a corporate benchmark, which provides a broad-based measure of the Euro-denominated corporate fixed income markets.

1.2.1 The index is created using the FTSE WorldBIG Corporate Universe filtered for Euro denominated bonds, which forms the basis of the starting universe (the base index).

1.2.2 The index seeks to deliver stable performance for a given level of risk relative to the base index. This is achieved through a series of screens and weight allocation adjustments aimed at return optimisation and/or volatility minimisation. Securities are selected and the weights adjusted in accordance to liquidity, ESG and/or fundamental weighting adjustments and term structure optimisation. The corporate universe is then duration adjusted and reweighted to match the base index in the resulting index composition.

1.3 The FTSE Goldman Sachs ESG-Enhanced Euro Investment-Grade Corporate Bond Index does take account of ESG factors in its design.

### 1.4 FTSE Russell

FTSE Russell is a trading name of FTSE International Limited, Frank Russell Company, FTSE Global Debt Capital Markets Limited (and its subsidiaries FTSE Global Debt Capital Markets Inc. and FTSE Fixed Income Europe Limited), FTSE Fixed Income LLC, FTSE (Beijing) Consulting Limited, Refinitiv Benchmark Services (UK) Limited, Refinitiv Limited and Beyond Ratings.

1.5 FTSE Russell hereby notifies users of the index that it is possible that factors, including external factors beyond the control of FTSE Russell, may necessitate changes to, or the cessation, of the index and therefore, any financial contracts or other financial instruments that reference the index or investment funds which use the index to measure their performance should be able to withstand, or otherwise address the possibility of changes to, or cessation of, the index.

1.5.1 Index users who choose to follow this index or to buy products that claim to follow this index should assess the merits of the index's rules-based methodology and take independent investment advice before investing their own or client funds. No liability whether as a result of negligence or otherwise is accepted by FTSE Russell or any members of the FTSE Russell Policy Advisory Board (or any person concerned with the preparation or publication of these Ground Rules) for any losses, damages, claims and expenses suffered by any person as a result of:

- any reliance on these Ground Rules;
- any inaccuracies in these Ground Rules;
- any non-application or misapplication of the policies or procedures described in these Ground Rules; and/or
- any inaccuracies in the compilation of the index or any constituent data.

## Section 2

# Management responsibilities

## 2. Management responsibilities

### 2.1 FTSE International Limited (FTSE)

2.2 FTSE is the benchmark administrator of the index series<sup>1</sup>.

2.2.1 FTSE is responsible for the daily calculation, production and operation of the index series, and will:

- maintain records of all the constituents;
- be responsible for the addition and deletion of bonds and changes of nominal amounts, in accordance with the Ground Rules; and
- disseminate the indices.

### 2.3 Amendments to these Ground Rules

2.3.1 These Ground Rules shall be subject to regular review (at least once a year) by FTSE Russell to ensure that they best reflect the aim of the index series. Any proposals for significant amendments to these Ground Rules will be subject to consultation with FTSE Russell advisory committees and other stakeholders if appropriate. The feedback from these consultations will be considered by the FTSE Russell Index Governance Board before approval is granted.

2.3.2 As provided for in the Statement of Principles for FTSE Russell Fixed Income Indices, where FTSE Russell determines that the Ground Rules are silent or do not specifically and unambiguously apply to the subject matter of any decision, any decision shall be based as far as practical on the Statement of Principles. After making any such determination, FTSE Russell shall advise the market of its decision at the earliest opportunity. Any such treatment will not be considered as an exception or change to the Ground Rules, or to set a precedent for future action, but FTSE Russell will consider whether the Ground Rules should subsequently be updated to provide greater clarity.

<sup>1</sup> The term administrator is used in this document in the same sense as it is defined in [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](#) (the European Benchmark Regulation) and [The Benchmarks \(Amendment and Transitional Provision\) \(EU Exit\) Regulations 2019](#) (the UK Benchmark Regulation).

## Section 3

# FTSE Russell index policies

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## 3. FTSE Russell index policies

These Ground Rules should be read in conjunction with the following policy documents which can be accessed using the links below or by contacting [fi.index@lseg.com](mailto:fi.index@lseg.com). These policies are reviewed annually and any changes are approved by the FTSE Russell Index Governance Board.

### 3.1 Statement of Principles for FTSE Fixed Income Indices (the Statement of Principles)

Indices need to keep abreast of changing markets and the Ground Rules cannot anticipate every eventuality. Where the Ground Rules do not fully cover a specific event or development, FTSE Russell will determine the appropriate treatment by reference to the Statement of Principles for FTSE Fixed Income Indices which summarises the ethos underlying FTSE Russell's approach to index construction. The Statement of Principles is reviewed annually and any changes proposed by FTSE Russell are presented to the FTSE Russell Policy Advisory Board for discussion before approval by the FTSE Russell Index Governance Board. The Statement of Principles for Fixed Income Indices can be accessed using the following link:

[Statement of Principles Fixed Income Indices.pdf](#)

### 3.2 Queries and Complaints

FTSE Russell's complaints procedure can be accessed using the following link:

[Benchmark Determination Complaints Handling Policy.pdf](#)

### 3.3 Recalculation Policy and Guidelines

The Recalculation Policy and Guidelines for Fixed Income Indices document is available from the FTSE Russell website using the link below or by contacting [fi.index@lseg.com](mailto:fi.index@lseg.com).

[Fixed Income Recalculation Policy and Guidelines.pdf](#)

### 3.4 Index Policy in the Event Clients are Unable to Trade a Market or a Security

3.4.1 Details of FTSE Russell's treatment can be accessed using the following link:

[Index Policy in the Event Clients are Unable to Trade a Market or a Security.pdf](#)

### 3.5 Policy for Benchmark Methodology Changes

Details of FTSE Russell's policy for making benchmark methodology changes can be accessed using the following link:

[Policy for Benchmark Methodology Changes.pdf](#)

### 3.6 FTSE Russell Governance Framework

To oversee its indices, FTSE Russell employs a governance framework that encompasses product, service and technology governance. The framework incorporates the London Stock Exchange Group's three lines of defence risk management framework and is designed to meet the requirements of the IOSCO Principles for Financial Benchmarks<sup>2</sup>, the European benchmark regulation<sup>3</sup> and the UK benchmark regulation<sup>4</sup>. The FTSE Russell Governance Framework can be accessed using the following link:

[FTSE Russell Governance Framework.pdf](#)

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<sup>2</sup> IOSCO Principles for Financial Benchmarks Final Report, FR07/13 July 2013.

<sup>3</sup> 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.

<sup>4</sup> The Benchmarks (Amendment and Transitional Provision) (EU Exit) Regulations 2019.

## Section 4

# Composition and design criteria

## 4. Composition and design criteria

4.1 The Euro corporates sector selects securities from the starting universe of the WorldBIG Corporate Universe filtered for EUR-denominated index (base index) to provide a broad representation of the Euro-denominated investment grade corporate bond market after applying ESG exclusions. This universe then applies a fundamental screening based on fundamental financial data and then utilising an optimisation process to select securities relative to the base corporates index and to determine weights such that projected return is maximised across the term structure based on currency and country weighted average life sectors.

### 4.2 Liquid ESG screen

4.2.1 Issuers are screened based on amount outstanding and minimum bond issuance to represent the more liquid portion of the market, from which a subsequent ESG screening is applied.

Issuers are excluded if they:

- are on-compliant with the United Nations Global Compact (UNGC) Principles;
- exceed the revenue thresholds in the following product involvement (PI) areas; weapons, civilian firearms, tobacco, thermal coal and oil sands. The exclusions criteria are outlined in Section 5.

4.2.2 Corporate issuers are screened for compliance with UNGC Principles and issuers that are non-compliant are removed. Issuers in compliance or where there is no UNGC coverage remain included in the index.

4.3 The UNGC assessments and PI data are provided by Sustainalytics<sup>5</sup>.

### 4.4 Fundamental screen

4.4.1 The liquid ESG universe is ranked based on year-on-year change in fundamental indicators within the respective country of risk and which would represent 90% of the eligible corporate issuers after the fundamental screen. For issuers domiciled in countries of risk that constitute at least 3% of the market capitalisation, bonds from the lowest ranked 10% of issuers are excluded<sup>6</sup>. The remaining bond subset, along with bonds of issuers that satisfy the size screening criteria but have neither fundamental indicator available or are domiciled in countries of risk that constitute less than 3% of the market capitalisation are included in the final bond subset. Furthermore, a final issuer capping is performed to help manage the concentration risk.

### 4.5 Optimisation

4.5.1 The optimisation aims to maximise one-month projected return by ensuring the return volatility of the sector remains below a pre-set level, the term structure is constrained within a band relative to the Base Corporates Index and the duration matches the Base Corporates Index.

<sup>5</sup> UNGC and PI Involvement assessment is conducted against Sustainalytics Research Universe. Issuers not in scope for SA research are included in the benchmark.

<sup>6</sup> For issuers subject to screening domiciled in countries of risk that are at least 3% of market capitalisation, those issuers remain screened until the next rebalancing quarter (e.g. end of February, May, August and November) when new fundamental rankings will be calculated.

For screened issuers, in the event that the size of the country of risk they're domiciled decreases below 3% between rebalancing quarters, the issuers remain screened until the next rebalancing quarter.

**Figure three: design criteria and calculation assumptions for the Euro Corporates sector**

|  |   |
|--|---|
| <b>Coupon</b>                            | Fixed rate  |
| <b>Currency</b>                          | EUR   |
| <b>Minimum maturity</b>                  | At least one year   |
| <b>Minimum issue size and bond count</b> | EUR 500 million and minimum two bonds per issuer  |
| <b>Minimum credit quality</b>            | BBB- by S&P or Baa3 by Moody's  |
| <b>Composition</b>                       | Euro corporate securities issued in registered form   |
| <b>Weighting</b>                         | Market capitalisation subject to capping and duration adjustments as described in reconstitution.   |
| <b>Rebalancing</b>                       | Once a month on the last business day of the month (pricing as of the last business day of the monthly and settlement as of the last calendar day of the month.) (Additional screening details to follow.)  |
| <b>Reinvestment of cash flows</b>        | Intra-month cash flows from interest and principal payments are not reinvested as part of monthly index total return calculations <sup>7</sup> .  |
| <b>Calculation frequency</b>             | Daily   |
| <b>Settlement date</b>                   | Monthly: settlement is on the last calendar day of the month.<br>Daily: same-day settlement except if the last business day of the month is not the last calendar day of the month; then, settlement is on the last calendar day of the month.  |
| <b>Fixing date</b>                       | Monthly: settlement is on the last calendar day of the month.<br>Daily: same-day settlement except if the last business day of the month is not the last calendar day of the month; then, settlement is on the last calendar day of the month.  |
| <b>Term buckets</b>                      | For duration match, two term sectors around the weighted average life.  |
| <b>Capping</b>                           | Issuer weights are capped at currency level at:<br>5% for issuers where fundamental indicators are applied; or<br>3% for issuers where fundamental indicators are not observable.   |
| <b>ESG screen</b>                        | Issuers are screened based on:<br>– non-compliance with UNGC Principles; and<br>– exceeding revenue thresholds in the following PI activities: weapons, firearms, tobacco, thermal coal and oil sands (see Appendix A).   |
| <b>Reconstitution</b>                    | Liquid universe and ESG screen<br>1 Apply minimum issue/issuer screen to the base index.<br>2 Removal of non-compliant issuers from PI screening and UNGC screening. Issuers are screened on a quarterly basis (February, May, August, November). On the non-quarterly rebalance months, a monthly reconstitution will occur whereby newly issued bonds will be mapped to existing issuers and based on the issuer inclusion/exclusion will permit new bonds entering. New Issuers will be excluded until such time data permits and included on quarterly review.<br>Each month, after filtering for minimum issue, issuer size and PI/UNGC screening, securities are ranked, capped and weighted through an iterative process to make sure all criteria are met and apply a fundamental screen.<br>1 Issuer capping – issuer weights are capped at 5% for issuers with fundamental indicators and 3% for issuers where fundamental indicators are not observable <sup>8</sup> . The capping is applied within the currency groups of issuers subject to screening and optimisation detailed below.<br>2 Duration adjustment – bonds are divided into maturity buckets based on the weighted average life. The weight of each maturity bucket is adjusted to match the weighted average effective duration of the maturity bucket in the base index. Within each maturity bucket, constituents are assigned weights in proportion to their market capitalisation.<br>3 Repeat steps three and four until duration and cap criteria is met. |

<sup>7</sup> Prior to 1 November 2022, reinvestment income was included in the total return calculation.

<sup>8</sup> If an issuer has at least one bond with available fundamental data, all bonds of that issuer are subject to the 5% cap. The cap is first assessed by currency group (e.g. USD, EUR and GBP bonds) for the fundamental screen, then once again in aggregate for the carry and roll down optimisation.

|                                       |   |
|---------------------------------------|---|
|                                       | <p>4 Fundamental screening<sup>9</sup> and ranking – the bond universe is initially screened for issuers with a country of risk greater than 3%. These issuers are then subject to further screening by two fundamental indicators reported by the issuers: by looking at improvements on a year-on-year absolute change in (1) operating margin and (2) leverage. Operating margin is measured by earnings before interest and taxes margin (EBIT margin), while leverage is measured by debt to enterprise value (debt to EV). The issuers are ranked within their respective country of risk – positively by operating margin and negatively by leverage, accounting for market capitalisation. The percentile rankings of individual indicators are combined to calculate each issuer's composite rank. When only a single indicator is available, that single indicator will be used to calculate the issuer's composite rank. The issuers within the lowest 10% composite rank are excluded and the index is formed with the remaining eligible bonds captured post initial ESG and liquidity screening.</p> <p>5 The remaining bond subset including those that did not meet the 3% minimum country criteria for fundamental screening, along with bonds of issuers that satisfy the size screening criteria but have neither fundamental indicator available are included in the final bond subset, in accordance with their market capitalisation.</p> <p>6 For the non-quarter-end months, bonds that no longer meet the liquidity, rating or maturity requirements are removed from the profile. Newly issued bonds from the qualified issuers of the most recent quarterly rebalancing will be included. The monthly profiles will reflect the latest par amount and market value of all included bonds.</p> <p>Final index</p> <p>1 Carry and roll down optimisation (detailed in next section).</p> <p>Screening utilises pricing and amounts outstanding of the base index in order to reconstruct index holdings and weights.</p> |
| <b>Reconstitution/optimisation</b>    | <p>Each month, eligible bonds are divided into country and maturity sectors based on their weighted average life (WAL) in years as of the month-end date (maturity sectors) as follows: one to three, three to five, five to seven, seven to 10, 20 and 20+.</p> <p>The bond weights are optimised with a goal to maximise projected one-month return. Projected returns for each security are computed by setting the settlement date forward by one month and assuming constant yield curve and OAS.</p> <p>The optimization selection constraints include:</p> <ol style="list-style-type: none"> <li>1 Each currency maturity sector's (e.g. EUR one to three years) market value can vary from 50% to 200%, relative to the corresponding maturity sector of the base index.</li> <li>2 Allocations to the bonds within a maturity bucket is weighted in proportion to the security's market capitalisation.</li> <li>3 Index return variance (weekly over the prior year) is not to exceed 125% of that of the base index in EUR.</li> <li>4 The modified duration and total market value of the index is set to the base index.</li> </ol> <p>In the case where the optimisation produces lack feasible results, constraints will be loosened to achieve a solution. First, the volatility cap will be repeatedly increased by multiplying by 1.02. If that optimisation fails to find a feasible result, the sector caps are repeatedly increased by 0.05% until a viable solution is found.</p> <p>Optimisation utilises pricing and amounts outstanding of the base index in order to reconstruct index holdings and weights.</p>   |
| <b>Transaction costs<sup>10</sup></b> | <p>Transaction costs are calculated at the security level, as the product of the increase in market value (compared to the previous months market value) times a cost factor of the relevant WAL bucket for the bond. The cost factor is assessed on an annual basis each December by averaging the relative spread between bid price and ask price of securities in the index profile in that month and applied in subsequent rebalances.</p> <p>Cost factor may be periodically reviewed and adjusted for market conditions.</p>  |
| <b>Pricing</b>                        | <p>EMEA: Refinitiv mid 16:15 London</p>   |

For more information on the FTSE EuroBIG Index, please see the [FTSE Fixed Income Index Guide](#).

<sup>9</sup> Fundamental screen data determined in February, May, August and November of each year, while also being applied for monthly rebalancing.

<sup>10</sup> Transaction costs were not considered in the optimisation prior to the December 2021 profile.

## Section 5

# ESG data inputs

## 5. ESG data inputs

5.1.1 The following ESG datasets are used in the construction of the indices.

| ESG data inputs                             | Details   | Used for selection, weighting or exclusion <sup>11</sup> |
|---|---|--|
| <b>Conduct related data- Sustainalytics</b> | The dataset focuses on controversial conduct screening companies violating United Nations Global Compact (UNGC). Information about the methodology is available here: <a href="http://www.sustainalytics.com/investor-solutions/esg-research/esg-screening/global-compact-norms-based-screening">www.sustainalytics.com/investor-solutions/esg-research/esg-screening/global-compact-norms-based-screening</a> . The data are subject to regular quality checks to identify discrepancies and ensure accuracy; these checks include trend analysis to assess data quality and detailed review of underlying data for significant Sustainalytics score changes | Selection  |
| <b>World Bank Indicators</b>                | The World Bank World Development Indicators (WDI) provides cross-country comparable data on development. More information can be found: <a href="https://datatopics.worldbank.org/world-development-indicators/">https://datatopics.worldbank.org/world-development-indicators/</a><br>The World Bank Worldwide Governance Indicators (WGI) report on six broad dimensions of governance for countries. More information can be found: <a href="https://www.worldbank.org/wgi/2022-interactive">WGI 2022 Interactive &gt; Home (worldbank.org)</a>  | Selection  |
| <b>Industry Classifications - COBS</b>      | The FTSE Russell Corporate Bond Sector (COBS) scheme is maintained by FTSE Russell for all bonds tracked by the FTSE Fixed Income Indices. COBS subsectors are used as one input to screen constituents of the Base Index to determine Fossil Fuels issuers. Further information can be found in the FTSE Fixed Income Index Guide, available <a href="https://www.ftserussell.com/indices/fixed-income/indices-guide">ftse-fixed-income-indices-guide.pdf</a>  | Selection  |

5.1.2 Further information on ESG data provided by FTSE Russell and third parties used in this index (index series) can be found in the following guide:

[Guide to FTSE and Third Party ESG Data used in FTSE Russell Indices](#)

This includes information on the data and standards used for these ESG data inputs. These data sets may include estimated data.

<sup>11</sup> Definitions

Selection- ESG data is used to select or rank constituents, or calculate minimum scores or thresholds

Weighting- ESG data is used to calculate the weight of a constituent in an index

Exclusion- ESG data is used to exclude securities from the index

## Appendix A

## Euro corporates exclusions

On a quarterly basis (February, May, August, November), FTSE Russell will exclude companies from the underlying eligible universe of the FTSE Euro Corporate Bond Index. This data is provided by third party data vendor, Sustainalytics.

| Exclusions  | Threshold                                |
|---|--|
| <b>Weapons</b>  |  |
| <b>Anti-personnel mines, nuclear weapons, cluster weapons, biological and chemical weapons, depleted uranium and white phosphorus munitions</b>                                 | Greater than 0% revenues                 |
| Companies providing core weapon systems or components/services of the core weapon system that are considered tailor-made and essential for these weapons.                       |  |
| <b>Firearms</b>   |  |
| Civilian assault and non-assault production   | Greater than 0% revenues                 |
| Civilian assault and non-assault retail   | Greater than or equal to 5% of revenues  |
| <b>Tobacco</b>  |  |
| Tobacco production  | Greater than 0% revenues                 |
| Tobacco retail  | Greater than or equal to 5% of revenues  |
| <b>Coal</b>   |  |
| Thermal coal extraction   | Greater than 0% revenues                 |
| Companies generating electricity from thermal coal  | Greater than or equal to 25% of revenues |
| <b>Oil sands</b>  |  |
| Oil sands extraction  | Greater than or equal to 5% of revenues  |
| <b>UN Global Compact (UNGC) violation</b>   |  |
| Companies responsible for egregious and severe violations of commonly accepted international norms related to human rights, labour rights, the environment and business ethics. | All companies deemed to be non-compliant |

# Additional index references – classifications

## FTSE Euro Broad Investment-Grade Bond Index – industry sector classification

The industry classification of the EuroBIG reflects the current structure of the market and is in line with the structure of the FTSE World Broad Investment-Grade Bond Index (WorldBIG).

| Corporate – utility | Corporate – industrial | Corporate – financial |
|---------------------|------------------------|-----------------------|
| Electric            | Consumer               | Banks                 |
| Gas                 | Energy                 | Independent finance   |
| Telecommunication   | Manufacturing          | Insurance             |
| Other utility       | Service                | Other finance         |
|                     | Transportation         |                       |
|                     | Other industrial       |                       |

# Additional index references – index pricing, conventions and analytics

Reliable pricing of each security is necessary to ensure reliable index values and returns. A combination of third-party pricing providers that vary based on asset class are used to price the indices. A robust vendor selection process is applied to pricing inputs to ensure that the quality of valuations within the indices remains high. This selection process includes both a qualitative review of the pricing methodology and operational capabilities of the provider, and a quantitative review of coverage metrics, historical pricing data and statistical analysis.

The remainder of this section provides further details on specific sources and conventions used within the FTSE fixed income indices.

## Index price sources and snap times

Figure 4 shows the local market pricing source and snap time used for the pricing of the fixed income indices. Prices are bid-side with the exception of Mexican government bonds for which mid-prices are used in order to conform to market conventions.

## Verification and price challenges

Statistical techniques are used to identify pricing anomalies based on day-over-day changes and comparisons across peer groups by maturity, asset type, etc. Any price challenges from index users and possible outliers from the verification process are reviewed with our third-party pricing providers. In the event that an issue is not able to be resolved in a timely manner, FTSE Russell may exercise expert judgement and roll prices from the previous day. Any exercise of expert judgement is recorded.

## Index holiday calendars

The indices are calculated Monday through Friday except Christmas Day (observed) and New Year's Day (observed). When a market observes a holiday, the closing prices from the previous available day are used as the closing prices for index calculations on such holiday for that market.

Each local market will observe its own holiday calendar: if a local market is on holiday, the closing prices used for that day will be the closing prices from the previous day. For example, USD-denominated indices such as the US Broad Investment-Grade Bond Index, Eurodollar Bond Index, Sukuk Index and Emerging Markets US Dollar Government Bond Index follow the holiday calendar applicable to New York. On any day where the US observes a holiday, the closing prices used for these indices are the prices from the previous available day.

Eurozone countries are considered as a single bloc and they use the European Central Bank's Trans-European Automated Real Time Gross Settlement Express Transfer (TARGET2) calendar in place of the local market calendars to determine holidays. As such, the closing prices used for all Eurozone countries on any holiday under the TARGET2 closing days calendar are the previously available closing prices of the respective countries.

## Settlement

For daily calculations, it is assumed that indices settle on a same-day basis except if the last business day of the month is not the last calendar day of the month; then settlement is on the last calendar day of the month. The last business day of the month is based on the local market holiday calendar. Monthly holding periods, therefore, are exactly one calendar month. For example, the January return period would run from the close on 31 December to the close on 31 January, regardless of the last business day.

## Index quality

An index quality is assigned to each index bond as of profile fixing. The quality is first mapped to the Standard & Poor's Financial Services LLC (S&P) rating. If a bond is not rated by S&P but it is rated by Moody's Investors Service, Inc (Moody's), the S&P equivalent of the Moody's rating is assigned to the index quality. If a bond is rated by neither S&P nor Moody's, the bond is not assigned an index quality. If a bond is rated as investment grade by one rating agency and high yield by the other, the S&P equivalent of the investment-grade rating is assigned to the index quality. These ratings remain unchanged for the entire performance month.

## Defaults

When an issuer defaults, is assigned a D rating by S&P regardless of whether that issuer has filed for bankruptcy protection or enters into Chapter 7 or Chapter 11 bankruptcy protection in the US (or equivalent in its local market), its bonds remain in the index until the end of the month. However, the bonds will not be included in the calculation of the current month's average profile statistics of the index. The returns are calculated without coupon payment or accrued interest, where applicable.

## FTSE Fixed Income index analytics

Index users rely on single security analytics to assess the risk profile of their investments, provide insights into the behaviour of the fixed income markets and drive their investment decisions. FTSE fixed income indices rely on analytics provided by The Yield Book Inc., which is a leading analytics platform with 30 years of experience in providing single security, risk and performance data for fixed income. While some calculations are relatively straightforward in nature, others rely on sophisticated models, which are rigorously tested by market participants who provide feedback into their evolution and development. A description of the major types of analytics calculated for FTSE fixed income indices can be found below. For more details on their calculations, please see the Glossary of Terms in appendix 4.

**Duration** generally represents the sensitivity in price of a security to changes in the interest rate environment. FTSE Russell publishes a number of duration measures, including effective duration, modified duration and Macaulay duration. The most widely used measure, effective duration, is a measure of sensitivity to yield for bonds with optionality, such as callable bonds and agency mortgages with prepayment optionality.

**Spread** metrics provide investors with a relative measure for the riskiness of a fixed income instrument and are often quoted to a comparable risk-free asset, such as a Treasury bond or curve. The most commonly used spread metric, option-adjusted spread (OAS), accounts for embedded optionality in a bond and the variability of future cash flows. FTSE Russell also published gross spread, which compares the yield of a bond to the interpolated yield of two Treasury bonds at the same weighted average life point.

**Yield** represents the expected return of a security given a certain set of assumptions. Yield to maturity is computed as the single yield which equates the sum of the discounted expected cash flows to the current price of the bond. Since it is not guaranteed that an investor will be able to hold a bond to its maturity date, yield to worst is calculated to quantify the lowest yield that could be realised by an investor given its optionality.

**Model-driven analytics**, such as those calculated for the FTSE Mortgage Index, utilise prepayment models maintained by The Yield Book. In addition to the incorporation of these models into standard risk measures, such as duration, spread and yield, these models also produce asset-class specific measures, such as projected prepayment rates for agency MBS.

For further information about The Yield Book, please visit <https://www.lseg.com/en/ftse-russell>

# Additional index references – index return calculations

## Return computation

For treasury, government-sponsored, corporate and ABS securities, total returns are computed on the assumption that each security is purchased at the beginning of the period and sold at the end of the period. An issue's total rate of return is the percentage change in its total value over the measurement period. The components of total return are price change, principal payments, coupon payments and accrued interest. The total returns are market capitalisation weighted using the security's beginning-of-period market value (see Figure 4).

### Figure seven: total rate of return calculation methodology

#### Beginning-of-period value

(Beginning Price + Beginning Accrued) x Beginning Par Amount Outstanding

#### End-of-period value

[(Ending Price + Ending Accrued) x (Beginning Par Amount Outstanding - Principal Payments)] + Coupon Payments + Principal Payments

#### Total rate of return (%)

$$\left[ \left( \frac{\text{End-of-Period Value}}{\text{Beginning-of-Period Value}} \right) - 1 \right] \times 100$$

A note on precision: returns are computed to at least six decimal places but reported to a maximum of five. In addition, owing to rounding inaccuracies inherent in computer floating-point arithmetic, the last digit in any reported value may sometimes be off by one from its true value.

# Additional index references

Ticker for the FTSE Goldman Sachs ESG-Enhanced Euro Investment-Grade Corporate Bond Index

| Ticker   | Index  |
|----------|--|
| CFIIEECE | FTSE Goldman Sachs ESG-Enhanced Euro IG Corporate Bond Index, in EUR terms |

Chronological summary of events

FTSE Goldman Sachs ESG Enhanced Euro Investment Grade Corporate Bond Index summary of event

| Year | Monthly highlights  |
|------|---|
| 2022 | <b>November:</b> intra-month cash flows from interest and principal payments are not reinvested as part of monthly index total return calculations. |
| 2021 | <b>June:</b> change in timing of pricing used in index.   |

## Appendix C

# Further information

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A Glossary of Terms used in FTSE Russell's Ground Rule documents can be found using the following link:

[Fixed Income Glossary of Terms.pdf](#)

For contact details, please visit the FTSE Russell website or contact FTSE Russell client services at [fi.index@lseg.com](mailto:fi.index@lseg.com)

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