

FTSE Nomura Climate Risk-Adjusted Carry and Roll Down (CaRD) World Government Bond Index Series

v1.6



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Section 1

Introduction

1. Introduction

1.1 FTSE Nomura Climate Risk-Adjusted Carry and Roll Down (CaRD) World Government Bond Index Series

1.1.1 The FTSE Nomura Climate Risk-Adjusted Carry and Roll Down World Government Bond Index Series (Climate CaRD WGBI, also refer to the index in this document) seeks to reflect a targeted exposure to the sovereign bonds in the FTSE Climate Risk-Adjusted World Government Bond Index (Climate WGBI, the base universe). The weightings for each index in the series are determined by an optimisation process that aims to maximise the carry and roll down of the index, subject to duration and country weight constraints of the base universe.

1.1.2 The FTSE Climate WGBI measures the performance of fixed-rate, local currency, investment-grade sovereign bonds, based on the market capitalisation of its index eligible debt, as well as by incorporating a tilting methodology that adjusts index weights according to each country's relative climate risk performance, measured across three distinct and quantitative, climate-related pillars: transition risk, physical risk and resilience.

1.1.3 The FTSE Nomura Climate Risk-Adjusted Carry and Roll Down (CaRD) World Government Bond Index Series does take account of ESG factors in its design.

1.2 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.

1.2.1 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.

1.2.2 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 Fixed Income LLC (FTSE)

2.1.1 FTSE is the benchmark administrator of the index series¹.

2.2 Amendments to these ground rules

2.2.1 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.

2.2.2 As provided for in the Statement of Principles for FTSE Russell Fixed Income Indexes, 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.

¹ 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). FTSE Fixed Income LLC administers the index series in line with the third country transitional provisions contained within Article 51(5) of the European Benchmark Regulation and the third country transitional provisions as amended by Article 42(5) of the UK Benchmark Regulation.

Section 3

FTSE Russell index policies

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. 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 Indexes (the Statement of Principles)

Indexes 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 Indexes, 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 Indexes can be accessed using the following link:

[Statement_of_Principles_Fixed_Income_Indexes.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 Indexes document is available from the FTSE Russell website using the link below or by contacting fi.index@lseg.com.

[Fixed_Income_Recalculation_Policy_and_Guidelines.pdf](#)

3.4 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](#)

3.5 FTSE Russell Governance Framework

3.5.1 To oversee its indexes, 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 Benchmarks² and the European benchmark regulation³. The FTSE Russell Governance Framework can be accessed using the following link:

[FTSE_Russell_Governance_Framework.pdf](#)

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

³ 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.

Section 4

Composition and design criteria

4. Composition and design criteria

4.1.1 The FTSE Climate WGBI composition is based on the sovereign markets and constituents of the FTSE WGBI. Therefore, a new market entering the FTSE WGBI will also enter the Climate WGBI, as well as Climate CaRD WGBI at the same time. Markets being removed from the WGBI because they are subjected to FTSE WGBI's exit criteria will also be removed from the Climate WGBI and Climate CaRD WGBI.

4.1.2 To be eligible for the FTSE WGBI, markets must satisfy minimum market size, credit rating and market accessibility level criterion. These criteria are assessed on an annual basis each September; however, markets that no longer meet the minimum credit quality will be removed from the index at the next month's profile.

4.1.3 As of November 2022, the index eligible markets include below 22 countries, denominated in a variety of currencies:

Americas	Asia-Pacific and Japan
Canada	Australia
Mexico	China ⁴
United States	Japan
	Malaysia
	New Zealand
	Singapore

EMEA		
Austria	Ireland	Denmark
Belgium	Italy	Norway
France	Netherlands	Poland
Finland	Spain	Sweden
Germany	Israel	United Kingdom

4.1.4 The index is based on the FTSE Climate Risk-Adjusted World Government Bond Index (base universe). For more information, please see the FTSE Fixed Income Index Guide or go to FTSE website: [climate-wgbi](https://www.ftserussell.com/climate-wgbi)

⁴ Inclusion of China phased in over a 36-month period starting in November 2021.

4.2 Design criteria and calculation assumptions for the FTSE Nomura Climate Risk-Adjusted Carry and Roll Down WGBI Series

Coupon	Fixed rate
Minimum maturity	At least one year
Minimum credit quality	Entry: A- by S&P and A3 by Moody's, for all new markets Exit: below BBB- by S&P and Baa3 by Moody's
Weighting	Alternatively weighted. The country weights of the base universe are determined by climate scores and pillars. The final weights of each index in the series are determined by performing an optimisation process; see the optimisation methodology section below.
Country climate scores	Updated annually and applied each May month-end rebalance. The cut-off for input data is 1 May of each year.
Country climate scores assessment cohort	Local currency sovereign bond markets eligible for the WGBI.
Climate pillars and tilt calibration	Geometric tilt – Transition risk: 0.25 – Physical risk: 1 – Resilience: 1
Reinvestment of cash flows	Intra-month cash flows from interest and principal payments are not reinvested as part of monthly index total return calculations ⁵ .
Rebalancing	Once a month on the last business day of the month.
Calculation frequency	Daily
Settlement date	Monthly: settlement is on the last calendar day of the month. 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.
Fixing date	Each month, the upcoming month's index constituents for the base universe are fixed on the profile fixing date ⁶ . The Index is fixed on fixing processing date.
Base date	31 December 2006

4.3 Pricing methodology

4.3.1 The index is calculated Monday through Friday except Christmas Day (observed) and New Year's Day (observed). 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. The local market pricing source and snap time used for the pricing of the Index follows the convention of the FTSE World Government Bond Index. For more details, please see the index guide on the website: [index](#).

4.4 Index quality

4.4.1 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.

⁵ Prior to 1 November 2022, reinvestment income was included in the total return calculation.

⁶ Fixing dates provide a clear reference point for index users to know in advance of any changes to the composition of the index for the upcoming month. Index rules stipulate that there must be a minimum of four (4) business days following each index fixing date and before calendar month-end in all the following business regions: US, UK, Eurozone, Japan and Australia.

The annual schedule of fixing dates is made available on the website at [index](#).

The generation of monthly preliminary profiles comprising the following month's profiles currently takes place the day after fixing day, known as fixing processing day. To provide index users with this information in a more timely manner, fixing processing day will be moved from the day after fixing day to fixing day, effective with the March 2021 profiles.

4.5 Maturity

4.5.1 In addition to the broad categories published, subsector breakdowns are also provided for many of the fixed income indexes. One such sub-division is based on the remaining maturity of the underlying securities. The maturity sector buckets are defined by including all underlying issues with a remaining average life at least equal to the lower bound, but less than the upper bound of the particular category. For example, the one- to three-year sector of the FTSE Climate WGBI includes all securities in the Climate WGBI with a remaining average life of at least one year, but less than three years. The set of bonds is then held constant for the calculation month, even if the average life drops below the lower bound of the maturity bucket.

4.6 Optimisation methodology

4.6.1 The bonds in each index are divided into sectors based on their country of issuance and maturity sector buckets (see maturity section above). The maturity sectors considered are one to three years, three to five years, five to seven years, seven to 10 years, 10 to 15 years and 15+ years. For each sector, expected returns are computed by assuming that yield curves and option adjusted spreads remain constant over the following 12 months. Using the above inputs, the sector-level optimisation aims to maximise the index's 12-month expected return, while the individual country weights and interest rate risks are both matched to the base universe (FTSE Climate WGBI).

The index series optimises on a local basis (LO variants). The optimisation process will ensure that:

- i. individual country modified durations will be the same as those in the base universe; and
- ii. the country-level market value weights remain the same as their starting levels. Country market value weights are anchored to their original value in the base universe. Within each country, sector weights can fluctuate without any cap on monthly turnover.

The optimisation is done on a monthly basis and targets the sector combinations with the highest expected returns. The bonds in the remaining sectors of the universe are assigned zero weight and will be excluded from the index. Leverage and negative weights are not allowed in the optimisation.

Figure one provides more information on the optimisation process:

[Figure one: optimisation details](#)

Objective function

Maximise: $\sum (\text{Bucket Market Value})_{\text{Climate CaRD WGBI}} \times (\text{Bucket Carry and Roll Down})$

Country market value constraint (within each country):

$\sum (\text{Bucket Market Value})_{\text{Climate CaRD WGBI}} = \sum (\text{Bucket Market Value})_{\text{Climate WGBI}}$

Country modified duration constraint (within each country):

$\left[\sum (\text{Bucket Market Value})_{\text{Climate CaRD WGBI}} \times (\text{Bucket Modified Duration}) \right] / \sum (\text{Bucket Market Value})_{\text{Climate CaRD WGBI}} = \left[\sum (\text{Bucket Market Value})_{\text{Climate WGBI}} \times (\text{Bucket Modified Duration}) \right] / \sum (\text{Bucket Market Value})_{\text{Climate WGBI}}$

4.7 Return computation

- 4.7.1 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 for each security 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 two). In the case of multi-currency or non-base indexes, the total return also includes currency movement (see Figure three).

Figure two: 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 errors inherent in computer floating-point arithmetic, the last digit in any reported value may sometimes be off by one from its true value.

Figure two: total rate of return calculation methodology for base currency returns, unhedged

Total rate of return (%)

$$\left\{ \left[1 + \left(\frac{\text{Local Currency Return}}{100} \right) \right] \times \left(\frac{\text{End-of-Month Spot Rate}}{\text{Beginning-of-Month Spot Rate}} \right) - 1 \right\} \times 100$$

This equation holds true only if the spot rates are quoted as base currency per unit of foreign currency.

- 4.7.2 The monthly currency-hedged return is calculated by using a rolling one-month forward exchange contract as a hedging instrument. The face value of the contract is equal to the estimated end-of-month full market value. To calculate this value, the bond's yield is assumed to be unchanged from the beginning of the month. Any known cash flows are then taken into account, such as coupon or principal payments, and interest expected to accrue for the period is also added in. This calculation leaves the intra-month changes in bond prices from yield movements unhedged. Any principal movement resulting from yield change is then settled at end-of-month spot exchange rates. Figure three gives an example of the calculation formula from the point of view of a US investor.

Figure three: total rate of return calculation methodology, currency-hedged

Beginning-of-period value

$$[(\text{Beginning Price} + \text{Beginning Accrued}) \times \text{Beginning Par Outstanding}] \times \left[\left(\frac{\text{Beginning-of-Period}}{\text{Spot Exchange Rate}} \right) \left(\frac{\text{US Dollar}}{\text{Local Currency}} \right) \right]$$

End-of-period value

$$\left[\left(\frac{\text{End-of-Period Local Currency Value, Assuming Unchanged Yield}}{\text{End-of-Period Local Currency Value, Assuming Unchanged Yield}} \right) + \left(\frac{\text{Known Intra-Month Cash Flows and Interest Expected to Accrue}}{\text{Known Intra-Month Cash Flows and Interest Expected to Accrue}} \right) \right] \times \left[\left(\frac{\text{Beginning-of-Period One-Month Forward Exchange Rate}}{\text{Beginning-of-Period One-Month Forward Exchange Rate}} \right) \left(\frac{\text{US Dollar}}{\text{Local Currency}} \right) \right] + \left[\left(\frac{\text{Change in Market Value of Principal Amount Due to Yield Change}}{\text{Change in Market Value of Principal Amount Due to Yield Change}} \right) \times \left(\frac{\text{End-of-Period Spot Exchange Rate}}{\text{End-of-Period Spot Exchange Rate}} \right) \left(\frac{\text{US Dollar}}{\text{Local Currency}} \right) \right]$$

This equation holds true only if the spot rates are quoted as base currency per unit of foreign currency.

4.8 Available indexes in the series

Index name	Universe	Objective	Constraint	Optimisation date ⁷	Vendor code
FTSE Nomura Climate Risk-Adjusted CaRD World Government Bond Index, in JPY terms	Climate WGBI	Maximise carry and roll down as measured by the index 12-month expected return	Country-level modified duration and market values equal to that of the universe	Fixing processing date ⁸	CFIICWJ
FTSE Nomura Climate Risk-Adjusted CaRD World Government Bond Index, currency hedged in JPY terms	Climate WGBI	Maximise carry and roll down as measured by the index 12-month expected return	Country-level modified duration and market values equal to that of the universe	Fixing processing date ⁶	CFIICWJC
FTSE Nomura Climate Risk-Adjusted CaRD World Government Bond Index ex Japan, in JPY terms	Climate WGBI ex-Japan	Maximise carry and roll down as measured by the index 12-month expected return	Country-level modified duration and market values equal to that of the universe	Fixing processing date ⁶	CFIICXJJ
FTSE Nomura Climate Risk-Adjusted CaRD World Government Bond Index ex Japan, currency hedged in JPY terms	Climate WGBI ex-Japan	Maximise carry and roll down as measured by the index 12-month expected return	Country-level modified duration and market values equal to that of the universe	Fixing processing date ⁶	CFIICXJC

4.9 Chronological summary of events

4.9.1 The construction of the FTSE Nomura Climate Risk-Adjusted Carry and Roll Down World Government Bond Index Series is driven by the same events that mark the FTSE Climate Risk-Adjusted World Government Bond Index. For more information, please see the FTSE Fixed Income Index Guide. Unless otherwise stated, the index follows the general methodology for FTSE Fixed Income Indexes. For details, please also refer to FTSE Fixed Income Index Guide.

⁷ Bond carry and roll down, modified duration and market value are calculated on the optimisation date with a settlement date of the corresponding month-end. Individual bond par amounts are derived by the optimisation process on the optimisation date. Such par amounts are then used for the corresponding month-end rebalancing.

⁸ Fixing dates provide a clear reference point for index users to know in advance of any changes to the composition of the index for the upcoming month. Index rules stipulate that there must be a minimum of four (4) business days following each index fixing date and before calendar month-end in all the following business regions: US, UK, Eurozone, Japan and Australia. The annual schedule of fixing dates is made available on the website at [index](#). The generation of monthly preliminary profiles comprising the following month's profiles currently takes place the day after fixing day, known as fixing processing day. To provide index users with this information in a more timely manner, fixing processing day will be moved from the day after fixing day to fixing day, effective with the March 2021 profiles.

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 ⁹
Beyond Ratings Climate KPIs	Beyond Ratings Climate KPIs consist in various indicators aiming to offer a broad assessment of sovereign climate risks across carbon intensity, transition, and physical risk metrics.	Weighting

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.

⁹ 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

Further information

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.

Website: www.lseg.com/en/ftse-russell/

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