

FTSE Nomura Carry and Roll Down (CaRD) World Government Bond Index Series

v1.8



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Section 1

Introduction

1. Introduction

1.1 FTSE Nomura Carry and Roll Down (CaRD) World Government Bond Index Series

1.1.1 The FTSE Nomura Carry and Roll Down (CaRD) World Government Bond Index Series (the “Series”) seeks to reflect a targeted exposure to the sovereign bonds in the FTSE World Government Bond Index (WGBI). The weightings for each index (the “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. Indices in the Series differ from each other depending on their respective targeted carry and roll down objectives and optimisation constraints.

1.1.2 The FTSE World Government Bond Index (WGBI) measures the performance of fixed-rate, local currency, investment-grade sovereign bonds.

1.1.3 The FTSE Nomura Carry and Roll Down (CaRD) World Government Bond Index Series does not 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, and/or
- any inaccuracies in these Ground Rules, and/or
- 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)

2.1.1 FTSE is the benchmark administrator of the index series.¹

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 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.

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).

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 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.

[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 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 Benchmarks², the European benchmark regulation³ and the UK benchmark regulation⁴. The FTSE Russell Governance Framework can be accessed using the following link:

[FTSE Russell Governance Framework.pdf](#)

3.6 Real Time Status Definitions

3.6.1 Please refer to the following guide for details of real time status definitions for indices that are calculated in real time.

[Real Time Status Definitions.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.

⁴ The Benchmarks (Amendment and Transitional Provision) (EU Exit) Regulations 2019.

Section 4

Base universe for the FTSE Nomura Carry and Roll Down Government Bond Index Series

4. Base universe for the FTSE Nomura Carry and Roll Down Government Bond Index Series

- 4.1 The base universe for the FTSE Nomura Carry and Roll Down Government Bond Index Series is the market capitalisation weighted FTSE World Government Bond Index (WGBI). The FTSE WGBI measures the performance of fixed-rate, local currency, investment-grade sovereign bonds and comprises sovereign debt from over 20 countries.
- 4.2 For full details on the design criteria and calculation assumptions for the base indices, please refer to the FTSE Fixed Income Index Guide which can be accessed using the following link: [FTSE Fixed Income Index Guide](#)

Section 5

Index methodology

5. Index methodology

5.1 Index weighting methodology

- 5.1.1 Each individual index composition is based on the sovereign markets and constituents of the WGBI. A new market entering the WGBI will also enter the Index at the same time. Markets being removed from the WGBI because they are subjected to WGBI's exit criteria will also be removed from the Index.
- 5.1.2 The bonds in each Index are divided into sectors based on their country of issuance and weighted average life⁵. For each sector, expected returns are computed by assuming that yield curves and option adjusted spreads remain constant over the following twelve months. Currency-hedged expected returns are derived from the local expected returns after adjusting for expected exchange rate movements based on current spot FX and forward FX.
- 5.1.3 Using the above inputs, the sector-level optimisation aims to maximise the Index's twelve-month expected return. Three optimisation variants are calculated:
- 5.1.4 For Indices optimised with a constraint on PV01⁶ weights (XOPV variants), the individual country interest rate risks are matched to the Universe. The optimisation process will ensure that: i) the modified duration of the Index will be the same as the Universe, and ii) the country-level PV01 weights remain below a preset multiple of their starting levels. Country market value weights are not anchored to their original value in the Universe and can fluctuate without any cap on monthly turnover.
- 5.1.5 For Indices optimised with a constraint on market value weights (XOMV variants), the individual country weights are matched to the Universe. The optimisation process will ensure that: i) the modified duration of the Index will be the same as the Universe, and ii) the country-level market value weights remain below a preset multiple of their starting levels. Country market value weights are anchored to their original value in the Universe. Within each country, sector weights can fluctuate without any cap on monthly turnover.
- 5.1.6 For Indices optimised on a local basis (LO variants), the individual country weights and interest rate risks are both matched to the Universe. The optimisation process will ensure that: i) individual country modified durations will be the same as those in the 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 Universe. Within each country, sector weights can fluctuate without any cap on monthly turnover.
- 5.1.7 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.

⁵ Maturity sectors considered are 1-3 years, 3-5 years, 5-7 years, 7-10 years, 10-15 years and 15 years+.

⁶ PV01 is proxied as Market Value x Modified Duration/10000.

Figure 1 provides more information on the optimisation and the different variants.

Figure 1. Optimisation Details

1. XOPV Variants
Objective Function:
 Maximise: $\sum (\text{Bucket Market Value})_{\text{CaRD}} \times (\text{Bucket Carry and Roll Down})$
Total Index Market Value Constraint:
 $\sum (\text{Bucket Market Value})_{\text{CaRD}} = \sum (\text{Bucket Market Value})_{\text{WGBI}}$
Country PV01 Constraint (Within Each Country):
 $\sum (\text{Bucket Market Value})_{\text{CaRD}} \times (\text{Bucket Modified Duration}) = \sum (\text{Bucket Market Value})_{\text{WGBI}} \times (\text{Bucket Modified Duration})$

2. XOMV Variants
Objective Function:
 Maximise: $\sum (\text{Bucket Market Value})_{\text{CaRD}} \times (\text{Bucket Carry and Roll Down})$
Total Index Modified Duration Constraint:
 $\sum (\text{Bucket Market Value})_{\text{CaRD}} \times (\text{Bucket Modified Duration}) = \sum (\text{Bucket Market Value})_{\text{WGBI}} \times (\text{Bucket Modified Duration})$
Country Market Value Constraint (Within Each Country):
 $\sum (\text{Bucket Market Value})_{\text{CaRD}} = \sum (\text{Bucket Market Value})_{\text{WGBI}}$

3. LO Variants
Objective Function:
 Maximise: $\sum (\text{Bucket Market Value})_{\text{CaRD}} \times (\text{Bucket Carry and Roll Down})$
Country Market Value Constraint (Within Each Country):
 $\sum (\text{Bucket Market Value})_{\text{CaRD}} = \sum (\text{Bucket Market Value})_{\text{WGBI}}$
Country Modified Duration Constraint (Within Each Country):
 $\frac{[\sum (\text{Bucket Market Value})_{\text{CaRD}} \times (\text{Bucket Modified Duration})]}{[\sum (\text{Bucket Market Value})_{\text{WGBI}} \times (\text{Bucket Modified Duration})]} / \frac{\sum (\text{Bucket Market Value})_{\text{CaRD}}}{\sum (\text{Bucket Market Value})_{\text{WGBI}}} =$

Figure 2. Additional design criteria and calculation methodology for the FTSE Nomura Carry and Roll Down World Government Bond Index Series

Weighting	The weights of each Index in the Series are determined by performing an optimisation process, see weighting methodology section above.
Rebalancing	Once a month at the end of the month
Calculation Frequency	Daily
Fixing date	Each month, the upcoming month’s index constituents are “fixed” on the profile fixing date. Each year’s scheduled fixing dates are published on the website.
Base date	December 31, 2006

5.2 Holiday calendar

5.2.1 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.

5.3 Index sectors classification

5.4 Maturity

5.4.1 In addition to the broad categories published, sub-sector breakdowns are also provided for many of the fixed income indices. 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 World Government Bond Index (WGBI) includes all securities in the 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.

5.5 Index quality

5.5.1 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.

5.6 Exchange rates

5.6.1 LSEG Pricing Service closing spot and forward rates are used. LSEG Pricing Service takes several snapshots at regular intervals centered on the fixing time of 4:00 p.m. London time and selects the median rate for each currency. All rates are mid-market quotations and appear on LSEG Pricing Service (see WMRSPT01).

5.7 Return computation

5.7.1 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 3). In the case of multi-currency or non-base indices, the total return also includes currency movement (see Figure 4).

Figure 3. 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 Payments⁷

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 4. 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.

⁷ Prior to 1 November 2022, reinvestment calculation was included in the total return calculation.

5.7.2 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 5 gives an example of the calculation formula from the point of view of a US investor.

Figure 5. 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

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

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

5.8 Available indices in the Series

Index Name	Currency	Universe	Objective	Constraint	Optimisation Date*	Vendor code
FTSE Nomura CaRD World Government Bond XOPV Index, currency-hedged in USD terms	Hedged in USD terms	WGBI	Maximise carry and roll down as measured by the Index 12-month expected return, currency-hedged in USD terms	i. modified duration of the Index equals to modified duration of the Universe, and ii. Country-level PV01 weights remain below 1x of their starting levels	Fixing Date**	CFIIXPVU
FTSE Nomura CaRD World Government Bond XOPV Index, currency-hedged in EUR terms	Hedged in EUR terms	WGBI	Maximise carry and roll down as measured by the Index 12-month expected return, currency-hedged in EUR terms	i. modified duration of the Index equals to modified duration of the Universe, and ii. Country-level PV01 weights remain below 1x of their starting levels	Fixing Date**	CFIIXPVE
FTSE Nomura CaRD World Government Bond XOPV Index, currency-hedged in GBP terms	Hedged in GBP terms	WGBI	Maximise carry and roll down as measured by the Index 12-month expected return, currency-hedged in GBP terms	i. modified duration of the Index equals to modified duration of the Universe, and ii. ii) Country-level PV01 weights remain below 1x of their starting levels	Fixing Date**	CFIIXPVG
FTSE Nomura CaRD Non-AUD World Government Bond XOPV Index, currency-hedged in AUD terms	Hedged in AUD terms	WGBI ex-Australia	Maximise carry and roll down as measured by the Index 12-month expected return, currency-hedged in AUD terms	i. modified duration of the Index equals to modified duration of the Universe, and ii. Country-level PV01 weights remain below 1x of their starting levels	Fixing Date**	CFIIXPV4

Index Name	Currency	Universe	Objective	Constraint	Optimisation Date*	Vendor code
FTSE Nomura CaRD World Government Bond XOPV Index, currency-hedged in JPY terms	Hedged in JPY terms	WGBI	Maximise carry and roll down as measured by the Index 12-month expected return, currency-hedged in JPY terms	<ul style="list-style-type: none"> i. modified duration of the Index equals to modified duration of the Universe, and ii. Country-level PV01 weights remain below 1x of their starting levels 	Fixing Date**	CFIIXPVJ
FTSE Nomura CaRD Non-JPY World Government Bond XOPV Index, currency-hedged in JPY terms	Hedged in JPY terms	WGBI ex-Japan	Maximise carry and roll down as measured by the Index 12-month expected return, currency-hedged in JPY terms	<ul style="list-style-type: none"> i. modified duration of the Index equals to modified duration of the Universe, and ii. Country-level PV01 weights remain below 1x of their starting levels 	Fixing Date**	CFIIXPV3
FTSE Nomura CaRD World Government Bond ex-BBB XOPV Index, currency-hedged in JPY terms	Hedged in JPY terms	WGBI with minimum index quality of A-	Maximise carry and roll down as measured by the Index 12-month expected return, currency-hedged in JPY terms	<ul style="list-style-type: none"> i. modified duration of the Index equals to modified duration of the Universe, and ii. Country-level PV01 weights remain below 1x of their starting levels 	Fixing Date**	CFIIXPV1
FTSE Nomura CaRD Non-JPY World Government Bond ex-BBB XOPV Index, currency-hedged in JPY terms	Hedged in JPY terms	WGBI ex-Japan with minimum index quality of A-	Maximise carry and roll down as measured by the Index 12-month expected return, currency-hedged in JPY terms	<ul style="list-style-type: none"> i. modified duration of the Index equals to modified duration of the Universe, and ii. Country-level PV01 weights remain below 1x of their starting levels 	Fixing Date**	CFIIXPV2
FTSE Nomura CaRD Non-JPY Non-CNY World Government Bond ex-BBB XOPV Index, currency-hedged in JPY terms	Hedged in JPY terms	WGBI ex-Japan ex-China with minimum index quality of A-	Maximise carry and roll down as measured by the Index 12-month expected return, currency-hedged in JPY terms	<ul style="list-style-type: none"> i. modified duration of the Index equals to modified duration of the Universe, and ii. Country-level PV01 weights remain below 1x of their starting levels 	Fixing Date**	TBD

* 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.

** 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 of the following business regions: US, UK, Eurozone, Japan, and Australia. The annual schedule of fixing dates is made available on the website at www.ftserussell.com/index

Appendix A

Further information

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

[Glossary_of_terms_FTSE_Fixed_Income.pdf \(ftserussell.com\)](#)

For contact details please visit the FTSE Russell website or contact FTSE Russell client services at fi.index@lseg.com.

Website: www.ftserussell.com

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