

# FTSE Advanced Climate Risk-Adjusted Government Bond Index Series

v1.6



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## Section 1

# Introduction

## 1. Introduction

### 1.1 Overview

- 1.1.1 The FTSE Advanced Climate Risk-Adjusted Government Bond Index Series is built upon the same quantitative climate risk assessment framework established in the existing FTSE Climate Risk-Adjusted Government Bond Index Series but aims to achieve greater climate benefit (measured by improvement in 2-degree alignment).
- 1.1.2 The FTSE Advanced Climate Risk-Adjusted Government Bond Index Series takes account of ESG factors in its design.

### 1.2 FTSE Advanced Climate Risk-Adjusted Government Bond Index Series

- 1.2.1 The FTSE Advanced Climate Risk-Adjusted Government Bond Index Series measures the performance of fixed-rate, local currency, investment-grade sovereign bonds by incorporating a tilting methodology that adjusts index weights according to each country's relative climate risk performance. The series comprises:
- FTSE Advanced Climate Risk-Adjusted World Government Bond Index (“Advanced Climate WGBI”)
  - FTSE Advanced Climate Risk-Adjusted World Government Bond ex Japan Index (“Advanced Climate WGBI ex Japan”)
  - FTSE Advanced Climate Risk-Adjusted European Monetary Union (EMU) Government Bond Index (“Advanced Climate EGBI”)

The FTSE Advanced Climate Risk-Adjusted Government Bond Index Series weights each country based on the market capitalisation of its index eligible debt, as well as its relative climate risk performance, measured across three distinct and quantitative, climate-related pillars. The growing risks of climate change and the scale of the transition to a 2-degree pathway is strengthening the thesis that the materiality of climate risk is growing for government bond issuers. The unique Climate-Risk Model that underpins the FTSE Advanced Climate Risk-Adjusted Government Bond Index Series is designed to mitigate against climate change related risks for the sovereign bond asset class.

The series follows the monthly rebalancing mechanics of the standard FTSE global government bond indices with respect to universe membership, however, the market value weight for each security is tilted by its respective country's climate score. Climate scores are calculated on an annual basis using input data through May 1, and are effective for each May month-end rebalance. The country climate scores are derived by assessing each country's relative climate risk across three core climate risk pillars (each with multiple sub-indicators):

- **Transition risk** represents the level of climate related risk exposure of the country's economy as measured by the distance to reach the modeled emissions needed to meet a 2-degree alignment
- **Physical risk** represents the level of climate related risk exposure to the country and its economy from the physical effects of climate change
- **Resilience** represents a country's preparedness and actions to cope with its level of climate related risk exposure

Countries are scored across each pillar and a single combined score is derived for each country. The country scores are used to reweight its index exposure to provide higher exposures to countries less exposed to climate change risks and lower exposures to countries that are more exposed to climate change risks.

1.2.2 These Ground Rules are detailed in two core sections to best reflect the way in which the index series is constructed:

1. The Base Index: detailing the methodology of the underlying market value weighted index, and
2. The Climate Index: detailing the methodology to assess and quantify relative sovereign climate exposure and to use these scores to tilt the Base Index.

### 1.3 Index Objective and Intended Use

1.3.1 The indices and index statistics are intended to reflect the eligible fixed income government markets and to facilitate the detailed analysis of such markets.

### 1.4 FTSE Russell

1.4.1 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.

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

1.4.3 Index users who choose to follow this index series or to buy products that claim to follow this index series 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 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 Fixed Income LLC

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

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

- maintain records of the index weightings of all constituents;
- make changes to the constituents and their weightings in accordance with the Ground Rules;
- carry out the periodic index reviews of the index series and apply the changes resulting from the reviews as required by the Ground Rules;
- disseminate the indices.

### 2.2 Amendments to these Ground Rules

2.2.1 These Ground Rules shall be subject to regular review by FTSE Russell to ensure that they continue to best reflect the aims 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 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 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). FTSE Fixed Income LLC administers the Index Series in line with the third country transitional provisions contained within the Article 51(5) of that 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:

### 3.1 Queries and Complaints

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

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

### 3.2 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 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](#)

### 3.3 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 [info@ftserussell.com](mailto:info@ftserussell.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](#)

## Section 4

# Base Universes for the FTSE Advanced Climate Risk-Adjusted Government Bond Index Series

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## 4. Base Universes for the FTSE Advanced Climate Risk-Adjusted Government Bond Index Series

- 4.1 The base universe for the FTSE Advanced Climate Risk-Adjusted World Government Bond Index (“Advanced Climate WGBI”) is the standard, market value 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 The base universe for the FTSE Advanced Climate Risk-Adjusted World Government Bond ex Japan Index (“Advanced Climate WGBI ex Japan”) is the standard, market value weighted FTSE World Government Bond ex Japan Index (WGBI ex Japan).
- 4.3 The base universe for the FTSE Advanced Climate Risk-Adjusted European Monetary Union (EMU) Government Bond Index (“Advanced Climate EGBI”) is the standard FTSE EMU Government Bond Index (EGBI). The FTSE EGBI measures the performance of fixed-rate, local currency, investment-grade sovereign bonds. It consists of the EMU-participating countries that meet the WGBI inclusion criteria.
- 4.4 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

# 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>2</sup>
<b>Beyond Ratings – Climate KPIs</b>	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.	<b>Weighting</b>

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>2</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



## Section 6

# Index methodology

## 6. Index methodology

### 6.1 Advanced Climate Risk-Adjusted Government Bond Index Series overview

- 6.1.1 The FTSE Advanced Climate Risk-Adjusted Government Bond Index Series is built upon the same quantitative climate risk assessment framework (climate risk pillars and underlying indicators) applied in the existing FTSE Climate Risk-Adjusted Government Bond Index Series, but aims to achieve greater climate benefit (measured by improvement in 2-degree alignment), while maintaining sufficient diversification and without compromising replication. This is achieved through the calibration of the tilts applied to the climate risk pillars, with the Advanced Series applying an equal tilt to each climate risk pillar. Specifically, the Advanced Series differs from the existing standard climate variants by applying a stronger tilt to the transition pillar.
- 6.1.2 The Advanced Climate Risk-Adjusted Government Bond Index Series applies the country climate scores (derived from the three climate risk pillars) to the market value weights of each country. The index weights are a function of the market value weights and country climate scores.
- 6.1.3 The Advanced Climate Risk-Adjusted Index Series follows the monthly rebalancing mechanics of the standard FTSE Government Bond Indices with respect to universe membership. However, the market value weight for each security is tilted by its respective country's climate score. Climate scores for each country are calculated on an annual basis using input data through May 1, and are effective for each May month-end rebalance. The country climate scores are derived by assessing each country's relative climate risk across three core climate risk pillars (each with multiple sub-indicators):
- Transition risk represents the level of climate related risk exposure of the country's economy as measured by the distance to reach the modeled emissions needed to meet a 2-degree alignment
  - Physical risk represents the level of climate related risk exposure to the country and its economy from the physical effects of climate change
  - Resilience represents a country's preparedness and actions to cope with its level of climate related risk exposure
- 6.1.4 Countries are scored across each pillar and a single combined score is derived for each country. The country scores are used to reweight its index exposure to provide higher exposures to countries less exposed to climate change risks and lower exposures to countries that are more exposed to climate change risks.

### 6.2 Advanced Climate Risk-Adjusted WGBI design criteria and calculation methodology

- 6.2.1 The base universe for the FTSE Advanced Climate WGBI is the FTSE WGBI. 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 are removed from the index at the next month's profile. Securities must also meet minimum amount outstanding requirements, have a fixed-rate, and at least one year to maturity.
- 6.2.2 For full details on the design criteria and calculation assumptions for the FTSE WGBI please refer to the [FTSE Fixed Income Index Guide](#).

6.2.3 The tilting of index weights is designed reweight countries based on their relative Climate score in the cohort outlined below:

<b>Weighting</b>	Alternatively weighted
<b>Country Climate Scores</b>	Updated annually and applied each May month-end rebalance. The cut-off for input data is May 1 of each year.
<b>Country Climate Score Assessment Cohort</b>	Local currency sovereign bond markets eligible for the WGBI.
<b>Climate Pillars and tilt calibration</b>	Geometric tilt – Transition risk: 1 – Physical risk: 1 – Resilience: 1
<b>Rebalancing</b>	Once a month at the end of the month
<b>Calculation frequency</b>	Daily
<b>Fixing date</b>	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 <a href="https://www.yieldbook.com">yieldbook.com</a> website.
<b>Base date</b>	December 31, 2001

6.2.4 FTSE Advanced Climate WGBI ex Japan shares the same design criteria and calculation methodology as FTSE Advanced Climate WGBI.

### 6.3 Advanced Climate Risk-Adjusted EGBI design criteria and calculation methodology

6.3.1 The base universe for the FTSE Advanced Climate EGBI is the standard FTSE EGBI, which consists of the Eurozone-participating countries that meet the WGBI criteria. To be eligible for the FTSE EGBI, 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 are removed from the index at the next month's profile. Securities must also meet minimum amount outstanding requirements, have a fixed-rate, and at least one year to maturity

6.3.2 For full details on the design criteria and calculation assumptions for the FTSE EGBI please refer to the [FTSE Fixed Income Index Guide](#).

6.3.3 The tilting of index weights is designed reweight countries based on their relative Climate score in the cohort outlined below:

<b>Weighting</b>	Alternatively weighted
<b>Country Climate Scores</b>	Updated annually and applied each May month-end rebalance. The cut-off for input data is May 1 of each year.
<b>Country Climate Score Assessment Cohort</b>	Local currency sovereign bond markets eligible for the EGBI.
<b>Climate Pillars and tilt calibration</b>	Geometric tilt – Transition risk: 1 – Physical risk: 1 – Resilience: 1
<b>Rebalancing</b>	Once a month at the end of the month
<b>Calculation frequency</b>	Daily
<b>Fixing date</b>	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.
<b>Base date</b>	December 31, 2001

## 6.4 Climate Pillars and underlying indicators

6.4.1 ESG pillar scores assess a country's exposure to and management of ESG risk factors and are taken from the Sustainability Profile of the Beyond Ratings Sovereign Risk Monitor. This includes quantitative assessments across Environmental, Social and Governance performance pillars. Each pillar contains multiple underlying indicators. Raw data inputs are typically normalised to ensure countries are scored between 0 and 100 for each indicator.

### FTSE ESG Pillars and Indicators: Sovereign Assessment

Climate Pillar	Indicator	Indicator description	Source(s)	Lag <sup>3</sup>	History <sup>4</sup>	Ref
<b>Transition Risk</b>	Territorial distance to target	Required annual reduction of total territorial GHG emissions including LULUCF in order to reach 2°C-compliant territorial GHG budgets in 2050 (expressed as CAGR). Budgets are estimated using the FTSE Climate Liabilities Assessment Integrated Methodology <sup>5</sup> (CLAIM).	Various <sup>6</sup>	2-3 years	2000	TRI.01
	GHG emissions gap between trend and distance to target	Gap between the 5-year historical trend of total territorial GHG emissions including LULUCF and the required annual reduction of these emissions to reach 2°C-compliant territorial GHG budgets in 2050 (based on CAGRs).	Various <sup>3</sup>	2-3 years	2005	TRI.02
<b>Physical Risk</b>	Sea level exposure	Percentage of total population living in areas where elevation is below 5 meters.	World Bank	0-5 years	1990	PRI.01
	Agricultural exposure	Agricultural production coefficient of variation (standard deviation/mean) weighted by share of agriculture in GDP.	FAO	0-5 years	1961	PRI.02
	Climate related natural disaster exposure	95 <sup>th</sup> percentile of the distribution of the proportion of population killed by climate related natural disasters in a given year.	EM-DAT	0-1 year	1990	PRI.03
<b>Resilience</b>	Institutional resilience	<i>NDC temperature equivalent</i> : intended country CO2 emissions in 2030 as explicitly or implicitly targeted in the country National Determined Contribution (NDC) is translated into an equivalent climate trajectory (temperature increase) using the FTSE Climate Liabilities Assessment Integrated Methodology (CLAIM).	Beyond Ratings	Not relevant <sup>7</sup>	2016	RI.01
		<i>Government effectiveness</i> : captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.	World Bank WDI	1-2 years	2000	RI.02
		<i>External debt percentage of GDP</i> : outstanding amount of debt owed to non-residents expressed as a share of GDP.	Oxford Economics	0-1 year	2000	RI.03
		<i>Disaster preparedness</i> : an indication of a country's capacity to deal with climate-related nature disasters.	ND-GAIN	2-3 years	2000	RI.04

<sup>3</sup> Time period between indicator measurement and indicator publication.

<sup>4</sup> First available publication date for each indicator.

<sup>5</sup> Powered by Beyond Ratings, a London Stock Exchange Group company. Further details on the CLAIM model can be provided by Beyond Ratings on request.

<sup>6</sup> Various underlying data sources including: PRIMAP-hist; UNFCCC; CAIT; National data; United Nations; CDIAC; World Bank; OECD; Enerdata.

<sup>7</sup> Because the NDC temperature equivalent reflects a country's target, it does not change each year.

Climate Pillar	Indicator	Indicator description	Source(s)	Lag <sup>3</sup>	History <sup>4</sup>	Ref		
Social resilience		<u>Fuel subsidies</u> : ratio of subsidies vs. taxes on fuels. This indicator compares actual fuel prices to international prices to determine the level of subsidies/taxes.	Enerdata/EIA	1-2 years	2000	RI.05		
		<u>GINI index</u> : measures the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution.	World Bank WDI	0-5 years	2000	RI.06		
		<u>Human development index</u> : measures three key dimensions of human development: <ul style="list-style-type: none"> <li>– a long and healthy life – life expectancy at birth</li> <li>– being knowledgeable – expected years of schooling and mean years of schooling, and</li> <li>– standard of living – Gross National Income per capita.</li> </ul>	UNDP	1-2 years	2000	RI.07		
		<u>Voice and accountability</u> : captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.	World Bank WDI	1-2 years	2000	RI.08		
		<u>Use of sanitation services</u> : percentage of population with access to improved sanitation facilities.	World Bank WDI	3-4 years	2000	RI.09		
		<u>Access to electricity</u> : percentage of population with access to electricity.	World Bank WDI	2-3 years	2000	RI.10		
		Economic resilience		<u>CDP performance ratio</u> : percentage (based on market capitalisation) of companies in a country that communicate on their impact on the environment.	CDP and Factset	0-1 year	2017	RI.11
				<u>Insurance penetration</u> : the ratio of premium underwritten in a given year to the GDP. Includes life-insurance and non-life insurance.	OECD	1-2 years	2007	RI.12
				<u>R&amp;D expenses</u> : gross domestic expenditures on R&D, expressed as a percentage of GDP. Includes both capital and current expenditures in the four main sectors: business enterprise, government, higher education and private non-profit.	World Bank WDI	2-3 years	2000	RI.13
				<u>Logistics performance</u> : reflects perceptions of a country's logistics based on: efficiency of customs clearance process, quality of trade- and transport-related infrastructure, ease of arranging competitively priced shipments, quality of logistics services, ability to track and trace consignments, and frequency with which shipments reach the consignee within the scheduled time.	World Bank WDI	0-1 year	2007	RI.14
<u>Ease of doing business</u> : the distance of an economy to the "frontier," which measures the gap between an economy's performance and a measure of best practice across the entire sample of 41 indicators for 10 Doing Business topics.	World Bank Doing Business			0-1 year	2009	RI.15		
<u>Green bonds performance ratio</u> : 3 year moving average of green bond new issuance as a percentage of GDP.	World Bank			0-1 year	2016	RI.16		
<u>Water productivity</u> : indicates the efficiency by which each country uses its water resources. Water productivity is calculated as GDP in constant prices divided by annual total water withdrawal.	World Bank WDI			0-5 years	2000	RI.17		
<u>Agricultural adaptive capacity</u> : composite index that reflects each country's capacity to adapt their agricultural system to environmental issues, especially climate change. The indicator corresponds to the average score on seven sub-indicators: <ul style="list-style-type: none"> <li>i. Agricultural capital stock (in USD) relative to agricultural production (in USD)</li> </ul>	FAO			2-3 years	2016	RI.18		

Climate Pillar	Indicator	Indicator description	Source(s)	Lag <sup>3</sup>	History <sup>4</sup>	Ref
		ii. Agriculture Orientation Index, reflects public support to agricultural sector iii. Agrobiodiversity, reflects the variety of crops cultivated in the country iv. The share of organic agriculture (as a % of agricultural land) v. The long-term cereals yield trend (calculated as the second derivative) vi. The share of irrigated agriculture (as a % of land), and vii. The share of conservation agriculture (as a % of land).				
	Ecological resilience	<p><u>Freshwater withdrawals</u>: percentage of total annual freshwater withdrawals on internal resources. Annual freshwater withdrawals refers to total water withdrawals, not counting evaporation losses from storage basins. Withdrawals also include water from desalination plants in countries where they are a significant source of freshwater. Withdrawals can exceed 100 percent of total renewable resources where extraction from nonrenewable aquifers or desalination plants is considerable or where there is significant water reuse.</p>	World Bank Indicators	1-3 years	2002	RI.19
		<p><u>Share of protected areas</u>: percentage of protected areas (terrestrial and marine) of total territorial area.</p> <ul style="list-style-type: none"> <li>– Terrestrial protected areas are totally or partially protected areas of at least 1,000 hectares that are designated by national authorities as scientific reserves with limited public access, national parks, natural monuments, nature reserves or wildlife sanctuaries, protected landscapes, and areas managed mainly for sustainable use.</li> <li>– Marine protected areas are areas of intertidal or subtidal terrain – and overlying water and associated flora and fauna and historical and cultural features – that have been reserved by law or other effective means to protect part or all of the enclosed environment. Sites protected under local or provincial law are excluded.</li> </ul>	UNEP/IBAT	2-3 years	2016	RI.20
		<p><u>Share of biodiversity threatened</u>: percentage of the total number of species in the country (Biodiversity Stock), both animal and vegetal, that are threatened according to International Union for Conservation of Nature – IUCN categories. Species referred as 'Threatened' include 'Critically endangered', 'Endangered' and 'Vulnerable' species, corresponding to different levels of extinction risk.</p>	IUCN	0-1 year	2017	RI.21
		<p><u>Biodiversity stock</u>: total number of species in the country as reported by the International Union for Conservation of Nature – IUCN, including both animal and vegetal.</p>	IUCN	0-1 year	2017	RI.22
		<p><u>Afforestation rate</u>: previous 5-year variation of forest cover based on FAO forestry data. All types of forest are considered, including primary, planted and naturally regenerated forests.</p>	FAO	2-3 years	2000	RI.23

## 6.5 Climate Pillar scoring

6.5.1 Indicator values are combined for each pillar and are then converted into z-scores that have been mapped to s-scores that range from 0 to 1 using a cumulative normal distribution function. Some sub-indicators, where there are significant outlier country scores, have been windsorised before normalisation with values above the 95th percentile and below the 5th percentile set to the 95th percentile and the 5th percentile, respectively.

## 6.6 Climate Score assessment cohort

6.6.1 To compute z-scores, underlying indicator values are evaluated relative to an index assessment cohort (current and historical).

6.6.2 The countries assessed for the Climate WGBI and Climate WGBI ex-Japan is in line with the universe of local currency sovereign bond markets tracked by the standard version of these indices. For the Climate EGBI, the subset of EGBI eligible countries are used to compute z-scores and climate pillar scores.

## 6.7 Tilting methodology

6.7.1 A single climate score is calculated for each sovereign and applied to the market value weight of each security in the underlying index to derive the adjusted weights<sup>8</sup>.

6.7.2 First, the three pillars are combined to derive a climate score for each country:

$$CS = TRI^{\alpha} \times PRI^{\beta} \times RI^{\gamma}$$

where,

*TRI*, is the country's Transition Risk Index value

*PRI*, is the country's Physical Risk Index value

*RI*, is the country's Resilience Index value

$\alpha$ , is the TRI tilt power

$\beta$ , is the PRI tilt power

$\gamma$ , is the RI tilt power

*CS*, is the final country climate score

6.7.3 For each Climate Risk-Adjusted Government Bond Index in the series, tilt powers have been calibrated to:

- Achieve meaningful climate benefit for sensible deviations from the underlying index characteristics and minimal tracking error
- Ensure other index characteristics (e.g. index yield, duration, turnover and market value weights) do not deviate significantly from the standard index characteristics.

6.7.4 Second, the climate scores are applied to each country's market value weight in the underlying index to derive the adjusted weights:

$$\theta_i = \frac{\omega_i CS_i}{\sum_{i=0}^n (\omega_i CS_i)}$$

where,

$\omega$ , is the county's market value weight in the underlying index

$\theta$ , is the county's weight in the Climate Adjusted Index

<sup>8</sup> A similar tilting methodology to that employed in the FTSE Global Factor Index Series is used with some modifications to cater for the differences between equity and fixed income indices.

## 6.8 Exchange rates

6.8.1 The closing WM/Refinitiv Spot Rates and The WM/Refinitiv Forward Rates, provided by Refinitiv, are used. WM 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.

## 6.9 Chronological summary of events

6.9.1 In addition to the following events, the constructions of Advanced Climate WGBI, Advanced Climate WGBI ex Japan and Advanced Climate EGBI are driven by the same events that mark the WGBI and EGBI.

For details, please also refer to the [FTSE Fixed Income Index Guide](#).

Year	Highlights
2022	<b>November:</b> New Zealand is added to the FTSE World Government Bond Index.
2019	<b>July:</b> FTSE Climate Risk-Adjusted World Government Bond Index is introduced.
2020	<b>January:</b> FTSE Climate Risk-Adjusted EMU Government Bond Index and FTSE Climate Risk-Adjusted World Government Bond Index ex-Japan are launched.
	<b>May:</b> FTSE Advanced Climate Risk-Adjusted World Government Bond Index and FTSE Advanced Climate Risk-Adjusted EMU Government Bond Index are launched.
2022	<b>May:</b> FTSE Advanced Climate Risk-Adjusted World Government Bond ex Japan Index is launched.

Appendix

# Further information

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For contact details please visit the FTSE Russell website or contact FTSE Russell client services at [info@ftserussell.com](mailto:info@ftserussell.com).

**Website:** [www.lseg.com/en/ftse-russell/](http://www.lseg.com/en/ftse-russell/)



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