

Product Profile | Fixed Income

Meeting investors' needs in Emerging Markets Fixed Income

November 2022



AUTHOR

Lydia Hamill Manager, Fixed Income and Multi-Asset (FIMA) Product +44 (0)7976677562 Iydia.hamill@lseg.com

Introduction

FTSE Russell's fixed income index range includes extensive coverage across regions and asset classes. It has market-leading regional benchmarks, such as the FTSE UK Actuaries UK Gilts Index Series (with over \$70.4bn in passive AUM), as well as global bond benchmarks, such as the FTSE World Government Bond Index (WGBI) (with \$43.4bn in passive AUM as of 2021)¹. This strength in sovereign fixed income indexing is extended to its Emerging Markets (EM) fixed income product range, providing investors with a consistent index framework across the full EM spectrum – an asset class that poses a unique set of challenges.

The FTSE Emerging Markets Government Bond Index (EMGBI) tracks mainstream EM local currency sovereign bond markets, while the FTSE Frontier Emerging Markets Government Bond Index (FRNTEMGBI) tracks nascent bond markets that may not yet be considered mainstream EM, but are sufficiently investable for global portfolio managers based on an objective set of technical criteria.

In this paper, we profile FTSE Russell's capabilities in emerging markets fixed income. We demonstrate how our core emerging market bond index family is built using principles of accessibility, modularity, and flexibility, forming a robust basis for ESG or smart overlays.

Together with best-in-class bond pricing, market-leading bond analytics, and comprehensive reference data, FTSE Russell's indices provide a rules-based, transparent method of targeting exposure to an increasingly important segment of the global bond market.

¹ Total assets invested in passive index tracking funds as of December 31, 2021. These assets include separate accounts, commingled funds, retail and institutional mutual funds, and ETFs, as reported directly from index-licensed passive and ETF clients and their websites; third party data sources such as Morningstar and eVestment are used in cases when clients did not report assets.

Capturing key market trends

Together with its partner firms within London Stock Exchange Group (LSEG), FTSE Russell aims to provide clients with a comprehensive emerging market fixed income product ecosystem that captures the following key market trends:

Active to passive	Ongoing shift from actively managed to index-based fixed income portfolios with a focus on quantitative and systematic strategies. We recognize the need for passive EM solutions that are accessible to global investors.
Growing sophistication	Increasing demand for innovative, sophisticated index methodologies, tailored to the requirements of specific customer emerging market investment mandates that may have multiple, complex objectives.
Sustainability	Growing prominence of environmental, social, and governance (ESG) themes and the use of ESG approaches throughout the fixed income investment process. Emerging markets fixed income is no exception, bringing specific challenges to the table such as data quality, diversification and accessibility, and EM-specific ESG risks.
Regulatory focus on data	Major regulatory investment reforms that require data-driven solutions across asset classes. This is particularly challenging in nascent emerging markets that are generally under-represented in traditional EM indices.
Electronification	Continued electronification of fixed income markets and resulting impact on the way bonds are priced and traded.

Breadth and depth of emerging market coverage

Our comprehensive range of indices offer broad emerging markets coverage, with extensive history in well established markets. For all market capitalization-weighted indices, a zero-plus index is available with minimum one month to maturity, instead of the standard one year applied to traditional fixed income indices. In volatile periods, and more generally for emerging markets, granular term sub-indices such as 0-3 year are particularly relevant.

Index	Description	Base date
FTSE Emerging Markets Government Bond Index (EMGBI)	Local currency government bonds from EM markets as defined by the FTSE Fixed Income Country Classification Framework. A 10% per issuer capped version is available.	Dec 31, 2007
FTSE Frontier Emerging Markets Government Bond Index Series (FRNTEMGBI)	Local currency government bonds from frontier EM markets as defined by the FTSE Fixed Income Country Classification Framework. A 10% per issuer capped version is available.	Dec 31, 2017
FTSE Emerging Markets Inflation- Linked Securities Index	Local currency inflation-linked government bonds from EM markets as defined by the FTSE Fixed Income Country Classification Framework.	Mar 31, 2008
FTSE Emerging Markets US Dollar Government Bond Index (EMUSDGBI)	Hard currency government bonds issued by governments in over 60 emerging markets.	Mar 31, 1995
FTSE Emerging Markets US Dollar Broad Bond Index (EMUSDBBI)	Investment-grade and high-yield US dollar-denominated debt issued by governments, regional governments, government-sponsored entities, and corporations domiciled in over 60 emerging markets.	Dec 31, 2012

Figure 1: FTSE Emerging Markets Fixed Income Index product range

Index	Description	Base date
FTSE ESG Emerging Markets US Dollar Government Bond Index (ESG EMUSDGBI)	Incorporates a tilting methodology that adjusts index weights of the FTSE EMUSDGBI according to each country's relative ESG performance.	Dec 31, 2009
FTSE ESG Emerging Markets Government Bond Index – Capped (ESG EMGBI-C)	Incorporates a tilting methodology that adjusts index weights for the FTSE EMGBI-Capped according to each country's relative ESG performance.	Mar 31, 2011

Transparency and objectivity

Based on transparent and objective rules, our emerging market indices strike a balance between comprehensiveness and replicability, making them appealing to portfolio managers, asset owners, and ETF issuers.

Ease of customization

A unified methodology across markets, granular sub-indexing capability, and flexible datasets enables investors to use FTSE Russell indices as building blocks for customized benchmarks or for the basis of smart overlays to meet their unique investment objectives.

Easy access to data

Our indices are broadly published and widely followed. We employ multiple channels of distribution to ensure easy access to data. Information on this range of fixed income indices is also made available through a number of data and analytics vendors.

Licensing

Our fixed income indices are designed, calculated, and published by FTSE Fixed Income LLC and may be licensed for use as underlying indices for OTC or exchange-traded investment products, including ETFs, swaps, structured products, warrants, and certificates. Leading financial institutions that issue these instruments utilize these indices for the creation of their index-based investment products.

Strong governance

FTSE Russell acknowledges the importance of integrity with benchmarks in financial markets and is committed to operating its business in accordance with the International Organization of Securities Commissions (IOSCO) Principles and other relevant industry standards.

FTSE Russell has a long history of implementing robust index governance practices, which has been extended and applied to fixed income and multi-asset indices. We are committed to leading global best practice standards in index governance and have established a reputation for transparent, robust, and rules-driven index construction.

Emerging Markets indices: What are the key challenges and themes?

1. What does "emerging" mean in fixed income markets?

Classifying bond markets

The term "emerging market" was first coined by an economist (Antoine van Agtmael) at the International Finance Corporation (IFC), part of the World Bank, in 1981. It was invented to characterize an economy with low-to-middle per capita income that has embarked on a modernization of its capital markets.

While the term has served investors well for over four decades, it's unclear what it means in the context of global fixed income markets. What if a country has relatively low per capita income but a relatively developed local currency bond market? What if the reverse is true? If a country is classified as an emerging equity market, does the same term apply to its bond market? Indicators of a country's national wealth, such as its income per capita, may be a poor guide to the openness of its bond market to global investment.

FTSE Russell adopts a formal fixed income country classification framework to address such questions and to determine government bond markets' index eligibility in a consistent and logical way. The framework focuses on market infrastructure, rather than on broader measures of economic development, to gauge individual sovereign bond markets' eligibility for FTSE Russell's global fixed income indices.

The framework consists of four criteria, designed to measure the accessibility of fixed income markets to outside investors:

- Market, macroeconomic and regulatory environment
- Foreign exchange market structure
- Bond market structure
- Global settlement and custody

We summarize the results of the country classification in a scoring system that assigns an accessibility level of 0 (lowest), 1, or 2 (highest) to each local currency bond market. In conjunction with other criteria, these thresholds determine membership in flagship sovereign indices.

An accessibility level of 0 is required for inclusion in the FTSE Frontier Emerging Markets Government Bond Index (FRNTEMGBI), versus a minimum of level 1 for the FTSE Emerging Markets Government Bond index (EMGBI). An accessibility level of 2 is required for inclusion in the FTSE World Government Bond Index (WGBI).

In Figure 2 we show the full range of government bond markets tracked by FTSE Russell, as of August 2022, which is constantly expanding to provide new exposure as markets develop. It demonstrates how we categorize government bond markets, with economic development on the left axis and foreign market accessibility on the bottom axis. It allows us to track markets from inception, and as they graduate through the various stages of market development. This framework provides investors with a clear, tangible path for index progression that is client-informed and forward-looking.

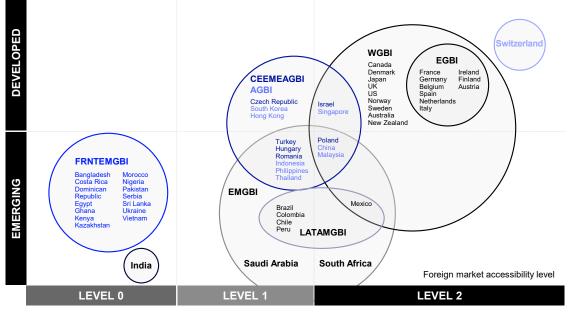


Figure 2: Mapping global government bond markets

Source: FTSE Russell, as of June 2022. *New Zealand entered the WGBI as of November 2022 profiles.

Country classification reviews and watch lists

To help index users anticipate future changes in a country's foreign accessibility level, countries under review for potential reclassification are placed on a watch list. Every March and September, FTSE Russell announces the results of the review. The ensuing inclusion of a country in any index will be announced with at least six months' notice.

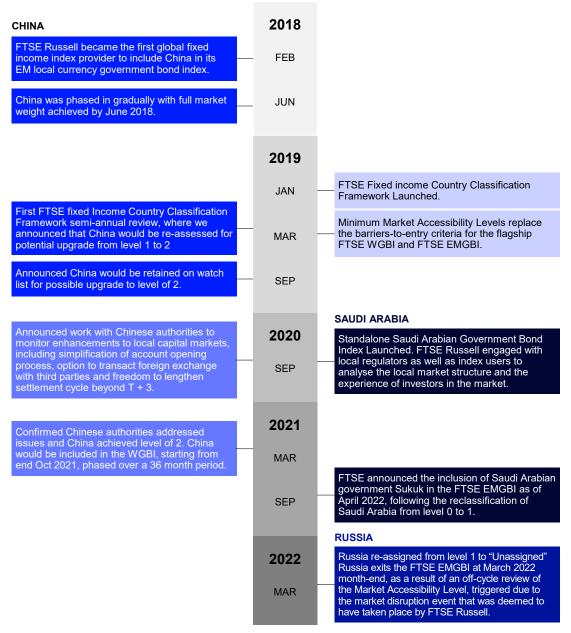
The transparent nature of this process allows for open engagement between FTSE Russell and local central banks or regulators, to pass on investor feedback or advising on the changes needed for a level upgrade, while simultaneously providing portfolio managers with a clear view of expected index evolution.

2. Managing country inclusion given the fastevolving nature of emerging markets

As fixed income markets undergo structural improvements or, in certain cases, foreign investors face new restrictions on access, those markets' eligibility for individual FTSE Russell indices may change. It's important that the country classification framework handles the evolution of markets in a transparent, consistent, and predictable way.

Recent years have seen several examples of such changes and FTSE Russell has implemented these changes in a way that enables clients to manage portfolios as seamlessly as possible. For example:

Case Study: Fixed Income Country Classification Evolution



Source: FTSE Fixed Income Country Classification Reviews. Please see the website announcements for further details.

3. Quality pricing and reference data is vital in emerging markets

It is often the case that a lack of index coverage for a given asset class has a limiting effect on international investment and analysis. Availability of an index affords fixed income market participants the tools needed for peer group relative value analysis (as defined by the index provider with rules-based inclusion criteria), price, and term structure transparency. FTSE Russell has extensive local currency sovereign EM coverage, bringing greater transparency to EM markets.

To ensure objectivity, fixed income benchmarks need reliable price sources, particularly since much of bond trading takes place off-exchange and in the bilateral, over-the-counter markets. LSEG Data & Analytics, which offers global fixed income pricing from over 800 contributors and over 150 exchanges, including the world's largest broker price platform, is a market leader in this area and operates as the primary price source for FTSE Russell's fixed income indices.

FTSE Russell's fixed income indices are also supported by LSEG D&A's comprehensive reference data (the static and dynamic data used to classify and describe the individual characteristics of specific financial instruments).

Since fixed income is a complex and challenging asset class, with myriad categories and subcategories, the tight coupling between reference data, pricing services, and FTSE Russell fixed income indices provides a more seamless experience for investors.

4. Thoughtful, differentiated approaches to the unique challenges for EM investors

Comparing global EM FI benchmarks

Although global emerging market fixed income benchmarks aim to map the asset class in a similar way, there can be subtle differences in the way these indices are constructed which have a significant impact on the resulting universe.

Notable differentiators between FTSE fixed income emerging markets indices and competitor providers include:

- The definitions of "emerging market" differ. FTSE Russell uses a combination of World Bank and IMF classifications to define EM versus Developed Markets (DM), and its FTSE Fixed Income Country Classification Framework to assess the accessibility level to foreign investors and suitability for global benchmarks
- FTSE Russell published a clear, transparent handling of defaulted government bonds, <u>announced in</u> <u>August 2022</u>, after careful consideration of the practicalities faced by investors in these securities
- Generally, FTSE Russell's minimum amount outstanding requirements are higher. Calibrated to each local market, these ensure that a relatively liquid choice-set of bonds are captured
- FTSE Russell distinguishes between Frontier EM and mainstream EM using different minimum market size requirements, among other criteria. The FTSE EMGBI uses a \$10bn minimum market size, while the FTSE FRNTEMGBI uses a minimum of \$5bn. Other providers may not distinguish between these two distinct choice-sets, despite these being distinct exposures with different investor bases, characterized by distinct risk factors and strategies.

The FTSE Frontier Emerging Markets government bond index

FTSE Russell pioneered indexing frontier emerging markets local currency government markets by first defining it. Historically, it has been relatively straightforward for index providers to track US dollar denominated government bonds issued by these countries, since hard currency indices tend not to incorporate specific country inclusion, only requiring the country to be classified as 'emerging'.

However, to offer an index that tracks local currency frontier EM government bonds, accessibility is crucial, due to the need for investment in the local capital markets ecosystem. In launching the FTSE FRNTEMGBI, FTSE Russell was able to accomplish this by leveraging the same market accessibility assessment that is incorporated into the flagship FTSE WGBI and FTSE EMGBI methodologies.

The FRNTEMGBI includes markets within the FTSE fixed income country classification framework with a market accessibility level of 0. To achieve this level, frontier fixed income markets are required to meet minimum standards for sustainable issuance and debt management, market liquidity, and the trading infrastructure. Frontier markets must also have bond conventions and bond pricing that support index calculation.

In Figure 4 we summarize the key features of the FTSE WGBI, the FTSE EMGBI and the FTSE FRNTEMGBI, noting the minimum accessibility levels, market size and credit rating requirements of these three indices.

Dimension	WGBI	EMGBI Frontier EMGBI				
EM designation	None	Must be classified as an Emerging Market based on the FTSE fixed income definition, which uses IMF and World Bank designations				
Accessibility Level	Minimum level 2	Minimum level 1 Level 0 only				
Market Size	Entry: At least USD 50 bn, EUR 40 bn and JPY 5 trn	Entry: at least USD 10 bn	Entry: at least USD 5 bn and below USD 50 bn*			
	Exit: Must maintain a minimum market size of at least half of the entry market size	Exit: must maintain a minimum market size of at least half of the entry market size				
Credit rating	Entry: A- (S&P) and A3 (Moody's) Exit: below BBB- (S&P) and Baa3 (Moody's)	Min: C (S&P) and Ca (Moody's), excluding defaulted bonds	Max: BBB- (S&P) and Baa3 (Moody's)*. Countries must have a long-term local currency sovereign rating from S&P or Moody's			

Figure 4: Comparing the WGBI, EMGBI and FRNTEMGBI

Source: FTSE Fixed Income Index Guide. *Countries do not exit the index if an investment-grade rating is assigned after inclusion.

5. Demand for short-duration EM indices

With interest rates in major economies rising from the levels that had prevailed since the 2008 financial crisis, there is increasing demand for short-term bond indices. These include bonds that have lower duration and therefore less price sensitivity to interest rate increases. Additionally, downward pressure on trading costs and fees have made for a much lower tolerance of excess turnover in benchmarks.

To address these demands from index users, FTSE Russell has introduced a range of 0+ (hold-to-maturity) bond indices across its fixed income range. Instead of removing bonds at the traditional one-year mark, these indices hold bonds until they reach one month to maturity, at which point they exit the index.

Given emerging bond markets' higher historic volatility, short-duration and hold-to-maturity bond indices are particularly relevant for this asset class.

As of November 2022, FTSE Russell calculates 0+ versions of all market value weighted indices, including all emerging markets indices.

Figure 5: Profile of the FTSE Emerging Markets Government Bond 0+ Years Index versus the flagship FTSE EMGBI

Index	Count		Average Rating			Yield to Maturity	EffDur	OAS (bps)
EMGBI0+	412	4.20	А	3,440.33	3,429.64	4.34	5.22	-0.54
EMGBI	371	4.25	A	3,103.68	3,089.04	4.43	5.73	-1.07

Source: FTSE Russell as of July 31, 2022.

6. Sustainability in emerging market bonds

Environmental, social, and governance (ESG) factors are now fully integrated into the investment process at many institutions, yet incorporating them in sovereign risk analysis is particularly challenging. When it comes to emerging markets, there are additional considerations due to the unique ESG risk profile of EM markets versus DM markets.

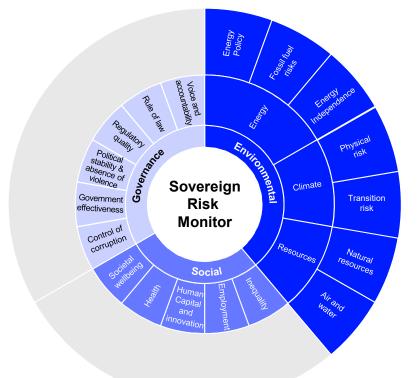
Beyond Ratings, FTSE Russell's partner firm within London Stock Exchange Group, has developed a proprietary methodology that uses systematic analysis to offer a rigorous assessment of sovereign ESG risk.

Product Profile | Fixed Income

Beyond Ratings' Sovereign Risk Monitor (SRM) includes 69 indicators of sovereign creditworthiness from 151 markets, assessed quarterly since 1999, within a comprehensive and transparent statistical and econometric framework. SRM combines two risk profiles: (i) the economic and financial profile which reflects traditional sovereign risk assessments by looking at economies' cyclical strengths and weaknesses, while (ii) the sustainability profile includes relative ESG performances, including long-term sustainability drivers.

The scoring system produces scores on a scale from 0-100 for each ESG 'pillar', as well as an aggregate ESG score (SRM Sustainability profile) for each country (see Figure 6). The coverage extends to all countries included in both the FTSE EMGBI and the FTSE EMUSDGBI, allowing for robust assessment of ESG risk in these markets.

Figure 6: Beyond Ratings' ESG ratings framework



A 2020 World Bank report² highlighted that there is still little consensus among market participants over a common ESG analysis framework that accurately measures sovereign risk. The World Bank said this was due to the multi-faceted nature of the ESG issues facing governments in relation to corporate entities, as well as a more complex transmission mechanism of the sovereign debt asset class to sustainable outcomes in the real economy.

As regards the relationship between sovereign ESG scores and levels of economic development, the World Bank³ also found that the E, S, and G individual and combined ESG scores were correlated with gross national income (GNI) per capital to various degrees, depending on the ESG provider. In its analysis, which includes Beyond Ratings/FTSE Russell's SRM as an ESG scoring methodology, shows S scores were most correlated, with little variation across providers, while the E scores were least correlated, with large discrepancies across providers. The World Bank called for more transparency in both sovereign ESG methodology and data sources. In response, Beyond Ratings launched the research paper⁴, "Dealing with income bias in sovereign ESG scores", which presents the first income-adjusted ESG scores in the market.

² A New Dawn: Rethinking Sovereign ESG. Gratcheva, Ekaterina M.; Gurhy, Bryan; Emery, Teal; Wang, Dieter; Oganes, Luis; Linzie, Jarrad K.; Harvey, Lydia; Marney, Katherine; Murray, Jessica; Rink, Rupert. World Bank 2021.

³ Demystifying Sovereign ESG': Gratcheva, Emery and Wang, World Bank, 2020.

⁴ Dealing with income bias in sovereign ESG scores - Sovereign ESG revisited': Moussavi, Julien and Karapandza, Lazar, FTSE Russell, 2022.

Our sovereign ESG fixed income index range is underpinned by data from Beyond Ratings. FTSE Russell has taken a balanced approach in assessing sovereign ESG risk and offers transparency in ESG scoring and data sets. The FTSE ESG Government Bond Index Series uses a tilt approach, that tilts market value weights according to relative ESG performance. The standard ESG Emerging Markets indices apply a higher tilt strength on the Governance pillar versus the Environmental and Social pillars⁵. However, the tilt strengths can be flexed for custom benchmark designs or be optimized to achieve specific levels of ESG improvement.

How ESG factors affect sovereign bond index weights

In Figure 7 we show the country weighting differences for an example profile month between the FTSE Emerging Markets US Dollar Government Bond Index (EMUSDGBI, tracking US dollar-denominated emerging market sovereign debt) and the ESG version of the same index.

The application of country ESG factors results in significant increases in index weights for certain sovereign bond issuers (for example, Uruguay, Qatar, and Chile) by comparison with the starting index (EMUSDGBI). For other countries (for example, Egypt, Mexico, and Turkey), applying the ESG factor results in a significant decrease in the index weight. The individual E, S, and G pillar scores are also shown in the table, as well as the overall ESG country scores.

We exclude some countries from the ESG index if they are designated as a "Consolidated Authoritarian Regime" or a "Semi-Consolidated Authoritarian Regime" by the Freedom House⁶. This rule effectively and transparently captures the specific totalitarian regime risk that can cause extreme reversals in E, S, and G score improvements in emerging market countries.

Figure 7: EMUSDGBI and ESG EMUSDGBI—differences in country weight

Country	EMUSDGBI Weight	ESG EMUSDGBI Weight	Weight Change	Factor	E	S	G	Country ESG Score
URUGUAY	1.98%	8.68%	6.71%	4.4x	0.96	1.00	0.99	0.97
QATAR	5.80%	12.19%	6.39%	2.1x	0.36	0.98	0.88	0.46
CHILE	1.97%	7.87%	5.90%	4.0x	0.91	0.86	1.00	0.88
HUNGARY	1.33%	4.71%	3.38%	3.5x	0.91	1.00	0.90	0.78
PANAMA	3.34%	6.32%	2.98%	1.9x	0.90	0.64	0.74	0.42
POLAND	0.68%	2.68%	2.00%	4.0x	0.91	0.94	0.97	0.87
COSTA RICA	0.60%	2.22%	1.62%	3.7x	0.93	0.82	0.97	0.82
ROMANIA	0.96%	2.03%	1.07%	2.1x	0.70	0.71	0.81	0.47
UAE	0.45%	1.41%	0.96%	3.1x	0.60	0.99	0.95	0.69
CROATIA	0.40%	1.35%	0.95%	3.4x	0.90	0.87	0.92	0.75

Top movers ranked by weight change

Top movers ranked by weight change

Country	EMUSDGBI Weight	ESG EMUSDGBI Weight	Weight Change	Factor	Е	S	G	Country ESG Score
CHINA	2.29%	1.32%	-0.97%	0.58x	0.62	0.98	0.40	0.13
UKRAINE	1.81%	0.48%	-1.32%	0.27x	0.48	0.89	0.30	0.06
NIGERIA	1.53%	0.02%	-1.51%	0.01x	0.20	0.11	0.14	0.00
SAUDI ARABIA	7.61%	5.16%	-2.46%	0.68x	0.35	0.86	0.52	0.15

⁵ 'Why have ESG Emerging Market fixed income portfolios outperformed?', FTSE Russell, March 2022.

⁶ Freedom House 'Nations in Transit' report.

Country	EMUSDGBI Weight	ESG EMUSDGBI Weight	Weight Change	Factor	E	S	G	Country ESG Score
PHILIPPINES	3.90%	1.43%	-2.47%	0.37x	0.65	0.26	0.44	0.08
INDONESIA	6.38%	3.81%	-2.56%	0.60x	0.79	0.26	0.54	0.13
EGYPT	2.96%	0.12%	-2.84%	0.04x	0.46	0.20	0.17	0.01
MEXICO	6.96%	3.38%	-3.58%	0.49x	0.72	0.69	0.39	0.11
RUSSIA	4.26%	0.00%	-4.26%					
TURKEY	6.82%	2.54%	-4.28%	0.37x	0.86	0.49	0.36	0.08

Source: FTSE Russell and Beyond Ratings, as of November 2021. Past performance is no guarantee of future results. Returns shown prior to index launch reflect hypothetical historical performance. Please see the end for important legal disclosures. E, S, and G scores are normalized raw scores versus the eligible index country cohort, and then transposed between 0 and 1. Russia is excluded from the ESG index due to Freedom House definitions.

These tilted weights result in a different overall index ESG score and a different return and risk profile. Importantly, while investors have historically associated ESG investments with reduced performance, in the case of higher-yielding EM sovereigns, where these risks are more existential, we may see a higher correlation between better financial outcomes and ESG investment decisions. In particular, we found⁷ that the governance risk factor has a material positive impact on returns historically, and therefore have incorporated this into the index design. Countries with higher ESG scores are overweighted while countries with lower ESG scores are underweighted, with an emphasis on countries with high governance scores.

The result is an increased average ESG score, with a higher return per unit of risk versus the base index historically; our ESG index demonstrated improved returns, less severe drawdowns and lower volatility.

Conclusion

Over the last four decades, emerging fixed income markets have become a mainstay of many global investment portfolios. These markets present investors and benchmark providers with a unique set of challenges and themes that directly inform the index design.

FTSE Russell enables investors to measure the performance of the emerging and frontier government bond market universes via a comprehensive, flexible, and modular range of indices. These indices are available in any combination of asset class, maturity, and rating and can be further refined through the application of customizable attributes to reflect investors' unique perspectives.

Additionally, the indices are powered by LSEG D&A's best-in-class pricing and reference data and supported by the Yield Book's rich, deep analytics coverage, enhancing index users' experience with an ecosystem offering.

Finally, a comprehensive, forward-looking country classification framework is essential to support the evolution of emerging market indices over time, ensuring that they fully reflect the investment choice set for global investors through time.

FTSE Russell's ambition to stay at the forefront of market trends, helping meet investors' needs in this rapidly developing asset class is demonstrated by the recent addition of zero-plus, frontier, and ESG-tilted emerging markets fixed income indices to our coverage range.

⁷ Fixed income innovation: applying ESG and carry factors to an emerging markets portfolio, June 23, 2022.

ABOUT FTSE RUSSELL

FTSE Russell is a leading global provider of index and benchmark solutions, spanning diverse asset classes and investment objectives. As a trusted investment partner we help investors make better-informed investment decisions, manage risk, and seize opportunities.

Market participants look to us for our expertise in developing and managing global index solutions across asset classes. Asset owners, asset managers, ETF providers, and investment banks choose FTSE Russell solutions to benchmark their investment performance and create investment funds, ETFs, structured products, and index-based derivatives. Our clients use our solutions for asset allocation, investment strategy analysis, and risk management, and value us for our robust governance process and operational integrity.

For over 35 years we have been at the forefront of driving change for the investor, always innovating to shape the next generation of benchmarks and investment solutions that open up new opportunities for the global investment community.

CONTACT US

To learn more, visit lseg.com/ftse-russell; email info@ftserussell.com; or call your regional Client Service team office:

EMEA +44 (0) 20 7866 1810 North America +1 877 503 6437 Asia-Pacific Hong Kong +852 2164 3333 Tokyo +81 3 6441 1430 Sydney +61 (0) 2 7228 5659

Disclaimer

© 2023 London Stock Exchange Group plc and its applicable group undertakings ("LSEG"). LSEG includes (1) FTSE International Limited ("FTSE"), (2) Frank Russell Company ("Russell"), (3) FTSE Global Debt Capital Markets Inc. and FTSE Global Debt Capital Markets Limited (together, "FTSE Canada"), (4) FTSE Fixed Income Europe Limited ("FTSE FI Europe"), (5) FTSE Fixed Income LLC ("FTSE FI"), (6) The Yield Book Inc ("YB") and (7) Beyond Ratings S.A.S. ("BR"). All rights reserved.

FTSE Russell® is a trading name of FTSE, Russell, FTSE Canada, FTSE FI, FTSE FI, Europe, YB and BR. "FTSE[®]", "Russell[®]", "FTSE Russell[®]", "FTSE Academarks and service marks used herein (whether registered or unregistered) are trademarks and/or service marks owned or licensed by the applicable member of LSEG or their respective licensors and are owned, or used under license, by FTSE, Russell, FTSE Canada, FTSE FI Europe, YB or BR. FTSE International Limited is authorized and regulated by the Financial Conduct Authority as a benchmark administrator.

All information is provided for information purposes only. All information and data contained in this publication is obtained by LSEG, from sources believed by it to be accurate and reliable. Because of the possibility of human and mechanical error as well as other factors, however, such information and data is provided "as is" without warranty of any kind. No member of LSEG nor their respective directors, officers, employees, partners or licensors make any claim, prediction, warranty or representation whatsoever, expressly, or impliedly, either as to the accuracy, timeliness, completeness, merchantability of any information or of results to be obtained from the use of FTSE Russell products, including but not limited to indexes, data and analytics, or the fitness or suitability of the FTSE Russell products for any particular purpose to which they might be put. Any representation of historical data accessible through FTSE Russell products is provided for information purposes only and is not a reliable indicator of future performance.

No responsibility or liability can be accepted by any member of LSEG nor their respective directors, officers, employees, partners or licensors for (a) any loss or damage in whole or in part caused by, resulting from, or relating to any error (negligent or otherwise) or other circumstance involved in procuring, collecting, compiling, interpreting, analyzing, editing, transcribing, transmitting, communicating, or delivering any such information or data or from use of this document or links to this document or (b) any direct, indirect, special, consequential or incidental damages whatsoever, even if any member of LSEG is advised in advance of the possibility of such damages, resulting from the use of, or inability to use, such information.

No member of LSEG nor their respective directors, officers, employees, partners or licensors provide investment advice and nothing in this document should be taken as constituting financial or investment advice. No member of LSEG nor their respective directors, officers, employees, partners or licensors make any representation regarding the advisability of investing in any asset or whether such investment creates any legal or compliance risks for the investor. A decision to invest in any such asset should not be made in reliance on any information herein. Indexes cannot be invested in directly. Inclusion of an asset in an index is not a recommendation to buy, sell or hold that asset nor confirmation that any particular investor may lawfully buy, sell or hold the asset or an index containing the asset. The general information contained in this publication should not be acted upon without obtaining specific legal, tax, and investment advice from a licensed professional.

The information contained in this report should not be considered "research" as defined in recital 28 of the Commission Delegated Directive (EU) 2017/593 of 7 April 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council ("MiFID II") and is provided for no fee.

Past performance is no guarantee of future results. Charts and graphs are provided for illustrative purposes only. Index returns shown may not represent the results of the actual trading of investable assets. Certain returns shown may reflect back-tested performance. All performance presented prior to the index inception date is back-tested performance. Back-tested performance is not actual performance, but is hypothetical. The back-test calculations are based on the same methodology that was in effect when the index was officially launched. However, back-tested data may reflect the application of the index methodology with the benefit of hindsight, and the historic calculations of an index may change from month to month based on revisions to the underlying economic data used in the calculation of the index.

This document may contain forward-looking assessments. These are based upon a number of assumptions concerning future conditions that ultimately may prove to be inaccurate. Such forward-looking assessments are subject to risks and uncertainties and may be affected by various factors that may cause actual results to differ materially. No member of LSEG nor their licensors assume any duty to and do not undertake to update forward-looking assessments.

No part of this information may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without prior written permission of the applicable member of LSEG. Use and distribution of LSEG data requires a license from FTSE, Russell, FTSE Canada, FTSE FI, FTSE FI Europe, YB, BR and/or their respective licensors.

