Product Profile

Fixed Income

A Paris-Aligned Corporate Bond Benchmark

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Introduction

This paper profiles the FTSE Fixed Income EU Climate Benchmark index series, a set of corporate bond benchmarks designed to capture the goals of the 2015 Paris Climate Agreement within the fixed income asset class and to support the transition to a lower-carbon economy.

We provide an overview of the European Union's regulatory framework for Paris-aligned and Climate Transition benchmarks, before interpreting the implications for fixed income application, noting the distinct design characteristics and challenges that arise when it comes to fixed income versus equity Paris-aligned benchmarks.

We then explore some of these challenges in building climate benchmarks in fixed income in more detail, with a particular focus on data and its reliability, complexity in index calculation, and the need for flexibility in design due to the ever-evolving needs of investors in this space.

Finally, we outline the design approach of the FTSE Fixed Income EU Climate Benchmark index series, which functions as a configurable solution that addresses many of the challenges in this area, while also serving as a toolkit for customised benchmarks in this space.

Contents

What does the regulation say?

There is no single approach to sustainability in index construction: by their nature, climate and ESG indices are diverse. Within fixed income, different issuer types, such as sovereign versus corporate issuers, require a totally different approach and data set. On top of this, there are differing views around whether an exclusionary approach is optimal (eliminating exposure to issuers seen as non-compliant with sustainable goals), or an inclusive approach is preferred, focusing on the engagement with issuers to improve their ESG or climate performance. To complicate things further, the underlying datasets used by index providers are also unique (and are rarely consistent with each other). As a result, a wide variety of low-carbon indices, with varying degrees of ambition or objectives, have been pioneered in recent years.

However, the European Union's 2019 Regulation on EU Climate Transition Benchmarks was an important step in the standardisation of climate index approaches, with the aim of preventing potential fragmentation in markets resulting from a lack of distinction between whether a low-carbon index is aligned to the Paris Agreement objectives, or is merely lowering the carbon footprint versus the market value-weighted index.

The Regulation created two new categories or 'labels' of climate-related benchmarks: EU Climate Transition Benchmarks (EU CTB) and EU Paris-Aligned Benchmarks (EU PAB). The two types of benchmarks pursue similar objectives, but vary in their level of ambition, with the EU PAB setting more challenging goals:

- the EU CTB brings the resulting benchmark portfolio on a decarbonisation trajectory
- the EU PAB brings the resulting benchmark portfolio's carbon emissions in line with the Paris Climate Agreement target (to limit the global temperature rise to 1.5 degrees centigrade, compared to pre-industrial levels)

For the two new types of benchmark, a Delegated Regulation (2020) specifies the minimum standards of the benchmarks' methodology.

That methodology includes rules that go beyond a pure climate focus: for example, the EU specifies that PAB and CTB indices should not contribute to the promotion of investments in financial instruments issued by companies that violate global standards, such as the United Nations Global Compact (UNGC) Principles.

The EU rules also set specific exclusion criteria that are based on climate related or other ESG considerations.

The regulations have led to the development and introduction of many new climate indices. In equities, for example, FTSE Russell launched a Paris-aligned version of its FTSE All-World index (and several other of flagship equity indices) in July 2021. The FTSE All-World PAB index[1] targets a 50% reduction in carbon emissions over a ten-year period versus the parent universe (and a 7% reduction year-on-year) while incorporating analysis from the Transition Pathway Initiative (TPI)[2] on how the largest and most carbon-exposed companies are managing the climate transition. The index excludes companies producing high emissions or involved in controversial activities, as well as boosting green revenues and incentivising better corporate management.

When it comes to fixed income, there have been a myriad of index methodologies for applying PAB and CTB, and still a wide range of implementation approaches exist. The challenge for index providers becomes simultaneously complying with the regulations, pro-actively incorporating the latest available data, while balancing the complex objectives of investors when it comes to turnover, tracking error, and financial goals. While a degree of tracking error is inevitable, some even see it as the measure of impact achieved by the approach used to decarbonise versus the base index[3].

[1] For more information, please see the FTSE Russell Study on EU Paris-aligned Benchmarks, June 2020

[2] The TPI is a global, asset-owner led initiative which assesses companies' preparedness for the transition to a low-carbon economy.

[3] Understanding Paris-Aligned Indexes: A Guide for Fixed Income Investors, State Street Global Advisors, July 2022

Key considerations for fixed income climate benchmarks

While relatively prescriptive in their overall goals, the regulations still leave ample room for index construction variation. For example, the required carbon emissions reduction can be achieved via mathematical optimisation or otherwise. Providers must strike a balance between transparency and simplicity in approach in achieving these regulatory objectives, while at the same time facing data challenges. It follows that the extent and quality of the inputs used to construct the indices (and to ensure ongoing compliance with the stated targets) are particularly important.

Some of the key areas of concern for users of these indices include:

1. Transparency in index design, and ongoing assessment to ensure indices remain relevant
2. The application of forward-looking metrics as well as current metrics
3. The exclusions approach for high-emitting sectors
4. The approach taken for companies with a lack of carbon emissions reporting
5. The approach taken to tackle the large number of private issuers within fixed income indices
6. Awareness of tracking error and balancing this with the stated PAB or CTB required objectives

In fact, many of these have been articulated as part of the UN-convened Net-Zero Asset Owner Alliance November 2022 report[4], an example of how standards are being continually reviewed and unified across index users. So, while there are minimum requirements set out in regulation, the market is gradually coming to a consensus on what the practical implementation of this in an index solution looks like. Therefore, it's important for index providers to be forward-looking, and to implement a design approach that is flexible, as these consensus standards, or the regulatory standards, continue to evolve and solidify.

FTSE Russell's approach to PAB in fixed income

The PAB and CTB fixed income index framework adopted by FTSE Russell replicates in large part the approach taken for PAB and CTB equity indices, albeit with some important adaptations where required. Some key considerations when trying to align the equity and fixed income strategies like this are:

- The high degree of heterogeneity within fixed income sub-asset classes, requiring a wide array of data models and frameworks to assess their unique sustainable investment risks.
  For the series profiled in this paper, we focus on credit (sovereigns are not applicable)
- The complexity of corporate structures and the data mapping issues that result, especially when many subsidiaries are private and issue a significant proportion of the index-eligible debt
- The diversity of bond types and characteristics that exist, and their unique relationships with ESG risk
- The distinct risk-return appetite of a typical fixed income investor versus equity investors, with a focus on yield and avoidance of default, rather than potential for upside[5].

[4] UN-convened Net-Zero Asset Owner Alliance, Development and Uptake of Net-Zero-Aligned Benchmarks, November 2022

[5] For more on this topic, see "Sustainable investment—not just an equity game", FTSE Russell, July 2022.

Figure 1: FTSE Russell's application of PAB and CTB in fixed income

Starting universe

Existing market-cap weighted FTSE Corporate fixed income index

Rank and score

Rank companies on their green revenues, carbon intensity and management quality, then assign scores

New universe

Combine data sources and apply relevant product involvement, controversial conduct and DNSH* exclusions

Tilt and Target exposure

Achieve index targets by calculating applicable factor tilt strengths in index weighting. Apply additional tilts for carbon performance and green bonds

*Do No Significant Harm screen is applied using "Environmental Watchlist" based on Conduct screening.

The starting universes for the series at launch include the FTSE World Broad Investment-Grade Corporate Bond Index, the FTSE US Broad Investment-Grade Corporate Bond Index and the FTSE Euro Broad Investment-Grade Bond Index. For each respective universe, issuers are ranked based on the various metrics shown in Figure 2. Once metrics are calculated, issuers are excluded based on activities[6] (Oil, Gas, Coal and Electricity generators, Tobacco, Controversial Weapons, Conduct (e.g., UNGC)) and Do No Significant Harm minimum exclusions. After exclusions, issuers are then tilted based on their respective score derived from the metrics below, and the strength of tilts are calibrated based on a target exposure framework to achieve the minimum and additional objectives as outlined in Figure 2. Finally, corrective tilts are applied to ensure that sectors are constrained, as shown in Figure 3.

Figure 2: FTSE Russell Fixed Income PAB indices go beyond the minimum requirements

	Metric	Objective	Tilt used to achieve objective
Minimum	Carbon Emissions intensity (annual emissions ÷ EVIC). A separate measure is calculated for Scope 1 & 2, and scope 3. Apply multiplier based on TPI Carbon Performance.	Minimum carbon emissions reduction relative to Base Index: 50% - Carbon Intensity (Scope 1 & 2) 50% - Carbon Intensity (Scope 3)	Carbon emissions intensity, with a forward-looking adjustment based on TPI Carbon Performance, to reward issuers with relatively high implied reductions. Scope 1 & 2 carbon emissions intensity and required reduction is calculated separately to Scope 3. This is to remove the incentive for issuers to reduce their scope 3 emissions only, to score more favourably, without reducing their 1 and 2 emissions.
		Minimum average annual carbon emissions reduction relative to the index base year: 7% - Carbon Intensity (Scope 1 & 2) 7% - Carbon Intensity (Scope 3)	
Additional	Green revenue scores are calculated for each issuer: (green revenue/total revenue)	Green Revenue improvement above 100% versus the base index.	Issuers with a relatively high green revenue index score are overweighted using this tilt.
	TPI Management Quality score between 0 and 5	Corporate Target Setting: TPI Management Quality score improvement by 0.2 standard deviations versus the base index.	Issuers with a relatively high TPI Management Quality[7] index score are overweighted using this tilt.
	TPI Carbon Performance multiplier, defined as: • Below 2℃ aligned: 2x • 2℃ aligned: 1.5x • NDC aligned: 0.8x • Not aligned: 0x • Not assessed: 1x	Corporate Target Setting: TPI Carbon Performance improvement versus the base index. 'Not aligned' companies are assigned 0% weight.	Issuers with a relatively high TPI Carbon Performance index multiplier are overweighted using this tilt, and issuers that are 'Not Aligned' are removed.

[6] Exclusions are based on the Sustainalytics revenue thresholds. For a full list of exclusions and the associated thresholds, please see the FTSE Fixed Income EU Climate Benchmark index series Ground Rules.

[7] TPI's methodology: Methodology - Transition Pathway Initiative

	Issuer Green Bond Ratio multiplier, defined as the par amount ratio of green bonds over total index-eligible bonds issued by an issuer.	Increase in Green Bond exposure (no specific target) versus the base index.	An issuer-level multiplier overweights issuers depending on their proportional green bond issuance.
	Green Bond multiplier, 1.5x	Increase in Green Bond exposure (no specific target) versus the base index.	A bond-level multiplier, to increase the relative weight of green bonds versus traditional bonds.

Figure 3: Corrective tilts are applied to ensure the below constraints are met

Sector	Constraint
Active weight in TRBC Bank sector (5510)	$\leq 0\%$, no over-weight versus base index
Industry weight relative to the base index*	$\pm 10\%$ versus base index
Ticker max weight; max weight change**	5% max weight, or 10x starting index weight[8]

*Subject to relaxation in the case that delivering all targets and constraints is not achievable
**Subject to the composition of the base index

Source: FTSE Russell, FTSE Fixed Income EU Climate Benchmarks Index Series Ground Rules, March 2023

A thoughtful approach to address the key considerations outlined

Transparency in index design, and ongoing assessment to ensure indices remain relevant

A key requirement, as is the case with any good benchmark, is to arrive at a set of index Ground Rules that are easily understood regarding how weightings are calculated. For the PAB and CTB methodologies, this is a difficult task for index providers, as there is often an optimisation required to achieve a 50% reduction in carbon emissions versus the base index, as well as an ongoing year-on-year decarbonisation of 7%. Additionally, as datasets grow more and more sophisticated in measuring the metrics required for PAB and CTB, the indices need to be evolved to incorporate the most up-to-date datasets.

FTSE Russell's Ground Rules go into granular detail on the index methodology. Re-weightings are achieved using a tilt approach, based on "Target Exposure", which is simple and transparent by design. Additionally, the framework is flexible, incorporating a variety of datasets to achieve the various objectives stated in Figure 2. While some of the objectives are required to be labelled PAB or CTB, the additional objectives can be modified through time depending on individual investor needs. A building block approach has been chosen for its transparency, but also to achieve a customisable framework. For example, decarbonisation start date for the series is set at 2020, but a different base year can be chosen for a custom version, if required.

Moreover, the FTSE Fixed Income EU Climate Benchmarks Series goes beyond the required minimum improvements as specified in the regulations to achieve the PAB label. Exposure to green bonds is increased through the issuer green bond ratio multiplier – a cap is provided to limit exposure to banks, and our exclusions extend to oil sands. Additionally, a green bond constituent-level multiplier is also incorporated to further emphasize the weight of green bonds

[8] Max issuer weight is 5% for FTSE PAB WorldBIG Corporate Bond Index and FTSE PAB USBIG Corporate Bond Index, and 3% for the FTSE PAB EuroBIG Corporate Bond Index. The same holds for the respective CTB equivalents. Max issuer capacity ratio is 10x in all cases.

relative to an issuer's traditional bond issuance, a unique feature of the FTSE PAB fixed income approach. As with the FTSE Green Impact Bond Index Series[9], green bonds must be labelled as "green" by the Climate Bonds Initiative (CBI), as opposed to being self-labelled, providing an added layer of comfort. These are building blocks or features that we feel support the goals of PAB investors but can easily be removed depending on their other competing objectives.

The application of forward-looking metrics as well as current metrics

The Net-Zero Asset Owner Alliance paper referenced previously indicates that forward-looking indicators are key inputs in the decarbonisation process. Namely, data in the index should assess whether issuers are committed to achieving net-zero emissions by 2050, and whether they are pursuing serious decarbonisation targets.

FTSE Russell incorporates data from the Transition Pathway Initiative[10], developed by an international group of asset owners in partnership with the Grantham Research Institute on Climate Change and the Environment at the London School of Economics (LSE), supported by data from FTSE Russell. A robust approach was established based on objectivity, transparency and global application.

The initiative assesses companies on two dimensions based on publicly available information, namely Management Quality (the quality of companies' management of their greenhouse gas emissions and of risks and opportunities related to the low-carbon transition) and Carbon Performance (how companies' carbon performance now and in the future might compare to the international targets and national pledges made as part of the Paris Agreement).

Both indicators are incorporated in the PAB methodology, as shown in Figure 2. Notably, we use this data to adjust the carbon emissions intensity for issuers when calculating factor scores, to incorporate a forward-looking element directly into the decarbonisation element of index design, as well as separate building blocks or tilts in their own right.

The exclusions approach for high-emitting sectors

There is some divergence in benchmark design when it comes to excluding high-emitting sectors. While this is not necessary to achieve decarbonisation metrics, a very simple approach to achieving the minimum targets outlined by EU regulations could, in theory, be achieved by a simple exclusion approach after ranking issuers in order of carbon emissions intensity. However, this approach does not leave room for customised exclusions lists based on institutions' engagement lists.

While the standard FTSE Fixed Income EU Climate Benchmarks do incorporate baseline exclusions[11], removing some potentially high emitting issuers, this is not the mechanism by which the carbon emissions reduction requirement is achieved. The decarbonisation objective is instead primarily achieved through the decarbonisation tilts, as opposed to excluding the highest-emitting issuers. The exclusions approach is therefore customisable and can be configured depending on end user requirements. For example, a phased exclusion could be implemented, encouraging high-emitting sectors to decarbonise. Importantly, the target exposure approach taken by FTSE Russell enables the indices to achieve the minimum required carbon emissions reductions, focusing on corporate target setting towards the transition to a low-carbon economy.

[9] FTSE Green Impact Bond Index Series Rules, July 2021

[10] For more details on the Transition Pathway Initiative Methodology, please see the website.

[11] Baseline exclusions are achieved by combining Sustainalytics data, FTSE Fixed Income proprietary GLIC (Global Industry Classification) and COBS (Corporate Bond Sector) codes, as well as The Refinitiv® Business Classification (TRBC) and are detailed in the FTSE Fixed Income EU Climate Benchmarks Ground Rules

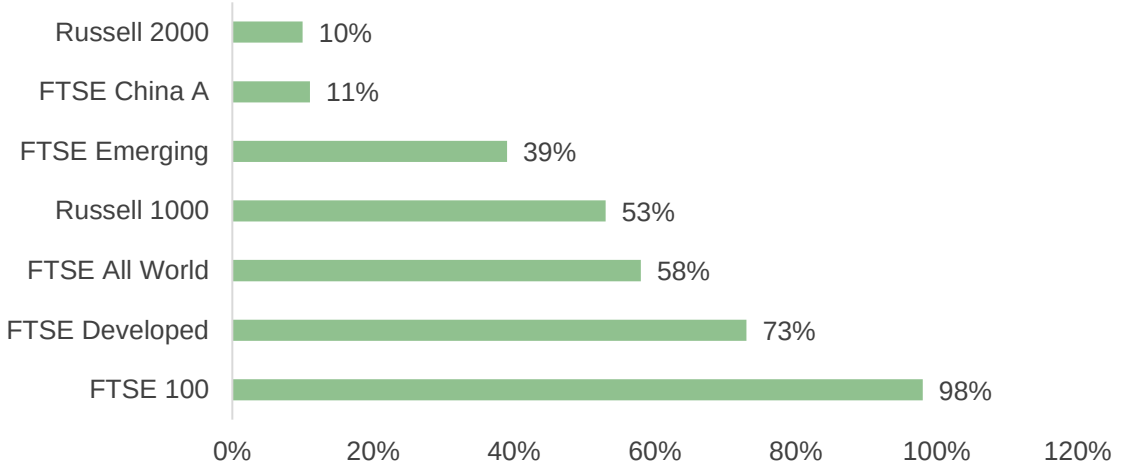
The approach taken for companies with a lack of carbon emissions reporting

It is expected that the disclosure levels will improve over time, however, there is still a lack of reported carbon emissions data, especially when it comes to scope 3 emissions. The challenges resulting from the disclosure and estimation gaps are compounded in fixed income markets, given the heterogeneity of asset classes, the complexity of corporate debt issuance structures and the diversity of bond types.

There are two persistent data challenges: the disclosure gap and the estimation gap.

- **The Disclosure Gap**: Many companies still fail to disclose operational carbon emissions, particularly in the US, China and emerging markets (see Figure 4), even when there is a well-developed local reporting framework. Despite a common perception that this 'disclosure gap' is closing rapidly, recent FTSE Russell research[12] suggests that the progress has been, at best, incremental. In some ways the disclosure gap is widening, as sustainable investment strategies and reporting are applied ever more broadly across regions and to smaller firms.

Figure 4: Share of companies disclosing Scope 1 & 2 emissions across selected FTSE Russell indices[13]



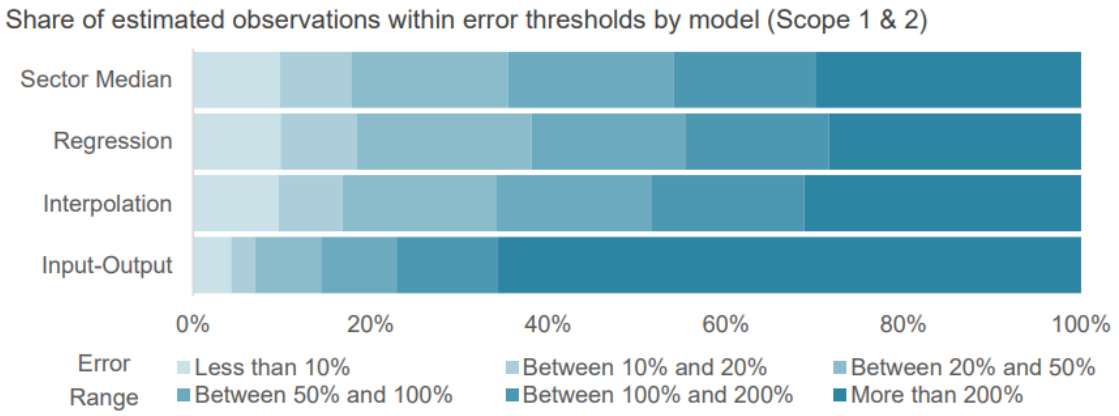
Source: FTSE Russell, 'Mind the gaps: Clarifying corporate carbon', May 2022

- **The Estimation Gap:** In the absence of universal carbon reserves and emissions reporting, investors routinely turn to estimates to fill missing values. However, there is no consensus on the models to be used and significant challenges remain in estimating carbon data, despite extensive research on the topic in the past two decades. In the same FTSE Russell research paper we found that, regardless of the strategy used, almost half of estimated carbon emissions values diverge from reported data by 100% (see Figure 5). This is enough to sway the weighted average carbon intensity (WACI) of a large, diversified global portfolio by several percentage points.

[12] "Mind the gaps: Clarifying corporate carbon", FTSE Russell, May 2022.

[13] Figures 4 and 5: Indices as at 31/12/2020 and using FY2019 emissions data although FTSE All World, Emerging and Developed as at 31/12/2021 using FY2020 emissions data. Firms disclosing in FY2019 assumed to disclose in FY2020. Disclosure requires reporting of both Scope 1 and Scope 2 emissions. Scope 1 emissions are direct GHG emissions, Scope 2 emissions are electricity indirect GHG emissions and Scope 3 emissions are other indirect GHG emissions (see https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf)

Figure 5: Carbon emissions models struggle to generate consistently accurate estimates[14]



Source: FTSE Russell, 'Mind the gaps: Clarifying corporate carbon', May 2022

Poor design choices in fixed income climate benchmarks could include an overly aggressive exclusion approach (in the case of absent or inadequate data) or estimation models that operate at higher levels of specification than are merited by the underlying data. Additionally, applying a sector average to issuers that do not report this data creates a potential incentive for 'not-aligned' issuers to improve their standing by not providing the data, or to issue securities out of new entities where data is not available.

To address the broader climate data challenge, in 2022 FTSE Russell introduced a hierarchical, multi-model approach to produce more consistent and transparent emissions data for around 10,000 companies in the FTSE Global All Cap equity index[15]. This approach first prioritises reported data, and then situational models where outputs are relatively more reliable, before drawing on a combined or 'ensemble' estimate derived from multiple general estimation strategies.

While FTSE Russell uses a robust proprietary methodology to collect emissions data, there are also deliberate index design choices which thoughtfully handle companies without reported data. In the standard FTSE PAB indices, a sector bottom Z-score is assigned, to effectively penalise the lack of reported emissions data, as opposed to excluding these issuers, or assigning them a sector average. However, private issuers falling under the umbrella of Academic institutions, Charity or Social Organizations and Hospitals are kept neutral, and are not subject to this missing data treatment[16].

[14] FTSE All World index constituents as at 31/12/2020 and using emissions data disclosed as part of FY2019 reporting where available. Estimated data is generated based on FTSE Russell's estimation models and outputs compared against reported figures where possible. Thresholds for negative errors adjusted to achieve symmetrical results relative to natural logarithm (e.g., 50% negative error equivalent to 100% positive error).

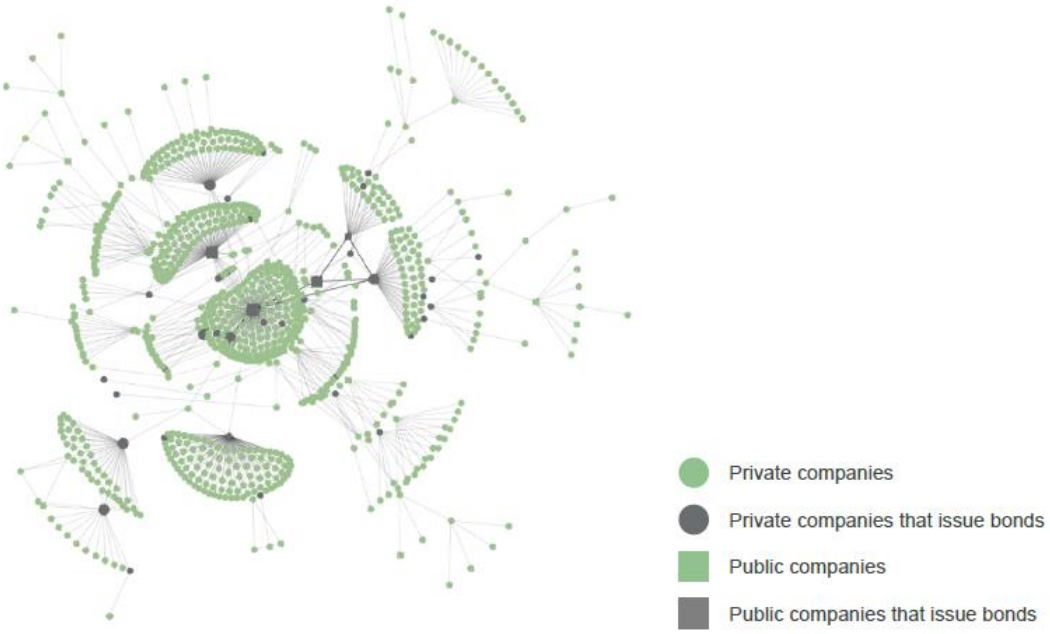
[15] See "Mind the gaps: Clarifying corporate carbon", FTSE Russell, May 2022.

[16] These must be assigned a TRBC Industry Group Code of 631020 "Schools, Colleges & Universities" or TRBC of 611010 "Institutions, Associations & Organizations" or TRBC of 561020 "Healthcare Providers & Services".

The approach taken to tackle the large number of private issuers within fixed income indices

Within fixed income, there are often large proportions of the universe that are issued by private entities, and their mapping to parents can be complex. To illustrate how challenging this question can be, Figure 6 depicts the corporate tree of HSBC Holdings plc, a banking and financial services company based in the UK with ~1,000 subsidiaries and affiliates[17]. We can see that many of the entities are private (circle shape) and many of them are known to issue bonds (depicted in grey). TRBC provides business classification data for all active issuers, including private issuers, enabling FTSE Russell to evaluate the business lines of a private issuer and determine if it is appropriate to assign it the climate indicators of its parent company.

Figure 6: HSBC corporate issuer tree

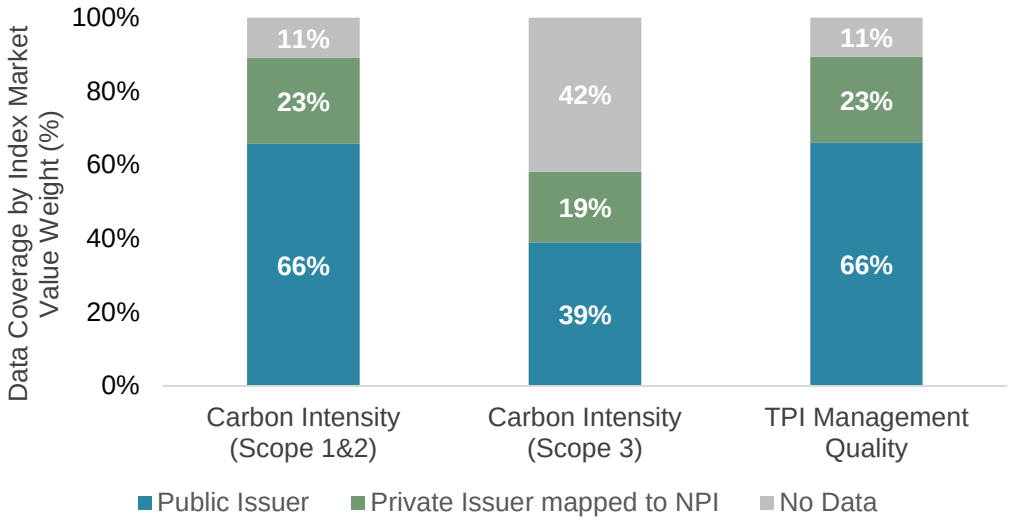


Source: Refinitiv.

In the FTSE Fixed Income EU Climate Benchmark index series, we are able to map issuers to the 'nearest public issuer' (NPI), which is the nearest listed parent company on the corporate tree of an issuer. Private issuers that are owned by listed parent companies are assigned their parents' climate transition indicators if the companies are in the same industry or if the subsidiary is non-operating. In the event the subsidiary of a holding company is industrial, the index may apply the missing data treatment to the issuer, i.e.,, the subsidiary will not take indicators of the parent company. Figure 7 illustrates how the coverage increases after this NPI mapping. Notably, Scope 3 emissions estimation models have not been extended to cover issuers in the Financials sector (around 35% market value in the FTSE WorldBIG Corporate Bond Index), which is reflected in the higher percentage of issuers with "No Data" for Scope 3 carbon intensity.

[17] Sustainable investment—not just an equity game, FTSE Russell, July 2022

Figure 7: After mapping to NPI, the data coverage for carbon intensity and TPI management quality are improved significantly.



Source: FTSE Russell, indicative data using the FTSE World Broad Investment-Grade Corporate Bond Index, as of March 2023.

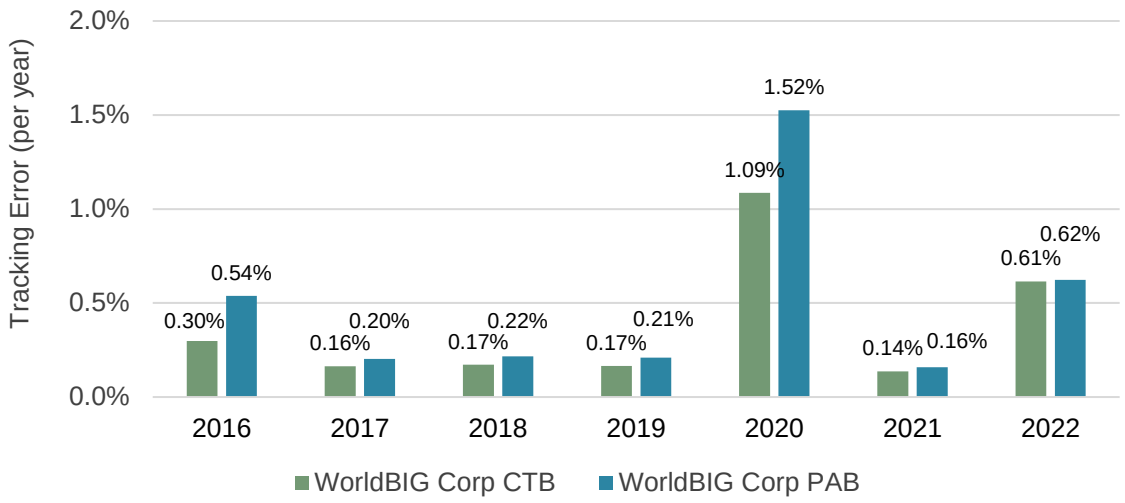
Awareness of tracking error and balancing this with the stated PAB or CTB required objectives

With any alternatively weighted index, there is a difficult balance to be struck between achieving the 'right level' of tracking error with reduced emissions or other goals. Defining this level will depend on the ambition level of the index, and the investor's tolerance. Figure 8 illustrates the different levels of tracking error for the PAB and CTB versions of the FTSE WorldBIG Corporate Bond Index.

There is a spike in tracking error in 2020, the decarbonisation base year, where the active share for the CTB and PAB indices was 27% and 35%, respectively. As we move further from 2020, the carbon intensity year-on-year reduction target becomes the dominating tilt factor. As of March 2023, more than two years after the decarbonisation base year, the active share for the CTB and PAB indices is 40% and 46% respectively. This active share will likely continue to grow, given the current speed of decarbonisation seen for the base index.

FTSE Russell's PAB and CTB approach incorporates objectives beyond the scope of regulatory requirements, which can be tweaked to accommodate acceptable levels of tracking error in customised versions. Additionally, stricter constraints on issuer or sector weight change could be applied versus those shown in Figure 3, depending on investor preferences.

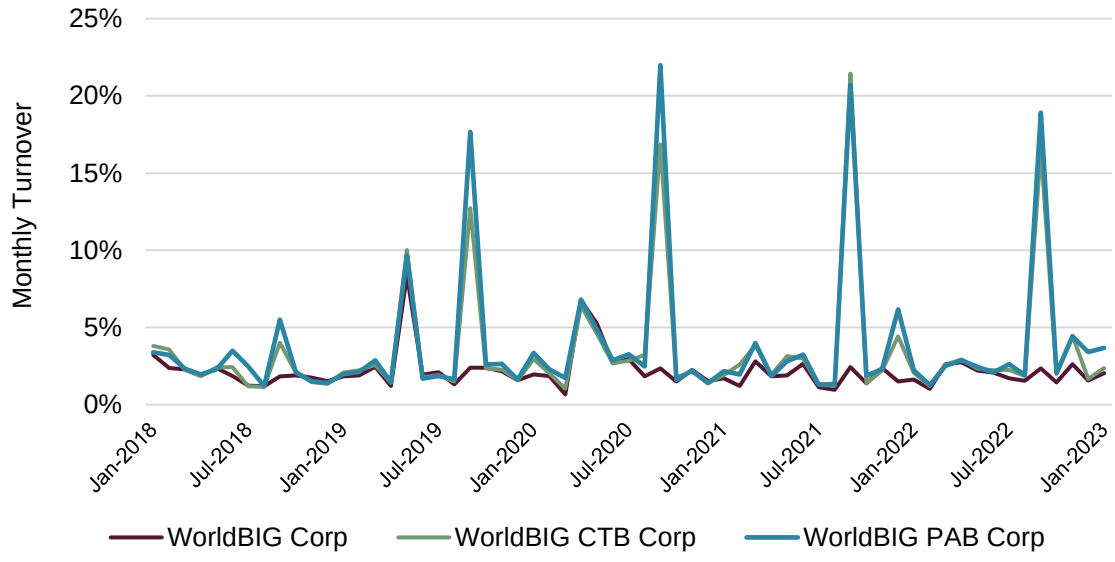
Figure 8: Historical simulated tracking error is generally higher for PAB versus CTB



Source: FTSE Russell, based on data from January 2016 to December 2022. Performance shown for the FTSE WorldBIG PAB Corporate Bond Index and the FTSE WorldBIG CTB Corporate Bond Index is hypothetical and for illustrative purposes only. Past performance is no guarantee of future results. Please see the end for important legal disclosures.

Additionally, while turnover in bond indices is inevitable (as bonds mature, are refinanced, or new issues come into the underlying universe), turnover levels that are too high may also render the benchmark unsuitable for practical use in investment portfolios. The excess turnover exhibited by the PAB and CTB indices versus the base index are mainly triggered by the annual climate data and quarterly exclusions data refreshes. These data refreshes may lead to jumps in turnover rates in October, while in other months, monthly turnover rates align with the base index during back-test period, as shown in Figure 9.

Figure 9: Monthly turnover for FTSE WorldBIG PAB and FTSE WorldBIG CTB versus the FTSE WorldBIG Corporate Bond Index



Source: FTSE Russell, based on data from January 2018 to January 2023. Performance shown for the FTSE WorldBIG PAB and FTSE WorldBIG CTB Index is hypothetical and for illustrative purposes only. Past performance is no guarantee of future results. Please see the end for important legal disclosures.

Results – FTSE World Broad Investment-Grade (WorldBIG) Paris-aligned (PAB) Corporate Bond Index

Looking at the impact of applying the relatively more restrictive PAB methodology to the FTSE WorldBIG Corporate Bond Index, which tracks investment-grade corporate bonds issued in US Dollar, Euro, Sterling and Japanese Yen, we can demonstrate the desired sustainable investment improvements versus financial concerns such as tracking error, return and volatility in Figure 10.

While the climate metric improvement is much more significant for the PAB index versus the CTB index, there is only a small difference in the return and volatility characteristics of the PAB and CTB versions, with both achieving a slightly lower return per unit of risk versus the market value weighted FTSE WorldBIG Corporate Index. The key trade-off, therefore, is between climate metric improvement and tracking error. However, both versions exhibit a relatively low annualised tracking error of 0.47% for CTB and 0.65% for PAB over a 7-year period.

Figure 10: Summary tables showing climate improvement metrics achieved through PAB and CTB, and the associated return, volatility and tracking error

Index profile	WorldBIG Corp	WorldBIG CTB Corp	Change versus base	WorldBIG PAB Corp	Change versus base
Bond count	10,462	9,545	-917	8,890	-1,572
Issuer count	1,409	1,296	-113	1,214	-195
Yield to worst (%)	5.14	4.99	-0.15	4.98	-0.16
Effective duration	6.10	6.24	0.14	6.36	0.26
Average rating	A-	A-	N/A	A-	N/A
OAS (bps)	131	121	-10	118	-13
Climate metrics					
GHG Intensity (scope 1&2) (tCO2e/USD m)	72.02	34.79	-51.70%	24.92	-65.41%
GHG Intensity (scope 3) (tCO2e/USD m)	640.49	252.02	-60.65%	179.54	-71.97%
TPI Management Quality	3.15	3.33	0.2 σ	3.33	0.2 σ
TPI Carbon Performance	4.83	5.90	1.07	5.92	1.09
Green revenues (%)	4.22	8.44	+99.85%	8.39	+98.66%
Green bond exposure (%)	3.91	9.41	+140.73%	8.11	+107.54%

Source: FTSE Russell, based on data as of March 2023. Performance shown for the FTSE WorldBIG PAB Corporate Bond Index and FTSE WorldBIG CTB Corporate Bond Index is hypothetical and for illustrative purposes only. Past performance is no guarantee of future results. Please see the end for important legal disclosures.

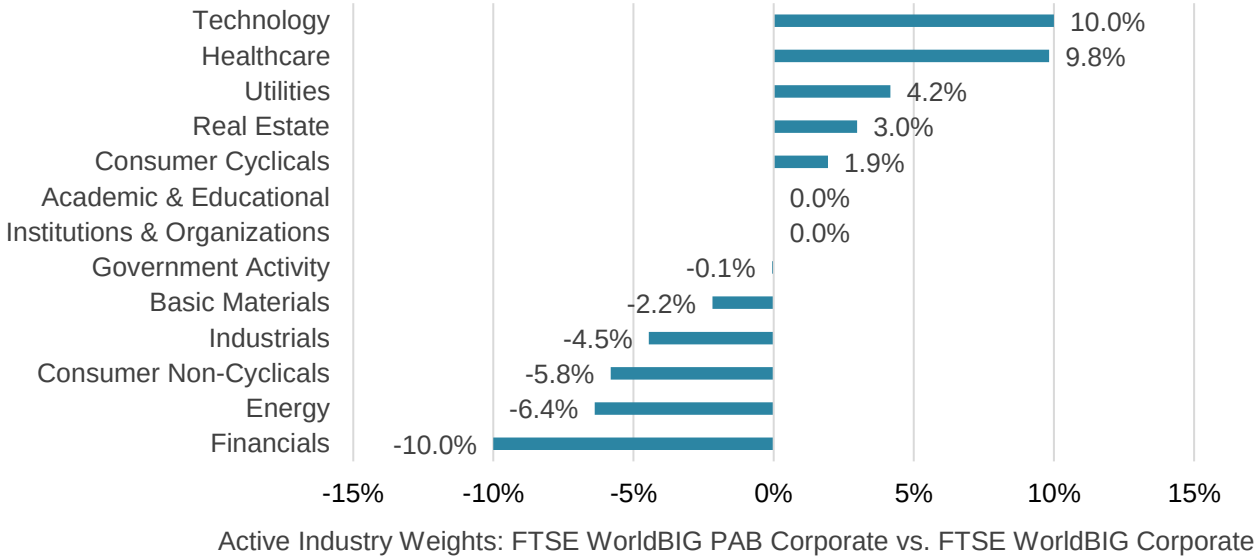
USD-hedged returns	WBIG Corp	WBIG CTB Corp	WBIG PAB Corp
Annualised return (%)	2.34%	2.21%	2.20%
Annualised volatility (%)	6.13%	5.99%	5.96%
Return per unit of risk	0.38	0.37	0.37
Annualised tracking error (%)	-	0.47%	0.65%

Source: FTSE Russell, measurement period from October 2015 to March 2023. Performance shown for the FTSE WorldBIG PAB Corporate Bond Index and FTSE WorldBIG CTB Corporate Bond Index is hypothetical and for illustrative purposes only. Past performance is no guarantee of future results. Please see the end for important legal disclosures.

Finally, a key consideration here is the change in industry exposure that results from applying PAB methodology to the underlying market value weighted index. The active industry weights shown in Figure 11 are driven mainly by the adjustments required to meet the climate targets shown in Figure 10 and the index exclusions outlined previously. Specifically, the increased exposure to Technology and Healthcare sectors results from relatively low carbon intensity (for both Scope 1 & 2 and Scope 3) and high TPI Management Quality scores. Additionally, most of the top overweighted issuers in the Technology and Utilities sectors have positive Green Revenues percentages, which results in a greater exposure in the PAB index, according to the FTSE Russell PAB methodology.

On the other hand, the Energy sector changes are driven largely by activity-based exclusions, while the reduced exposure to the Financials sector is due to the prevalence of missing Scope 3 carbon intensity data, the treatment for which involves assigning the lowest possible score in our model. However, when it comes to private issuers that fall under the umbrella of Academic institutions, Charity or Social Organizations and Hospitals, the index design assigns neutral weights and avoids excluding them due to a lack of product involvement data.

Figure 11: Change in sector exposure for the FTSE WorldBIG Corporate Bond Index and the FTSE WorldBIG PAB Corporate Bond Index



Source: FTSE Russell, based on data as of March 2023. Performance shown for the FTSE WorldBIG PAB Corporate Bond Index is hypothetical and for illustrative purposes only. Past performance is no guarantee of future results. Please see the end for important legal disclosures.

Conclusion

While there have been many EU PAB and EU CTB fixed income indices launched by index providers recently, they lack a unified approach. This is evidenced by the growing prevalence of papers from asset owners and asset managers that state their consensus views on the optimal implementation approach. Checklists for choosing an optimal benchmark are emerging, yet may evolve and solidify further over time.

The task for index providers is not simple, and is made more complex within fixed income, as the overarching challenge presented by a lack of carbon emissions data reporting is amplified by the existence of private issuers, and heterogeneity within fixed income sub-asset classes. To address this complex problem, index providers must develop an innovative approach that incorporates forward-looking metrics, is configurable, and listens to the end-user when it comes to challenges surrounding exclusion versus engagement, tracking error, and the need for credible, robust data sets to minimise the risk of greenwashing.

The FTSE Fixed Income PAB and CTB indices have historically delivered carbon intensity reduction beyond the minimum required as stated in EU regulation, while also delivering significant increases in exposure to issuers with strong TPI management quality, TPI carbon performance, and green revenues, and higher green bond exposure. Importantly, the carbon intensity measure has a forward-looking element due to the TPI Carbon Performance adjustment, a unique feature versus comparable PAB and CTB providers.

Back-tested results illustrated in this paper indicate that the FTSE WorldBIG CTB and FTSE WorldBIG PAB indices deliver similar risk and return profiles, with the key difference being the more significant climate metric improvement resulting from PAB, at the expense of some additional tracking error versus the FTSE WorldBIG Corporate Index.

While there is still clearly some stabilisation in the market around what is the ‘gold standard’ for EU PAB and CTB benchmarks in fixed income, FTSE Russell has delivered a transparent and flexible toolkit for investors to support them in their journey towards achieving Paris-alignment in fixed income benchmarks.

About FTSE Russell

FTSE Russell is a leading global provider of benchmarks, analytics and data solutions with multi-asset capabilities, offering a precise view of the markets relevant to any investment process. For over 30 years, leading asset owners, asset managers, ETF providers and investment banks have chosen FTSE Russell indexes to benchmark their investment performance and create investment funds, ETFs, structured products and index-based derivatives. FTSE Russell indexes also provide clients with tools for performance benchmarking, asset allocation, investment strategy analysis and risk management.

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