Index Insights

Sustainable Investment | Product Engineering

Targeted sustainability

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Overview

More than ever, investors recognize the risks and opportunities associated with the low carbon transition and are incorporating a wider set of considerations, including carbon, green revenues and environmental, social and governance (ESG) assessments issues into their decision making.

It is no longer sufficient to merely improve upon a set of sustainable investment (SI) characteristics compared to a benchmark, but rather that those improvements should achieve precise outcomes. Moreover, the desire to simultaneously control other index outcomes, such as tracking error, country/ industry weights and style exposures, provides additional complications. The ability to achieve such specific requirements in an index ultimately rests with portfolio construction.

This paper discusses how:

- multiple SI objectives can be incorporated in an index in a transparent and flexible manner.
- the Target Exposure methodology is an evolution of FTSE Russell's tilting methodology, which fits well with the increasing demand for index solutions that incorporate precise Low Carbon and ESG outcomes.
- precisely targeted SI solutions can also be designed for ease of implementation and limited levels of tracking error.

Table of contents

1 A new generation of sustainable investment indexes

More than ever, investors recognize the risks and opportunities associated with the low carbon transition and are incorporating a wider set of considerations, including carbon, green revenues and environmental, social and governance (ESG) assessments issues into their decision making.

FTSE Russell's annual smart beta survey for 2019 captured investors' appetite for ESG investing [8]; 77% of European respondents expressed interest in applying ESG considerations to smart beta allocations—up 22% from 2018. Among those who anticipate applying ESG considerations to a smart beta strategy, over three quarters are motivated by long-term risk mitigation objectives.

Increasingly, it is insufficient to merely improve upon a set of Sustainable Investment (SI) characteristics compared to a benchmark. Rather, those improvements should achieve precise outcomes. Moreover, the desire to simultaneously control other index outcomes, such as tracking error, country/industry weights and style exposures, provides additional complications. The ability to achieve such precise requirements in an index ultimately rests with portfolio construction.

Most portfolio construction methodologies have some mechanism that permits the levels of exposure to some quantity to be ratcheted up and down. Examples range from relatively simple selection and weighting techniques (S&W) through to complex, optimized portfolios. The former consists of selecting a set of stocks with desirable characteristics and then overlaying some portfolio-weighting scheme. The selection cut-off may be used to control the levels of exposure, but not other important exposures. Optimization often does not explicitly target a precise set of exposures, but rather a composite score, tracking error or risk budget.

In contrast, the FTSE Russell tilt approach provides a transparent mechanism for exercising complete and precise control over single and multiple objectives. For a detailed explanation of the flexibility and efficiency of this construction approach see [4, 5, 6, 7].

In Section 2, we explain how the tilt approach to construction works and then demonstrate how it may be used to create indexes that encompass both low carbon and ESG objectives. In Section 3, we examine the properties of such indexes. In Section 4, we draw our conclusions.

2 Tilting – A general exposure framework

The tilt methodology stems from the simple observation that one can obtain a greater degree of exposure to, say Value, than a given benchmark by multiplying that benchmark's weights by a positive score, which varies monotonically with the Value characteristic of individual stocks.

In other words:

$$W_T = W_M \times S_{Val} \tag{1}$$

where W_T represents the set of "tilted" portfolio weights (one for each stock), W_M is an initial set of benchmark weights and S_{Val} is a set of positive numbers representing the Value scores. Equation (1) results in a set of unadjusted stock weights that require normalization (or rescaling) such that they sum to one. We use this convention in equations throughout this paper, where it is understood that the normalization is implicit.

Note that the starting set of weights is arbitrary, so to obtain a greater Value exposure, we could simply tilt the previously obtained weights W_T towards Value again. This is equivalent to multiplying W_T by S_{Val} which, in turn, is equivalent to multiplying the original benchmark weights W_M by: $S_{Val} \times S_{Val} = {S_{Val}}^2$. The exponent "2", therefore, represents the "strength" of the tilt towards Value and gives the increased Value exposure we require. It is easy to see how this generalizes to non-whole numbers, which then yield varying degrees of Value exposure.

Imagine now that we wish to incorporate an improvement in ESG Ratings on top of the already achieved Value exposure. We can do this by tilting the "doubly-tilted" Value weights towards higher ESG Ratings and arrive at weights given by: $W_M \times {S_{Val}}^2 \times S_{ESG}$.

This process of sequential tilting, therefore, generalizes to yield the formula for a multiple tilt:

$$W_T = W_M \times \underbrace{S_{Val}^n \times \ldots \times S_{Mom}^p}_{\text{Style Factors}} \times \underbrace{S_{Carbon}^q \times \ldots \times S_{ESG}^r}_{\text{Sustainable Investment}} \times \underbrace{S_{Beta}^s}_{\text{Market Beta}} \times \underbrace{C \times I}_{\text{Country \& Industry}} \tag{2}$$

Each exposure target merely requires the incorporation of an additional term in the multiplicative formula. All exposure objectives are, therefore, embedded in *exactly the same way*. Indeed, additional implementation properties such as, levels of investment capacity, maximum stock weights and turnover, may also be expressed and controlled as additional multiplicative tilts in equation (2).

Recall that the exponents (or tilt strengths) in (2) determine the degree of the exposure to each metric. Therefore, given a target for each exposure, it is possible to determine the set of tilt strengths required to achieve each exposure target. This, in essence, is how we construct a "Target Exposure Index."

The flexibility of the above approach allows us to create a variety of sustainable indexes with different use cases. Some may concentrate on reducing carbon emissions and reserves, while neutralizing style exposures and controlling tracking error, while others may focus on smart sustainability; combining climate considerations and active style exposures.

In this note, we focus on portfolios with improved ESG Ratings, and lower carbon emissions and reserves than the market capitalization benchmark. Other SI objectives covering the exclusion of companies involved in contentious product activities such as weapons, tobacco, thermal coal and nuclear power, or controversies related to the UN Global Compact principles are additionally incorporated. Furthermore, we aim to achieve this without excessive tracking error or by skewing the resulting index to particular countries or industries.

More precisely, assume we require an increase in ESG ratings of 20% and reductions in both emission and reserve intensities of 50%, relative to the benchmark. We control tracking error and country and industry weights by imposing country neutrality and an active industry weight constraint of +/-5%.

This can be achieved by constructing a multiple tilt index with tilts to improved ESG, low emissions and low reserves, with additional tilts to control country and industry weightings. That is:

$$W_T = \widehat{W}_M \times S_{Emssions}^{p} \times S_{Reserves}^{q} \times S_{ESG}^{r} \times C \times I \quad (3)$$

where $\widehat{W}_M$ are weights that result after excluding companies involved in contentious product activities from the underlying market capitalization universe and rescaling the weights to ensure that they sum to one.

The Sustainable Investment targets for the ESG, Reserve Intensity (R) and Emission Intensity (E) objectives are:

$$W_T \cdot ESG = 120\% * W_M \cdot ESG, \qquad W_T \cdot R = 50\% * W_M \cdot R \qquad \text{and} \qquad W_T \cdot E = 50\% * W_M \cdot E \quad (4)$$

In each case, the L.H.S represents the weighted-average SI quantity in the proposed index, and the R.H.S represents the SI objective that is targeted relative to the benchmark.

The active weight targets of our index satisfy the following set of equations in order to meet the country neutrality and industry weight constraints:

$$(W_T - W_M) \cdot \delta_{Country} = 0\% \quad \text{and} \quad -5\% \leq (W_T - W_M) \cdot \delta_{Industry} \leq 5\% \quad (5)$$

where $\delta_{Country}$ ($\delta_{Industry}$) is a binary measure representing stock membership of a $Country$ ($Industry$).

Solving equations (4) and (5) for the tilt strengths in (3) yield the set of weights we require. Details of the solution method are set out in [1]. In the next Section, we will investigate the properties of resulting index.

3 ESG & Low Carbon indexes

In this section, we examine a simulated index, which is the result of the construction process described in the previous section. The index also includes additional tilts that limit the maximum stock weight to the minimum of 10% and 10 times the market capitalization weight. An exclusion list is also applied in September, prior to tilting, to remove companies involved with weapons, tobacco, thermal coal and nuclear power, in addition to companies involved in controversies related to the UN Global Compact Principles. The controversies exclusions list is re-applied at each subsequent quarter. Stock weights of less than 0.5 basis points are also removed.

We have simulated results for several FTSE universes—the outcomes of which are given in Appendix A. Here, we will focus on the results for a universe based on the FTSE Developed Index which, as one can observe in Appendix A, is pretty much representative of the other universes.

Figure 1 displays the statistics for our simulated SI index versus the FTSE Developed Index (here referred to as the "Benchmark") for the period from September 2014 to March 2020. All performance figures are annualized total return and measured in USD. Implementation and diversification metrics are based on monthly averages; see appendix B for their definitions. The SI characteristics are also averaged on a monthly basis; details of ESG ratings are given in [2] and Carbon Intensity measures are given in [3].

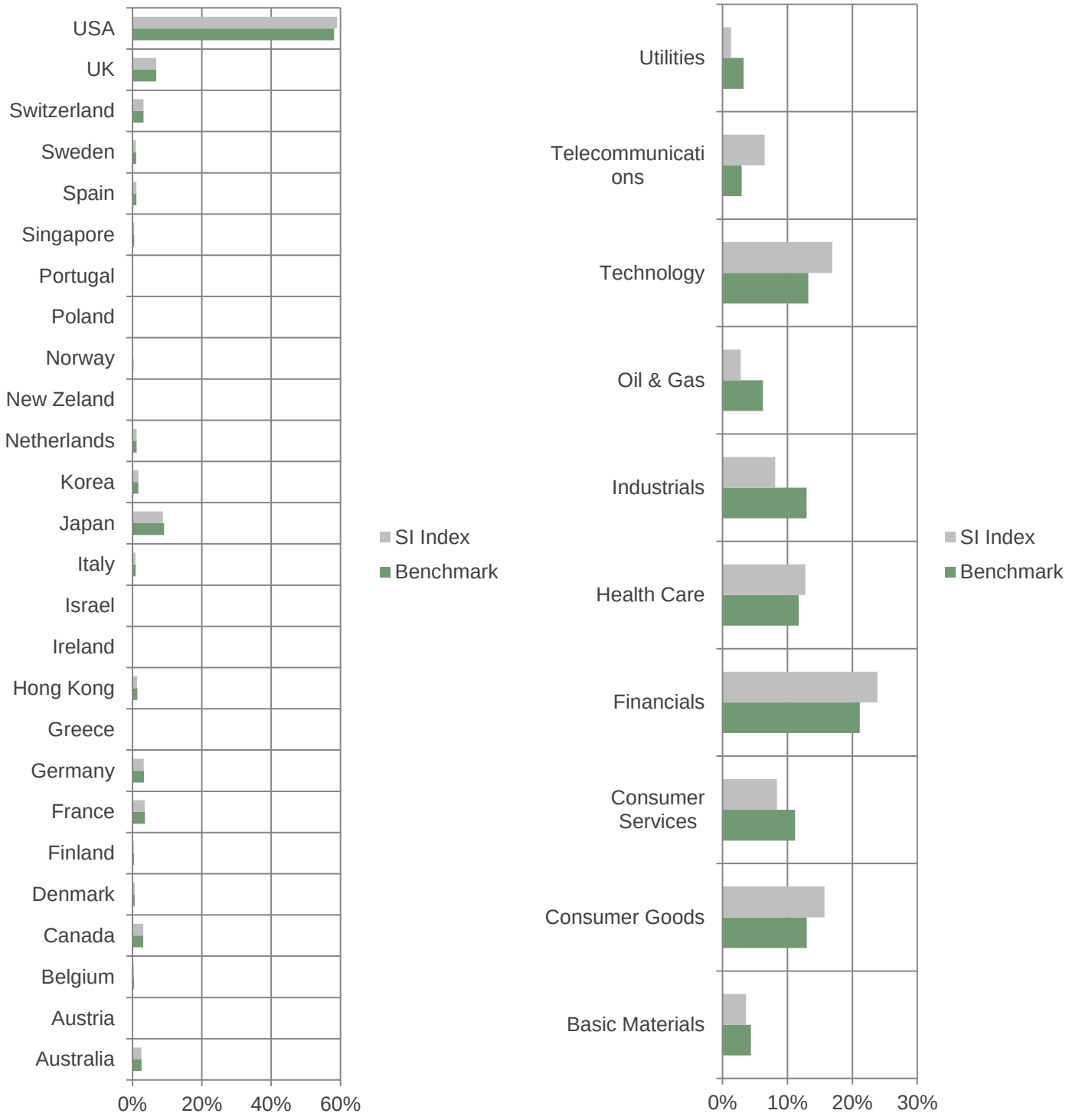
Figure 1: Summary Statistics for FTSE Developed Universe

	Benchmark	SI Index
Performance		
Geometric Mean (%)	3.51	4.75
Volatility (%)	14.46	14.64
Sharpe Ratio	0.24	0.32
DD (%)	-33.97	-32.77
Excess (%)		1.20
Tracking Error (%)		1.50
Information Ratio		0.80
Beta		1.01
Implementation		
Two Way Turnover (%)		28.63
Capacity (%)	100.00	49.90
Active Share (%)	0.00	38.30
Diversification		
Number of Stocks	2129	1114
Effective N	346	129
Top Ten Weight (%)	10.78	20.70
SI Characteristics		
Reserves Reduction (%)		49.32
Emissions Reduction (%)		50.77
ESG Ratings Uplift (%)		20.00

Source: FTSE Russell. Trucost Data based on the FTSE Developed Index Universe from September 2014 to March 2020. Performance shown for the SI Index is hypothetical and for illustrative purposes only. Past performance is no guarantee of future results. Please see the end for important legal disclosures.

The performance figures exhibit an excess return of approximately 1.2% p.a. over the period from September 2014 to March 2020. A beta of one implies the SI index has the same market exposure as its parent FTSE Developed Index. The modest tracking error of 1.5% p.a. reflects country neutrality and industry constrains that are applied to limit deviations from the benchmark. We can see this in time averaged country and industry weightings in Figure 2.

Figure 2: Time-Averaged Country and Industry Weights



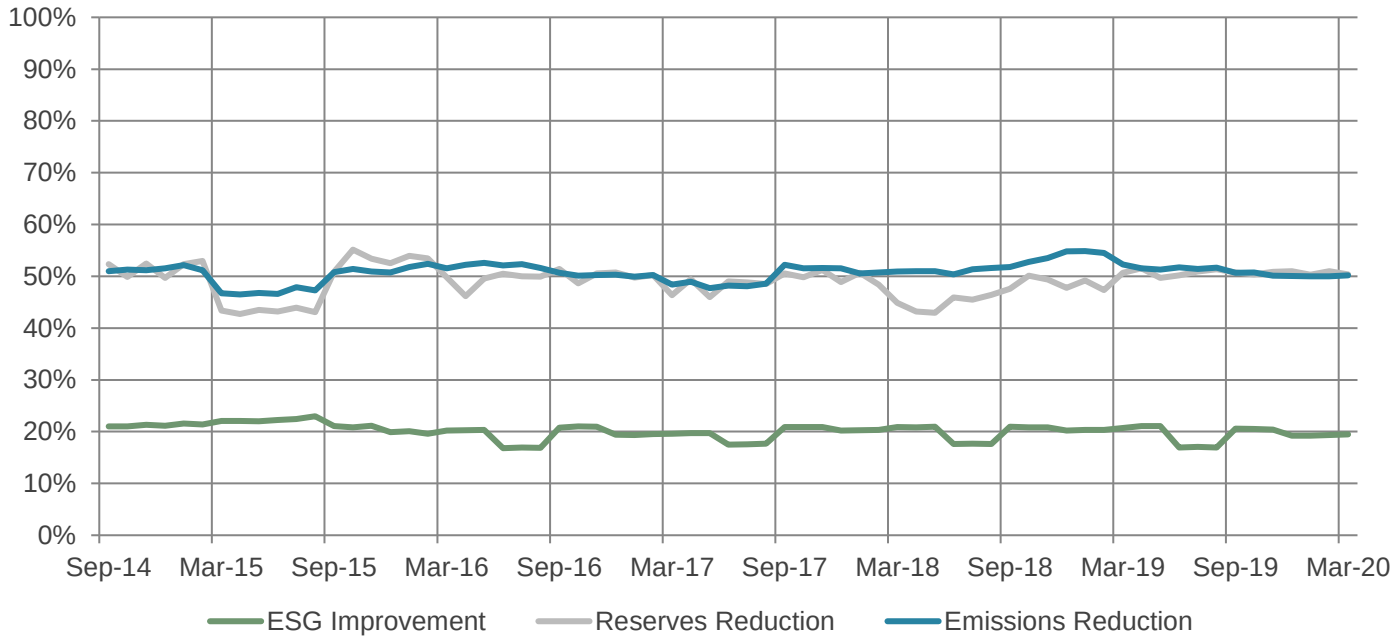
Source: FTSE Russell. Data based on the FTSE Developed Index Universe from September 2014 to March 2020.

The county weights of our index closely match those of the benchmark as expected. On the other hand, given that this index has a low carbon orientation; it is not surprising that the carbon intensive Oil & Gas, Basic Materials, Industrials and Utilities industries are underweighted. However, the minimum industry weight is constrained to be no lower than 5% below that of the benchmark. The flexibility of the portfolio construction approach outlined allows us to achieve more balanced outcomes than would result from the simple elimination of those sections of the economy that are intrinsically carbon intensive. Since carbon intensive companies are concentrated in a relatively small number of industries, simple construction approaches tend to re-allocate capital from carbon intensive industries to carbon light industries. Such indexes would therefore be less representative of the entire economy.

Figure 1 also indicates that the index is well diversified and has practical implementation properties. Notably, the figure of about 29% for the annualized two-way turnover indicates that the index will be feasible to implement.

The important quantities in the Figure 1 are, however, the time averaged reductions in both weighted measures of carbon intensity of approximately 50% and the uplift in weighted ESG ratings of 20% relative to the benchmark. Figure 3 shows that these outcomes are stable though time. Small deviations result from the drifting of weights, due to relative price movements between rebalances in September and quarterly additions to the UN Global Compact Principles exclusion list.

Figure 3: Carbon Intensity Reduction and ESG Improvement



Source: FTSE Russell. Trucost Data based on the FTSE Developed Index Universe from September 2014 to March 2020.

4 Conclusions

In this note, we've demonstrated how multiple sustainable investment objectives can be incorporated in an index in a transparent and flexible manner. The Target Exposure methodology is an evolution of FTSE Russell's tilting methodology, whereby tilt strengths are chosen to obtain a given set of exposure targets. This fits perfectly with the increasing demand for index solutions, which incorporate precise Low Carbon and ESG outcomes.

We have simulated indexes that employ the target exposure framework to combine precise SI objective targeting with control of important portfolio characteristics such as country, and industrial weightings, levels of diversification and capacity. Such indexes, therefore, not only provide precisely targeted SI solutions, but are also designed for ease of implementation and limited levels of tracking error.

5 Appendix A

This Appendix details the index characteristics of all simulated SI indexes. In each case the benchmark is the market capitalization weighted index for the associated FTSE Universe. All performance figures are annualized total return and measured in USD. Implementation and diversification measures and SI characteristics are averaged on a monthly basis. For detailed definitions of these quantities see Appendix B and references [2] and [3].

Table 1: Summary Statistics for Various FTSE Universes

	FTSE Developed		FTSE Emerging		FTSE Developed Europe	
	Benchmark	SI Index	Benchmark	SI Index	Benchmark	SI Index
Performance						
Geometric Mean (%)	3.51	4.75	-1.20	0.24	-1.27	-0.10
Volatility (%)	14.46	14.64	15.73	15.54	17.26	16.67
Sharpe Ratio	0.24	0.32	-0.08	0.02	-0.07	-0.01
DD (%)	-33.97	-32.77	-35.06	-33.51	-35.74	-33.85
Excess (%)		1.20		1.46		1.19
Tracking Error (%)		1.50		1.71		2.68
Information Ratio		0.80		0.85		0.44
Beta		1.01		0.98		0.95
Implementation						
Two Way Turnover (%)		28.63		40.63		50.55
Capacity (%)	100.00	49.90	100.00	56.52	100.00	27.59
Active Share (%)	0.00	38.30	0.00	31.52	0.00	53.53
Diversification						
Number of Stocks	2129	1114	1112	791	550	283
Effective N	346	129	132	75	150	38
Top Ten Weight (%)	10.78	20.70	20.80	28.31	17.43	42.56
SI Characteristics						
Reserves Reduction (%)		49.32		50.50		46.56
Emissions Reduction (%)		50.77		49.40		49.14
ESG Ratings Uplift (%)		20.00		20.71		17.61

Source: FTSE Russell. Trucost Data based on the Indicated FTSE Index Universe from September 2014 to March 2020. Performance shown for each SI Index is hypothetical and for illustrative purposes only. Past performance is no guarantee of future results. Please see the end for important legal disclosures.

Table 2: Summary Statistics for Various FTSE Universes (Continued)

	FTSE Asia Pacific ex Japan		FTSE USA		FTSE Japan	
	Benchmark	SI Index	Benchmark	SI Index	Benchmark	SI Index
Performance						
Geometric Mean (%)	0.43	1.99	6.48	7.70	3.35	3.82
Volatility (%)	14.80	15.09	17.51	17.91	18.04	18.10
Sharpe Ratio	0.03	0.13	0.37	0.43	0.19	0.21
DD (%)	-33.36	-31.49	-34.08	-33.14	-29.98	-28.28
Excess (%)		1.55		1.15		0.45
Tracking Error (%)		1.71		1.80		2.16
Information Ratio		0.90		0.64		0.21
Beta		1.01		1.02		1.00
Implementation						
Two Way Turnover (%)		31.47		25.86		21.70
Capacity (%)	100.00	57.50	100.00	54.36	100.00	68.67
Active Share (%)	0.00	31.24	0.00	35.87	0.00	27.05
Diversification						
Number of Stocks	1098	781	630	520	496	460
Effective N	131	64	149	63	127	66
Top Ten Weight (%)	21.91	32.62	17.80	30.73	18.60	28.41
SI Characteristics						
Reserves Reduction (%)		49.30		50.34		49.10
Emissions Reduction (%)		49.29		49.86		49.35
ESG Ratings Uplift (%)		20.46		19.19		19.37

Source: FTSE Russell. Trucost data based on the indicated FTSE Index Universe from September 2014 to March 2020. Performance shown for each SI Index is hypothetical and for illustrative purposes only. Past performance is no guarantee of future results. Please see the end for important legal disclosures.

6 Appendix B

This Appendix contains the definitions for the implementation and diversification metrics used in this document.

6.1 Diversification

To assess the degree of diversification in portfolio, we define Effective N of a portfolio as the inverse of the Herfindahl measure of concentration:

$$\text{Effective N} = 1/(W.W) = 1/\sum_{i=1}^{N} {W_i}^2 \tag{6}$$

Effective N attains its maximum under an equal weighting scheme when it is equal to the actual number of stocks. Hence, Effective N can be seen as a measure of "how far" a given portfolio is from this maximally diversified portfolio.

6.2 Active share

The active share is defined as half the sum of the absolute weight differences of two portfolios:

$$\text{Active Share} = \frac{1}{2}\sum_{i=1}^{N} |W_i - \widehat{W}_i| \tag{7}$$

where W and $\widehat{W}$ are two sets of portfolio weights.

6.3 Capacity

Portfolio capacity is defined as the reciprocal of the weighted sum of stock capacity ratios:

$$\text{Capacity} = 1/\left[\sum_{i=1}^{N} W_i * \frac{W_i}{W_{M,i}}\right] \tag{8}$$

where $W_{M,i}$ are the market capitalization weights. This yields a number between 0% and 100% and reflects the ease of investment relative to a market capitalization weighting (100%) scheme.

References

[1] FTSE Global Factor Index Series Ground Rules, FTSE Russell, April 2020.

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[5] “Factor Exposure and Portfolio Concentration,” FTSE Russell, April 2017.

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[8] “Smart Sustainability: 2019 global survey findings from asset owners,” FTSE Russell, 2019.

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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