FT Wilshire

Climate Change Indexes

1 Introduction

The Climate Change Indexes are designed to achieve specific Emission Intensity improvements in absolute terms and relative to their underlying benchmark indexes. This is achieved via a tilting methodology where an initial set of index weights are multiplied by positive scores to yield a new set of index weights with the required improvements. The details of the construction are set out below.

2 Index Construction

2.1 Data Definitions

The data definitions are in consensus with those found in the EU's technical expert group's report "Handbook of Climate Transition Benchmarks, Paris-Aligned Benchmark and Benchmark's ESG Disclosures".

2.1.1 GHG Emission Intensity

A company's GHG Emission Intensity E_i is defined as the ratio of the sum of Scope 1, Scope 2 and phased-in Scope 3 GHG emissions, in metric tons of CO2e, to enterprise value including cash (EVIC), in millions of USD. Details of reported and the modelling of un-reported carbon data are given in the document "Paris-Aligned Benchmarks - Carbon Emissions Model". [1]

2.1.2 Sector Dummy

The sector dummy factor is defined by the variable:

$$\delta_{i\in J} = \begin{cases} 1 & \text{if} \quad i \in J \\ 0 & \text{if} \quad i \notin J \end{cases} \tag{1}$$

In other words, this dummy variable takes the value of one if the stock i is a member of sector J and zero otherwise. The sector classification used for each index is set out in Table 1 of Section 3.

2.1.3 High Climate Impact Sector Dummy

The high climate impact dummy factor is defined by the variable:

$$\delta_{i\in H} = \begin{cases} 1 & \text{if} \quad i \in H \\ 0 & \text{if} \quad i \notin H \end{cases} \tag{2}$$

In other words, this dummy variable takes the value of one if the stock i is a member the high climate impact set of socks H and zero otherwise. The high climate impact set is the union of stocks in the high climate impact sectors given in Appendix A.

2.2 Calculation of Z-Scores and S-Scores

Emission intensities are converted to Z-Scores by subtracting of their cross-sectional mean μ from each raw value and then dividing by the cross-sectional standard deviation σ:

$$Z_{E,i} = \frac{E_i - \mu}{\sigma} \tag{3}$$

[1] For universe constituents with neither reported nor modelled carbon emission data, their GHG emission intensity will comprise of; the second level classification average if there are at least three stocks with valid data in the same second level classification; otherwise, the first level classification average if there are at least three stocks with valid data in the same first level classification; otherwise, the universe average. For this purpose, the Scope 1 & 2 GHG emission intensity is treated separately from the Scope 3 GHG emission intensity.

A winsorization process is then applied to ensure that all the results lay in the range -3 to +3. Emission Z-Scores, sector dummies and high climate impact sector dummies are then mapped to positive "S-Scores" according to:

$$S_{E,i} = \text{Exp}[Z_{E,i}], \qquad S_{J,i} = \text{Exp}[\delta_{i\in J}] \qquad \text{and} \qquad S_{H,i} = \text{Exp}[\delta_{i\in H}] \tag{4}$$

respectively. Stocks are therefore assigned a set of positive numbers that increase monotonically with their Z-Scores, sector dummies and high climate impact sector dummies.

2.3 Multiple Tilt Equation

The climate index weights are given by the multiple tilt equation:

$$W_i = \frac{1}{\Omega} \times S_{E,i}^{n} \times S_{1,i}^{t} \times \ldots \times S_{J,i}^{u} \times S_{H,i}^{r} \times \widehat{M}_i \tag{5}$$

where $S_{E,i}^{n}$ is the Emission intensity tilt of strength n, $S_{J,i}^{t}$ is the J^{th} sector tilt of strength t, $S_{H,i}^{r}$ is the high climate impact sector tilt of strength r, $\widehat{M}_i$ is the set of weights obtained by removing stocks specified in the exclusion lists of Appendix B from the set of underlying benchmark weights M_i and:

$$\Omega = \sum_{i=1}^{N} S_{E,i}^{n} \times S_{1,i}^{t} \times \ldots \times S_{J,i}^{u} \times S_{H,i}^{r} \times \widehat{M}_i \tag{6}$$

Tilt strengths can take positive or negative values. Varying the tilt strengths in equation (5) give rise to different levels of emission intensity reductions and sector exposures. Other tilts that control maximum weight, capacity and turnover may also be applied.

2.4 Emission Intensity and Sector Targets

At each review a range for Weighted Average Emission Intensity is specified by:

$$0 \leq \sum_{i=1}^{N} W_i \times E_i \leq \text{Min}\left[(1-P) * \sum_{i=1}^{N} M_i \times E_i\,,\ \frac{E_B}{I_B} * (1-Q)^{n/2}\right] \tag{7}$$

where E_B is the index Weighted Average Emission Intensity at a given decarbonization base date, n counts the number of semi-annual reviews since that decarbonization base date, P represents the point in time reduction relative to the benchmark, Q the required year-on-year reduction from that decarbonization base date and I_B is an inflation adjustment calculated as the ratio of average value of EVIC at the review to that at the decarbonization base date. See Table 1 in Section 3 for the P and Q values and Table 2 of Appendix C for the decarbonization base dates, for the Climate Change Indexes.

The active weight of stocks in the high carbon impact sectors is set to zero:

$$\sum_{i=1}^{N} (W_i - M_i) \times \delta_{i\in H} = 0 \tag{8}$$

Ranges are specified for active sector weight according to:

$$L_J \leq \sum_{i=1}^{N} (W_i - M_i) \times \delta_{i\in J} \leq U_J \tag{9}$$

where L_J and U_J represent the lower and upper allowable limits for the active weight of sector J.

2.5 Index Weights

Tilt strengths in equation (5) are found that satisfy equations (7), (8) and (9) along with constraints on maximum weight, minimum weight and capacity ratio (Climate Change Index weight / underlying index weight) [2].

Should the solution be infeasible, a hierarchical approach to constraint relaxation will be applied:

1) Increase upper sector bound by 10bps and decrease lower sector bound by 10bps. Repeat until a solution is found or up to a maximum of 50 times.
2) Increase maximum stock weight by 10bps, reset initial sector bounds and re-apply relaxion scheme 1). Repeat until a solution is found or up to a maximum 50 times.
3) Seek a solution where neither sector nor maximum stock weight constraints are applied.

Should the relaxation process fail to yield a feasible solution, the index weights will consist of the pre-review index weights, renormalized to account for exclusion of stocks that are not members of the underlying index on the effective date.

3 Available Indexes

Table 1 sets out the various Climate Change Indexes in the series, the stock universes, sets of targets and parameters that specify them.

Table 1: Targets and Parameters for Climate Change Indexes

Index Name	Emission Intensity (P%, Q%)	Sector Classification	Active Sector Const. (%)	High Climate Impact (%)	Max. Weight (%)	Min. Weight (bps)	Max. Cap. Ratio	Excl. List	Review
FT Wilshire US Large Cap Climate Change 1.5 °C Target	(50, 7)	Wilshire	+/-5	0	5	5	10	PAB	MS
Hang Seng Climate Change 1.5 °C Target	(50, 7)	HSICS	+/-5	0	10	5	10	PAB	MS
Nikkei 225 Climate Change 1.5 °C Target	(50, 7)	Nikkei	+/-5	0	10	0	10	PAB	AO

*M=March, A=April, S=September and O=October

For details of Wilshire, HSICS and Nikkei sector classifications see “CITS – Company & Industry Taxonomy System”, “Hang Seng Industry Classification System” and “Nikkei Stock Average Index Guidebook” respectively.

[2] In exceptional circumstances an additional constraint on the 2-way turnover may be applied.

4 Ongoing Review

4.1 Index Review

The FT Wilshire US Large Cap Climate Change 1.5 °C Target Index will be reviewed semi-annually in March and September. The price data cutoff date is Wednesday before the first Friday of the review month. Constituent and free-float changes are updated after the close of trading on the third Friday of the review month.

The Hang Seng Climate Change 1.5 °C Target Index will be reviewed semi-annually and becomes effective in March and September. The price data cutoff date and effective date will be the review announcement date and the effective date of the underlying Hang Seng Large-Mid Cap (Investable) Index as set out in "Index Operation Guide for Managing the Hang Seng Family of Indices". [3]

The Nikkei 225 Climate Change1.5 °C Target Index will be reviewed semi-annually in April and October. The price data cutoff date as of the close of second business day of the review month. Constituent and weight changes are updated at the open of trading on the last business day of the review month.

Emission data and exclusion lists will be updated at the end of January for March and April reviews, and the end of July for September and October reviews.

4.1 Intra-review Additions

Additions to the underlying FT Wilshire US Large Cap, Hang Seng and Nikkei 225 index will be eligible for inclusion in the FT Wilshire US Large Cap Climate Change 1.5 °C Target Index, Hang Seng Climate Change 1.5 °C Target Index and Nikkei 225 Climate Change 1.5 °C Target Index at the next index review.

4.2 Intra-review Deletions

A constituent will be removed from a FT Wilshire US Large Cap Climate Change 1.5 °C Target Index, Hang Seng Climate Change 1.5 °C Target Index or Nikkei 225 Climate Change1.5 °C Target Index if it is removed from the corresponding underlying Index. The deletion will be concurrent with that from the underlying index and its weight will be distributed pro-rata amongst the remaining constituents in the FT Wilshire US Large Cap Climate Change 1.5 °C Target Index, Hang Seng Climate Change 1.5 °C Target Index or Nikkei 225 Climate Change 1.5 °C Target Index.

5 Corporate Events

5.1 Corporate Action Treatment

The weight of a constituent of the FT Wilshire US large Cap Climate Change 1.5 °C Target Index will remain unchanged should it undergo a stock split, stock consolidation, rights issue, bonus issue, a change in the number of shares in issue or a change in free float (with the exception of tender offers).

Corporate action treatment for the Hang Seng Climate Change 1.5 °C Target Index can be found in the "Index Operation Guide for Managing the Hang Seng Family of Indices".

Corporate action treatment for the Nikkei 225 Climate Change 1.5 °C Target Index will follow the rules for the Nikkei 225.

[3] In the situation where the pro-forma weight of any constituent is increased and becomes higher than the level of weight cap * 1.3 on the Tuesday of the week before the effective date, the Hang Seng Climate Change 1.5 °C Target Index will be recapped.

5.2 Suspension of Dealing

Suspension of Dealing rules for the FT Wilshire US Large Cap Climate Change 1.5 °C Target Indexes can be found in the FT Wilshire 5000 Index Series Rule Book.

Suspension of Dealing rules for the Hang Seng Climate Change 1.5 °C Target Index can be found in the "Index Operation Guide for Managing the Hang Seng Family of Indices".

Suspension of Dealing rules for the Nikkei 225 Climate Change 1.5 °C Target Indexes are in accordance with those for the Nikkei 225.

5.3 Takeovers, Mergers and Spinoffs

The treatment of takeovers, mergers and spinoffs for the FT Wilshire US Large Cap Climate Change 1.5 °C Target Index can be found in the FT Wilshire 5000 Index Series Rule Book.

The treatment of takeovers, mergers and spinoffs for the Hang Seng Climate Change 1.5 °C Target Index can be found in the "Index Operation Guide for Managing the Hang Seng Family of Indices".

The treatment of takeovers, mergers and spinoffs for Nikkei 225 Climate Change 1.5 °C Target Index are in accordance with those for the Nikkei 225.

Appendix A: High Climate Impact Sectors

A.1 PAB High Climate Impact Sectors

The NACE definition of high climate impact sectors is as follows:

- Agriculture, forestry and fishing
- Mining and quarrying
- Manufacturing
- Electricity, gas, steam and air conditioning supply
- Water supply; sewerage, waste management and remediation activities
- Construction
- Wholesale and retail trade; repair of motor vehicles and motorcycles
- Transportation and storage
- Real estate activities

Each of these sectors are mapped to the equivalent sectors in the WICS, HSICS and Nikkei classifications to define the high climate impact sectors for the FT Wilshire US Large Cap Climate Change 1.5 °C Target Index, Hang Seng Climate Change 1.5 °C Target Index and Nikkei 225 Climate Change 1.5 °C Target Index respectively.

Appendix B: Exclusions

B.1 PAB Index Exclusions

Companies involved in the following activities are excluded from the PAB Indexes:

- Controversial weapons.
- Cultivation and production of tobacco.
- UN Global Compact violations.
- OECD Guidelines for Multinational Enterprises violations.
- Exploration, mining, extraction, distribution or refining of hard coal and lignite (1% or more of revenues).
- Exploration, extraction, distribution or refining of oil fuels (10% or more of revenues).
- Exploration, extraction, manufacturing or distribution of gaseous fuels (50% or more of revenues).
- Electricity generation with a GHG intensity of more than 100 g CO2 e/kWh (50% or more of revenues).
- Significant harm to the environment.

For more details of the exclusion criteria please see “Paris-Aligned Benchmarks – Exclusion Criteria”.[4]

[4] UNGC/OECD exclusions are applied by Hang Seng to the underlying Hang Seng Large-Mid Cap (Investable) Index for the Hang Seng Climate Change 1.5 °C Target Index.

Appendix C: Decarbonization Base Dates & Phased Scope 3 GHG Emissions

Table 2 displays the decarbonization base dates for year-on-year reduction of Scope 1 + Scope 2 GHG Emissions for phased Scope 3 GHG Emissions for the Climate Change indexes. At the reviews corresponding to decarbonization base dates in Table 2, the review count in equation (7) is reset to zero.

Table 2: Base dates and phased in Scope 3 emissions

Index Name	Scope 1+ 2	Scope 3: Phase 1	Scope 3: Phase 2	Scope 3: Phase 3
FT Wilshire US Large Cap Climate Change 1.5 °C Target	Sep 2015	Sep 2020	Sep 2022	Sep 2024
Hang Seng Climate Change 1.5 °C Target	Sep 2015	Sep 2020	Sep 2022	Sep 2024
Nikkei 225 Climate Change 1.5 °C Target	Oct 2015	Oct 2020	Oct 2022	Oct 2024

Scope 3 GHG Emission phases:

- Phase 1 - GHG Emissions data for energy and mining sectors
- Phase 2 - GHG Emissions data for transportation, construction, buildings, materials and industrial sectors
- Phase 3 - GHG Emissions data for all other sectors

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More information

For more information, please contact us directly:

T +1 310 451 3051

wilshireindexes@wilshire.com

Wilshire

1299 Ocean Avenue, Suite 700, Santa Monica, CA 90401

wilshire.com