

Sustainable Investment Insights

QUARTERLY REPORT: JANUARY 2023

FOR PROFESSIONAL INVESTORS ONLY

Industry exposure a key swing factor in regional performance

Industry exposures broadly outweighed higher beta effects in Q4. The structural underweight in Energy was additive to UK SI quarterly returns for the first time in 2022. The large sell-off in Telcos in the UK, Europe and EM posed headwinds for the ESG Low Carbon Target and the EU climate-aligned indexes in these regions, despite small active weights. US strategies overweight Tech struggled, with green-tech-focused Environmental Opportunities (EO) affected the most.

Highlights

EO regional divergences

Environmental Opportunities continued to recover in Europe in Q4, benefiting from an overweight in Industrials and an underweight in Staples. It lost ground in the US, reflecting its large Tech exposure. The underweight Financials was a significant headwind in Japan.

ESG uplifts and performance

Financials and Technology contributed most to ESG uplifts for FTSE4Good (page 10). While Financials lifted APAC's performance, it hurt in EM. For FTSE4Good US, the underweight in Consumer Discretionary more than compensated for the losses from Tech.

Energy underweight takes biggest toll in the US

UK's underweight to Energy was additive for the first time in 2022, but this was offset by the huge sell-off in Telcos, despite small active weights (page 15). Underweights in Energy were only significant headwinds in the US (page 14).

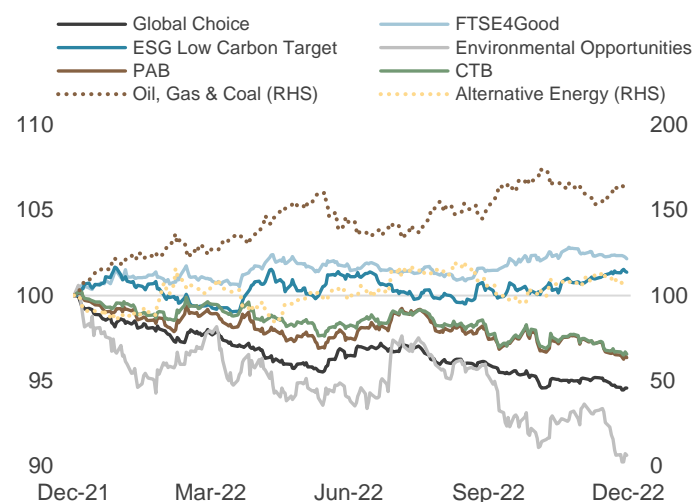
Valuations continue to contract

Forward P/Es for SI indexes in the UK and Japan all trade below their five-year averages, particularly for Environment Opportunities (page 15 and 17). Premiums for EO have narrowed globally, particularly in Japan and APAC.

Telco selloff another swing factor

ESG Low Carbon Target indexes in the UK and Europe were hit hardest by the sharp retreat in Telco stocks in the quarter (page 15 and 16).

Relative performance: Global SI Indexes, FTSE Oil Gas & Coal and FTSE Alternative Energy (LCY %)



Note: Low Carbon covers developed markets.

10.6%

FTSE Europe
3M (TR, LC)

3.0%

FTSE Japan
3M (TR, LC)

15.6%

Oil Gas & Coal Sector
Global 3M (TR, LC)

7.6%

Alternative Energy Sector
Global 3M (TR, LC)

14.4%

FTSE Europe ESG Ops
3M (TR, LC)

-2.2%

FTSE Japan
Environmental Ops 3M

Source: FTSE Russell / Refinitiv. Data as of December 31, 2022.

ESG & Sustainable Index Coverage – as of December 31, 2022*

At FTSE Russell, sustainable investing includes a range of index strategies that aim to provide purpose-driven outcomes aligned with investors' sustainable investment policies. Investors seeking close alignment with the benchmark can choose to apply screens to exclude companies with undesirable features or to overweight those with strong ESG practices. A more concentrated option, Thematic indexes, can help address specific social or environmental issues, and the transition to a greener economy, focusing on particular sectors. These indexes share rules-based selection methodologies and are market-cap weighted.

The FTSE Russell Target exposure methodology is for investors looking to integrate multiple climate-change objectives, such as hedging specific climate risks, into an index, while gaining exposure to potential upsides from rising demand for green products. It is also used to support investor's decarbonization or net-zero strategies, such as European investors' requirement to align with the minimum standards for EU Low Carbon Benchmarks Requirements. We hope this report provides the transparency and investment insights for investors in the sustainable investment universe.



Market-Cap Weighted Indexes

FTSE Global Choice Indexes select companies based on the impact of their products and conduct on society and the environment.

FTSE4Good Indexes include companies with an ESG and climate-change scores above a minimum threshold, with exclusions.

FTSE Environmental Opportunities Indexes include companies that derive at least 20% of their revenue from green products.

Target Exposure Indexes

FTSE ESG Low Carbon Target Exposure Indexes target a 20% uplift in the ESG score ** and a 50% reduction in carbon emissions, controlling for country and ICB industry exposures.

FTSE EU Climate Transition Benchmarks (CTB) target a 30% reduction in carbon emissions, 100% uplift in Green Revenues (70% in Japan) and high climate governance as measured by the Transition Pathway Initiative (TPI)

FTSE Paris Aligned Benchmarks (PAB) target a 50% reduction in carbon emissions, 100% uplift in Green Revenues and high climate governance.

*Please refer to the Appendix 3: Glossary Products and Methodology for a comprehensive list of FTSE Russell SI Index Solutions.

** ESG uplift target is the minimum of a standard deviation of market capitalization averaged index ESG score and a 20% uplift.

Risk and Climate Characteristics – as of December 31, 2022

Key Observations

Sustainable investing encompasses a range of strategies with different investment outcomes. In this section, we summarize the key risk and climate characteristics of the indexes covered in this report. See next page for climate characteristic scores.

Global Choice product category screens filter out fossil fuels, obtaining significant carbon reductions (43% to 60%) except in the UK.

Market-cap weighting the remaining stocks results in a risk profile close to the benchmark, betas around 1 and high diversification. The UK is the most diversified, holding 98% of benchmark stocks, whilst Europe is the least diversified, holding 82% of benchmark stocks and 29.1% more weight in the Top 10 largest stocks (129.1%).

FTSE4Good's best-in-class ESG selection thresholds result in significant ESG uplifts while keeping tracking errors low (around 2.0%), except in EM, where the highest ESG uplift of 27.9% is achieved with a 6.5% tracking error. Europe has the lowest ESG uplift (4.0%) but also one of the highest benchmark scores (3.8 Europe versus 2.7 EM). The climate thresholds improve the TPI Management Quality (MQ) score, up to 39.5% in EM.

Environmental Opportunities selects companies with significant environmental business activities, resulting in large improvements in active green revenues exposure from 34.6 pp in the US to 55.6 pp in the UK. The focus on "greenness" leads to index concentration and higher tracking errors.

ESG Low Carbon Target achieves the targeted 50% carbon reduction across regions and significant ESG uplifts with tracking errors around 2.5% and betas close to 1, except the UK (TE 6.3%, Beta 0.9).

Climate Transition Benchmark (CTB) achieves the targeted 30% reduction in carbon emissions, targeted green revenues uplift and an improved TPI Management Quality (MQ) score. Tracking errors are relatively high in the UK, which is also the least diversified, holding only 46.6% of benchmark stocks, versus 92.3% in Japan. The highest concentration in terms of relative top 10 stock weight is reached in the developed region.

Paris Aligned Benchmark (PAB) achieves the targeted 50% carbon reduction, TPI MQ* uplifts ranging from 9.6% to 37.1%. UK bears the highest tracking error (5.8% p.a.) and the lowest percentage of benchmark stocks, 35.5%.

RISK Characteristics: In green are lower risk (tracking error, beta) and more diversified (high % of stocks in benchmark, low weight in Top 10) indexes; in red are the more risky, concentrated indexes.

Risk	FTSE Russell SI Index	US	UK	Europe	Japan	Asia Pac	Emerging	Developed
Tracking Error	Global Choice	1.9%	1.9%	2.3%		1.2%	1.7%	1.8%
	FTSE4Good	2.2%	1.8%	1.0%	2.5%	2.0%	6.5%	1.6%
	Environmental Ops	8.6%	9.0%	6.3%	6.7%	8.7%		
	ESG Low Carbon Target	2.7%	6.3%	3.0%	2.4%	2.3%	2.5%	2.0%
	Climate Transition BMK		4.6%		1.2%		3.2%	1.6%
	Paris Aligned BMK		5.8%				3.3%	1.8%
Beta	Global Choice	1.0	1.0	1.0		1.0	1.0	1.0
	FTSE4Good	1.0	1.0	1.0	1.0	1.0	0.8	1.0
	Environmental Ops	1.1	0.9	1.1	1.1	1.0		
	ESG Low Carbon Target	1.0	0.9	1.0	1.0	1.0	1.0	1.0
	Climate Transition BMK		1.0		1.0		0.9	1.0
	Paris Aligned BMK		0.9				0.9	1.0
Number of stocks as % of benchmark	Global Choice	82.7%	98.3%	82.0%		87.5%	84.8%	84.8%
	FTSE4Good	42.1%	36.2%	68.5%	42.5%	41.2%	28.9%	48.6%
	Environmental Ops	7.8%	6.8%	12.4%	7.5%	4.8%		
	ESG Low Carbon Target	77.6%	53.3%	53.1%	74.2%	46.6%	52.1%	44.4%
	Climate Transition BMK		46.6%		92.3%		46.8%	45.1%
	Paris Aligned BMK		35.5%				45.1%	43.5%
Weight in Top 10 relative to benchmark	Global Choice	120.3%	100.0%	129.1%		113.4%	108.6%	123.8%
	FTSE4Good	152.3%	122.4%	121.7%	140.6%	129.5%	126.9%	137.5%
	Environmental Ops	304.9%	147.7%	248.7%	313.7%	322.2%		
	ESG Low Carbon Target	169.9%	150.2%	194.7%	172.1%	155.1%	137.3%	186.5%
	Climate Transition BMK		118.8%		137.0%		114.3%	155.4%
	Paris Aligned BMK		118.3%				116.3%	160.0%

Note: Tracking error and Beta calculations are based on five-years of daily data, all other calculations are 12-month averages.

Risk and Climate Characteristics – as of December 31, 2022

Climate Characteristics: In green are indexes achieving the highest uplift relative to the benchmark in the E,S,G and ESG Score, Green Revenues, TPI MQ and the largest carbon reduction. These reflect the different objectives embedded in the indexes.

Climate	FTSE Russell SI Index	US	UK	Europe	Japan	Asia Pac	Emerging	Developed
Active E score	Global Choice	1.7%	0.1%	-5.0%		-1.7%	-3.6%	-0.3%
	FTSE4Good	19.8%	11.4%	5.3%	17.1%	14.2%	34.9%	16.1%
	Environmental Ops	33.0%	-23.9%	0.7%	1.7%	38.9%		
	ESG Low Carbon Target	27.0%	20.5%	23.9%	19.8%	23.9%	21.7%	27.3%
	Climate Transition BMK		9.9%		8.0%		24.1%	12.1%
	Paris Aligned BMK		10.4%				23.8%	12.2%
Active S score	Global Choice	2.9%	-0.7%	-1.3%		-1.0%	-0.5%	1.1%
	FTSE4Good	13.0%	10.2%	4.5%	17.3%	14.7%	31.3%	12.3%
	Environmental Ops	12.9%	-17.4%	-4.9%	-9.2%	31.4%		
	ESG Low Carbon Target	19.5%	11.1%	14.1%	20.0%	20.7%	22.2%	18.7%
	Climate Transition BMK		1.0%		5.4%		17.9%	6.3%
	Paris Aligned BMK		1.9%				18.7%	6.9%
Active G score	Global Choice	-0.2%	-0.3%	-2.4%		-1.6%	0.2%	-1.2%
	FTSE4Good	4.7%	8.5%	2.3%	10.9%	10.3%	16.8%	5.9%
	Environmental Ops	9.8%	-8.0%	-1.9%	-4.8%	14.2%		
	ESG Low Carbon Target	10.2%	2.1%	5.5%	13.0%	9.6%	10.3%	9.4%
	Climate Transition BMK		-0.4%		2.6%		11.3%	1.6%
	Paris Aligned BMK		-1.1%				11.3%	1.4%
Active ESG score	Global Choice	1.5%	-0.6%	-2.7%		-1.3%	-0.8%	0.0%
	FTSE4Good	12.3%	10.0%	4.0%	15.0%	13.1%	26.3%	11.3%
	Environmental Ops	17.3%	-16.9%	-2.8%	-4.4%	25.5%		
	ESG Low Carbon Target	18.6%	10.2%	13.9%	17.6%	17.4%	17.4%	18.2%
	Climate Transition BMK		2.5%		5.3%		16.4%	6.3%
	Paris Aligned BMK		2.7%				16.6%	6.5%
Carbon Reduction	Global Choice	-60.6%	4.4%	-53.6%		-49.7%	-43.6%	-57.8%
	FTSE4Good	-39.4%	9.2%	-0.5%	5.9%	-7.4%	11.7%	-26.1%
	Environmental Ops	55.6%	-15.8%	78.1%	54.3%	56.7%	0.0%	
	ESG Low Carbon Target	-51.5%	-59.7%	-53.0%	-47.2%	-52.2%	-52.3%	-52.6%
	Climate Transition BMK		-47.3%		-42.5%		-50.6%	-39.9%
	Paris Aligned BMK		-67.1%				-64.4%	-59.5%
Active Green Revenues	Global Choice	0.22	0.20	-1.19		-0.52	0.45	0.00
	FTSE4Good	-0.71	-0.29	0.03	-1.17	-0.98	2.14	-0.62
	Environmental Ops	34.56	55.60	35.88	41.98	38.65		
	ESG Low Carbon Target	-0.76	0.28	2.23	-0.44	0.86	0.99	0.00
	Climate Transition BMK		3.53		5.67		5.73	4.91
	Paris Aligned BMK		6.18				5.38	4.50
Active TPI Management Quality Score	Global Choice	-1.2%	1.1%	-6.7%		-3.9%	-5.7%	-3.0%
	FTSE4Good	13.9%	7.6%	4.4%	15.7%	16.4%	39.5%	12.5%
	Environmental Ops	16.8%	-17.1%	-1.6%	7.5%	32.9%		
	ESG Low Carbon Target	16.8%	2.6%	11.5%	16.4%	22.7%	23.0%	16.0%
	Climate Transition BMK		13.6%		9.5%		37.4%	13.4%
	Paris Aligned BMK		9.6%				37.1%	13.0%

Note: All calculations are 12-month averages.

TPI MQ is the TPI Management Quality score. Carbon reductions are normalized by revenues except for the CTB and PAB benchmarks, where European law requires normalization by EVIC. ESG Low Carbon Target index series target the minimum of a standard deviation of market

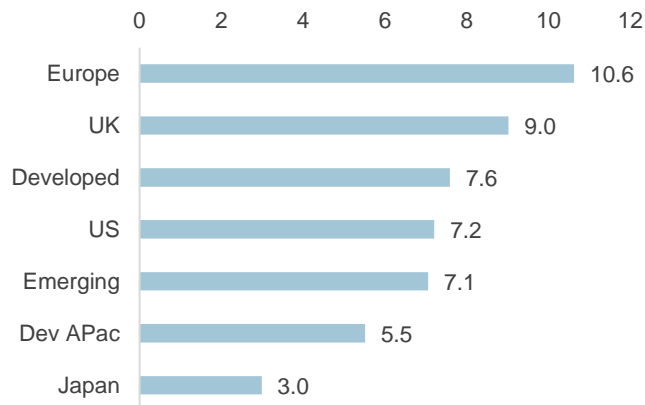
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Absolute Returns – 3M & 12M (TR, LC %) as of December 31, 2022

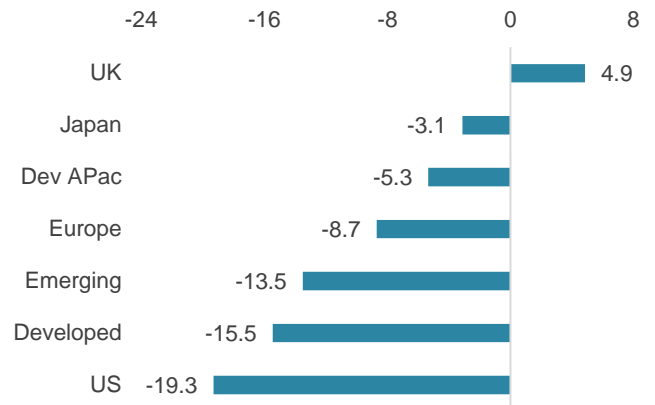
Key Observations

The last quarter of 2022 saw a general recovery of equity markets across the board. Although central banks maintained a strong stance against inflation, better-than-expected CPI readings and a tight labour market raised investors' hopes for a soft landing. Europe led the way with a 10.6% gain in Q4, helped by strong fundamentals. Japan ranked at the bottom, with a 3% gain, though it held up better than most of its global peers for the full year. The UK benefited from its large Energy exposure in 2022.

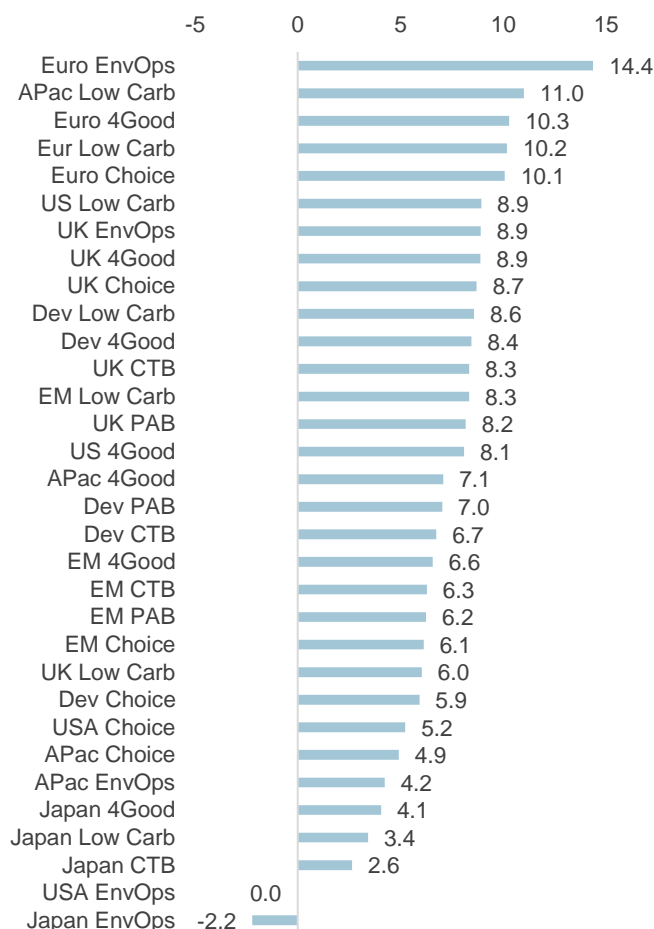
Regional 3M Absolute Returns (LC %). Europe led performance in Q4, helped by stronger fundamentals.



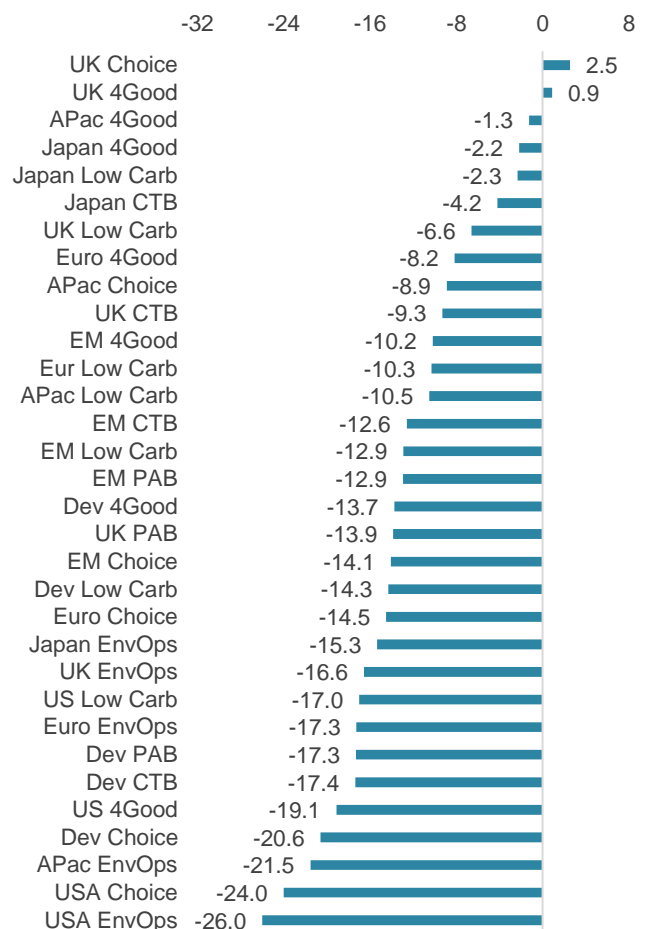
Regional 12M Absolute Returns (LC %). Value rotation and tech exposure hurt US in 2022. Only UK posted gains.



SI Index 3M Absolute Returns (LC %). High correlation of Japan SI indexes to the benchmark hurt performance in Q4.



SI Index 12M Absolute Returns (LC %). FTSE4Good held up in most regions, except in the US, whilst EO struggled.



The regional Indexes above are: FTSE USA, FTSE UK, FTSE Developed Europe, FTSE Japan, FTSE Developed Asia-Pacific and FTSE Emerging Markets. Benchmarks for the listed SI Indexes may vary. Appendix 1 shows the appropriate benchmark and market-cap coverage for the SI Indexes covered in this report.

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Global View - SI Index Macro Insights – Q4 2022

Q4 performance shows most divergence between underperforming EO (-5.21%) and outperforming FTSE 4Good (+0.74%) and ESG low Carbon Target (+0.98%). This is surprising given the typical outperformance of the higher-beta EO in up markets. One explanation is their sensitivity to changes in the economic cycle. Green-tech-focused EO is positively correlated to returns of the Alternative Energy sector (Chart 2), but negatively so to moves in long bond yields (Chart 5). FTSE4Good and ESG Low Carbon show the reverse pattern. Alternative Energy and bond yields ended the quarter flat. The main driver behind EO's losses are its large exposure to Technology stocks, particularly in the US.

Global SI indexes active returns and climate statistics (TR, LC%)

FTSE Russell SI Index	Active Return Q4	Active ESG Score	Carbon Reduction	Active Green Revenues	Active TPI Score	WTI Crude Return Q4	Alternative Energy Return Q4	US 10Y Yield Change Q4
Global Choice	-1.53%	-0.1%	-54.7%	0.05	-3.3%			
FTSE4Good	0.74%	12.7%	-20.5%	-0.37	14.7%			
Environmental Ops	-5.21%	13.5%	56.7%	36.46	15.8%	0.4%	7.6%	0.030
ESG Low Carbon Target *	0.98%	18.2%	-52.6%	0.00	16.0%			
Climate Transition BMK	-1.21%	7.6%	-37.5%	5.83	16.3%			
Paris Aligned BMK	-1.18%	8.2%	-59.6%	5.60	16.2%			

Note: Low Carb covers developed markets. For the relevant benchmarks please refer to Appendix 1.

Chart 1: WTI Crude Oil Performance Oil price fell 0.4% in Q4

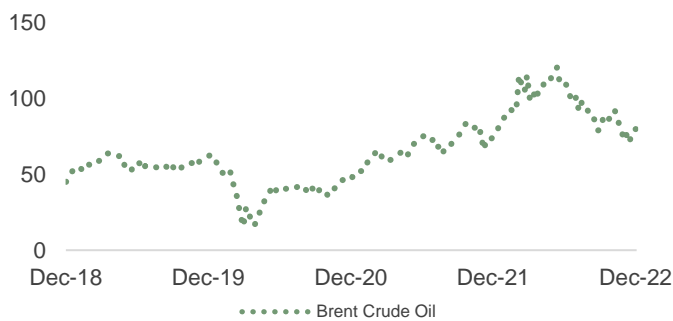


Chart 2: Correlations to shifts in Crude Oil prices. Oil price sell-off supports SI indices

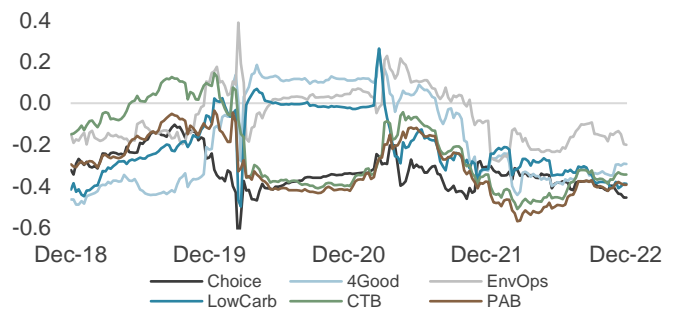


Chart 3: FTSE Alternative Energy sector relative Performance outperformed 0.1% in Q4

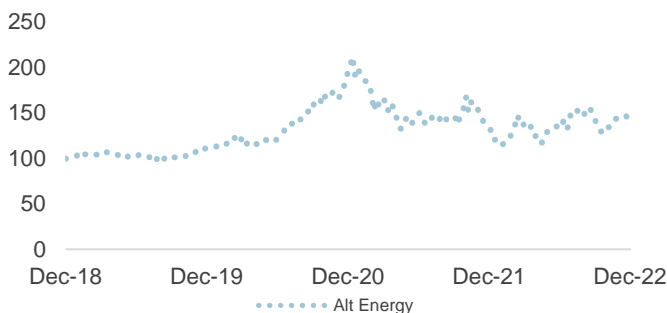


Chart 4: Correlations to shifts in Alternative Energy sector. Alternative energy affects SI strategies differently.

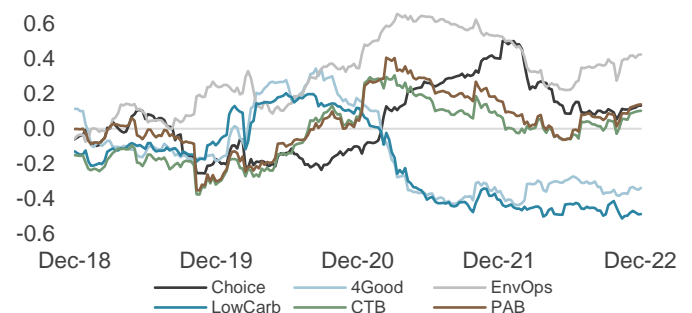


Chart 5: US 10-Year Treasury Yield increased sharply for most of 2022 but eased in Q4.

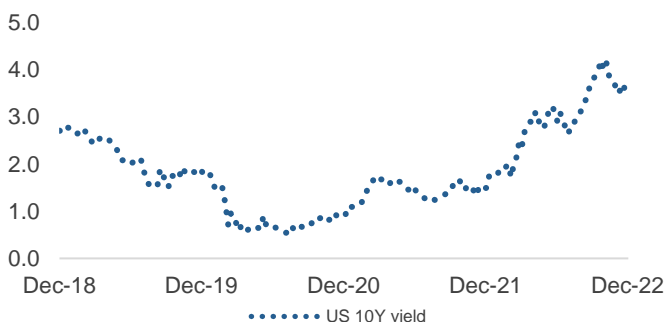


Chart 6: Correlations to US 10-Year Yields: FTSE4Good and ESG Low Carbon Target respond positively to rising yields.

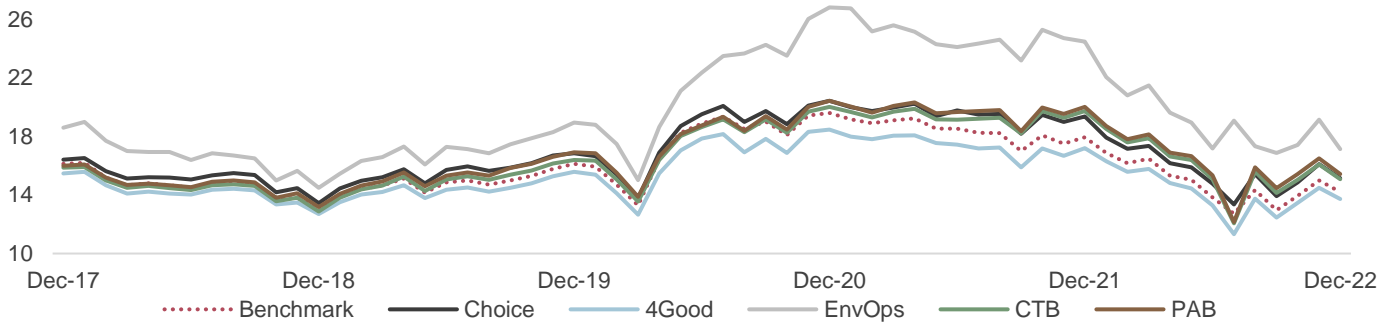


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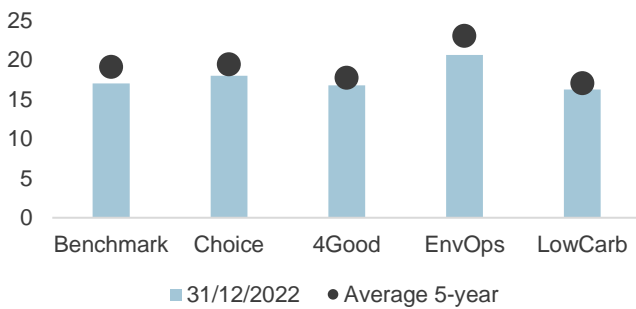
Global View – SI Index Valuation Insights – Q4 2022

Forward 12-month P/Es contracted across SI strategies in 2022 as markets sold off, with some recovery in Q4. EO's relative premium has contracted significantly from 2020 peak. The US benchmark and SI indexes continue to be the most expensive, despite the brutal 2022 sell-off. Both the benchmark and SI indexes in Japan, Europe and the UK trade well below their five-year average, with the largest discounts observed for Environmental Opportunities. The SI indexes in the UK and Japan remain the least expensive, despite the relative resilience of those two markets in 2022.

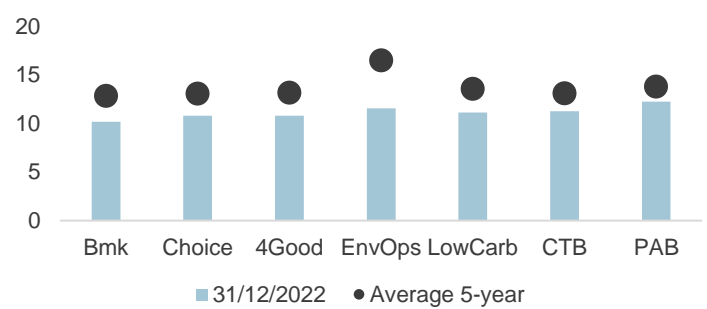
Global Markets—12-month forward factor P/E ratios



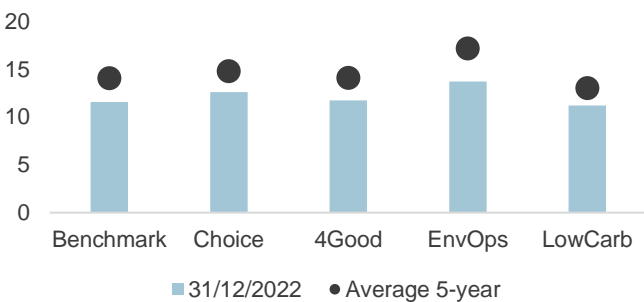
US - 12-month forward P/E vs history



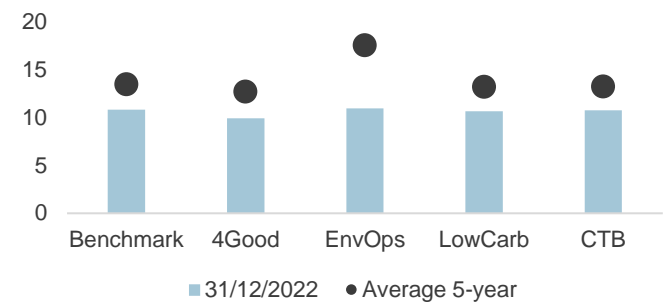
UK - 12-month forward P/E vs history



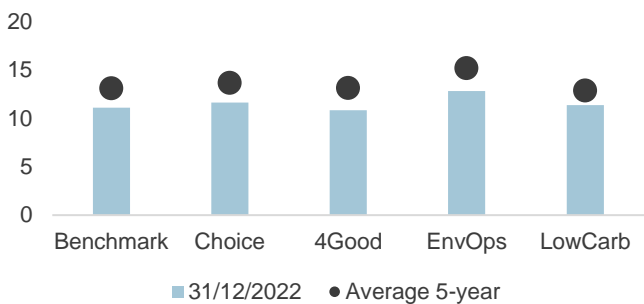
Europe - 12-month forward P/E vs history



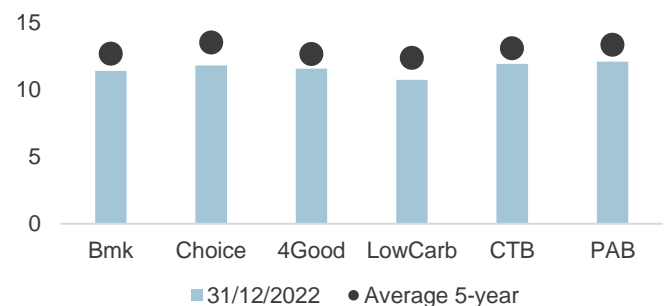
Japan - 12-month forward P/E vs history



APAC - 12-month forward P/E vs history



EM - 12-month forward P/E vs history



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Macroeconomic Backdrop

Key Observations

Sectoral effects remained significant in Q4. Headwinds from Energy underweights continued to take a major toll in the US but had limited impact elsewhere and positive in the UK. The Tech overweight broadly detracted in the US, but added in APAC. Underweights in Financials hurt globally, particularly for EO. Overweights in Telcos were a significant drag in the UK and EM.

FTSE Global Environmental Opportunities lost ground in Q4, but all the major EO sector indices outperformed. Water Technology took the lead, outperforming the Global EO index by 8.8 percentage points. Renewable & Alternative Energy and Energy Efficiency followed, with respective excess returns of 4.4% and 4.1%.

The turmoil triggered by the release of the UK mini-budget wreaked havoc for UK markets and most UK SI strategies (Chart 2). Only FTSE4Good and Global Choice held up. In Q4, gilt yields recovered, but the UK SI indexes mostly ended the quarter flat, except for ESG Low Carbon Target, which fell 3% (see page 15).

A sharp rise in Japanese bond yields posed a headwind for green-tech-focused EO, whilst the other strategies moved sideways.

In Europe, Environmental Opportunities partially recovered from the heavy losses incurred during the first half of 2022, as oil prices fell over the quarter.

Chart 1: EO indexes bounced back globally in Q4, particularly Water Technology.

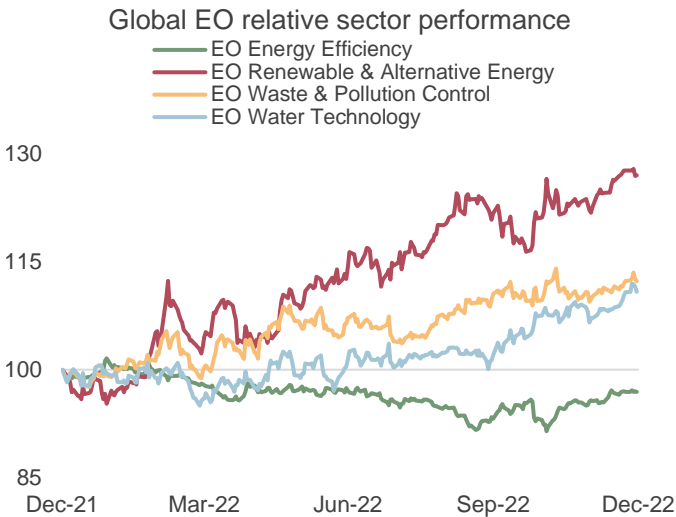


Chart 2: UK mini-budget turmoil did not affect the relative performances of SI strategies, which were stable in Q4.

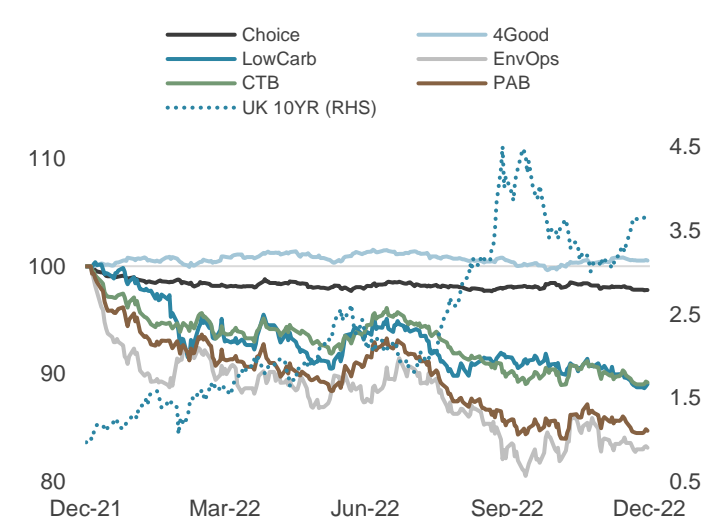


Chart 3: In Japan, rising 10-year JGB yields hurt growth-focused EO in Q4.

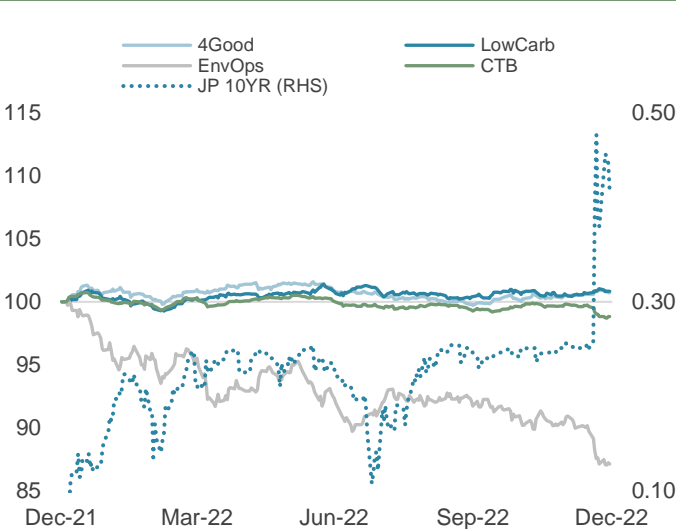
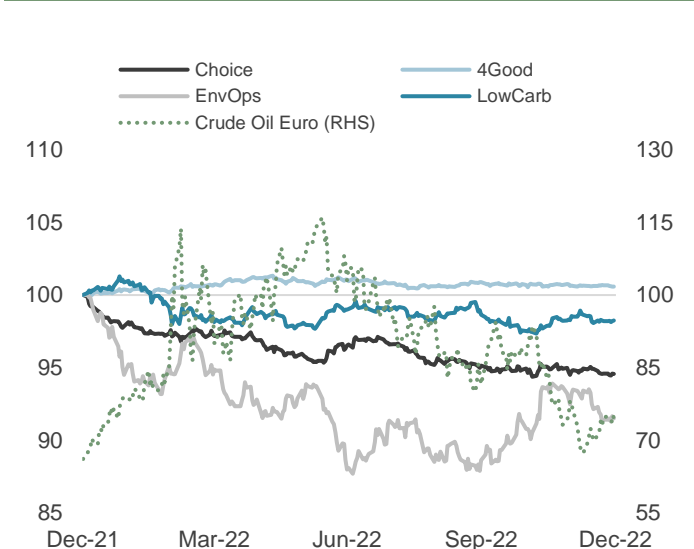


Chart 4: In Europe, lower oil prices helped EO and Low Carbon strategies in Q4.



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FTSE Global Choice Indexes – Q4 2022

Global Choice underperformed their benchmarks across all regions in Q4. The weakest performance was recorded in the US (-2%), which dragged down the developed-market returns as well. The underweight in outperforming Energy and overweight in loss-ridden Technology created the perfect storm for US Global Choice. UK Global Choice, which does not exclude energy companies, was the best performer (-0.3%), followed closely by APAC (-0.5%). Global Choice applies screens, excluding among others fossil fuels producing companies. All but the UK achieved substantial carbon reductions, especially from Utilities, followed by Energy and Basic Materials (Chart 4). The EM benchmark carbon emissions (Chart 2) are high relative to the other regions.

Chart 1: Active Performance (TR, LC %)

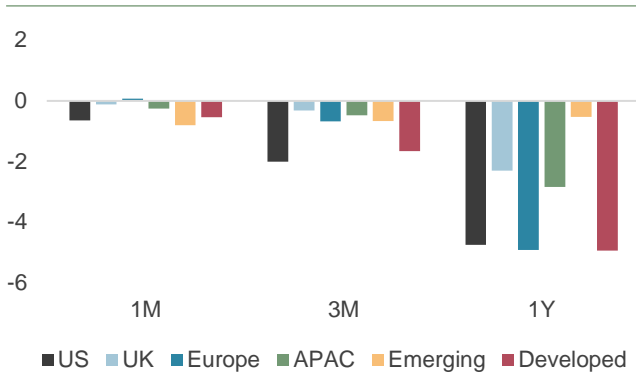


Chart 2: Benchmark Carbon Emissions / Revenues

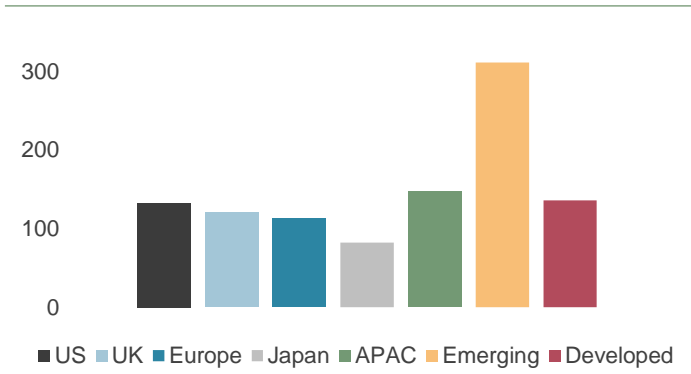


Chart 3: Contribution to ESG Uplift (%)

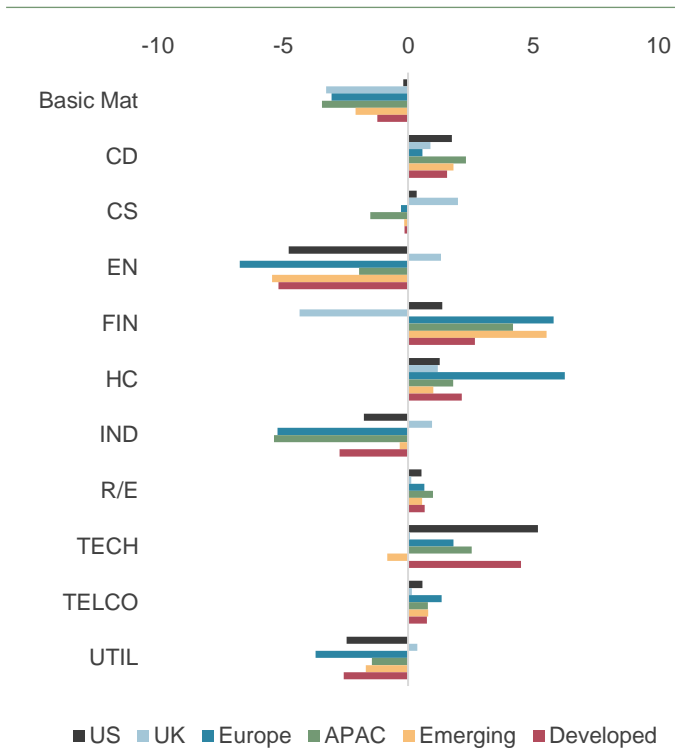


Chart 4: Contribution to Carbon Reduction (%)

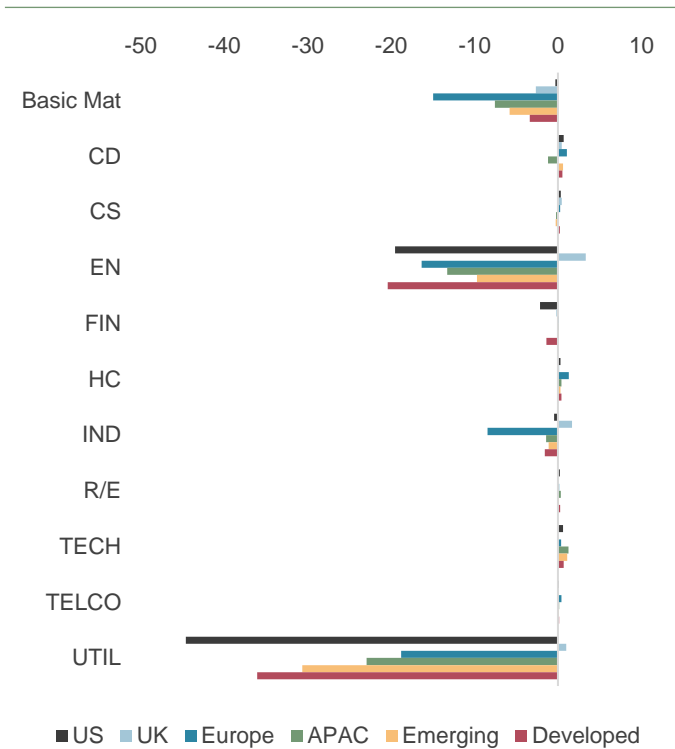
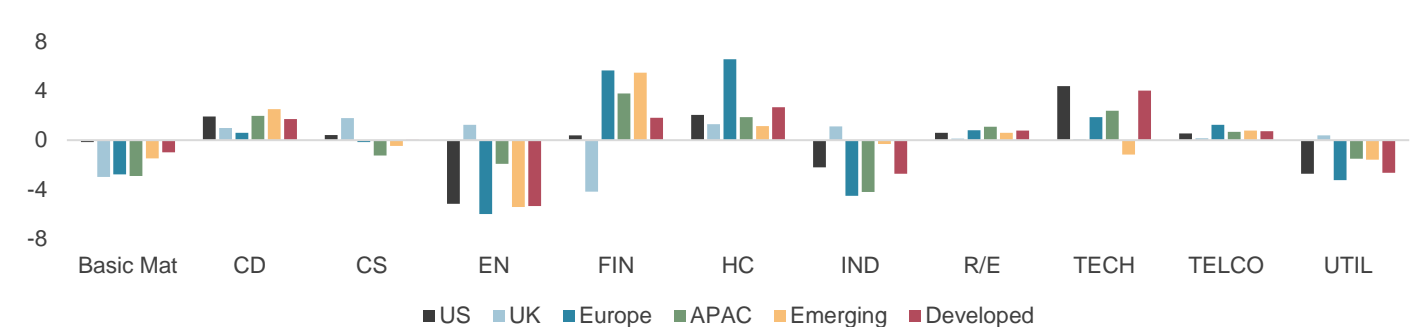


Chart 5: Active Industry Weights (%)



Source: FTSE Russell/Refinitiv. All data as of December 31, 2022. Past performance is no guarantee of future results. This report should not be considered "research" for the purposes of MIFID II. Please see the end for important legal disclosures. Results in this report are for research / illustrative purposes and do not represent the official performance of the indexes.

FTSE4Good Indexes – Q4 2022

FTSE4Good indexes modestly outperformed in Q4, except in Europe and EM, which slightly lagged. The underweight in Technology and overweight in Financials were additive in APAC (1.6%), while the overweight in Financials detracted in EM (-0.5%). The applied threshold for minimum ESG standards resulted in substantial ESG uplifts (see page 4), and industry contributions were dominated by Financials and Technology (Chart 3). Minimum climate standards resulted in uplifts in the TPI Management Quality score across regions, again with large contributions from Financials and Technology (Chart 4).

Chart 1: Active performance (TR, LC %)

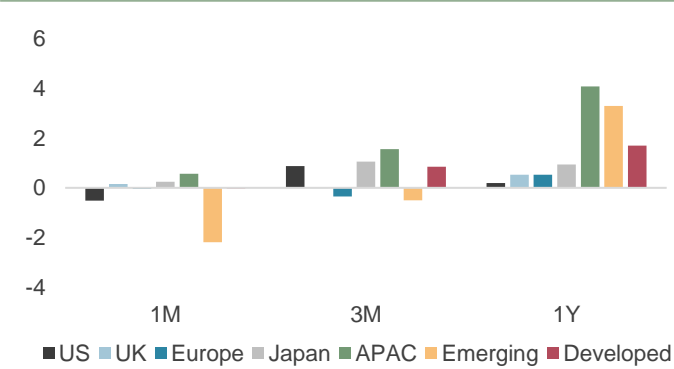


Chart 2: Benchmark ESG Scores

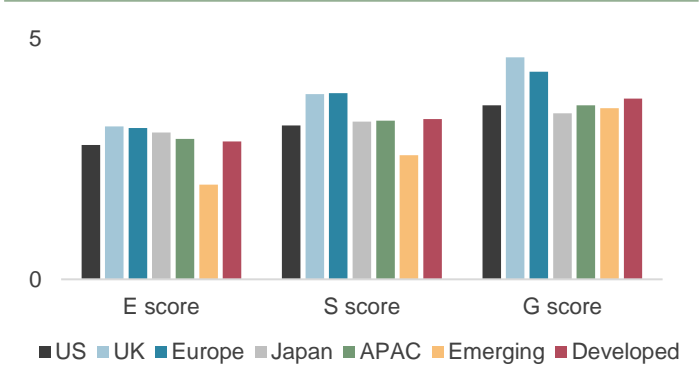


Chart 3: Contribution to ESG Uplift (%)

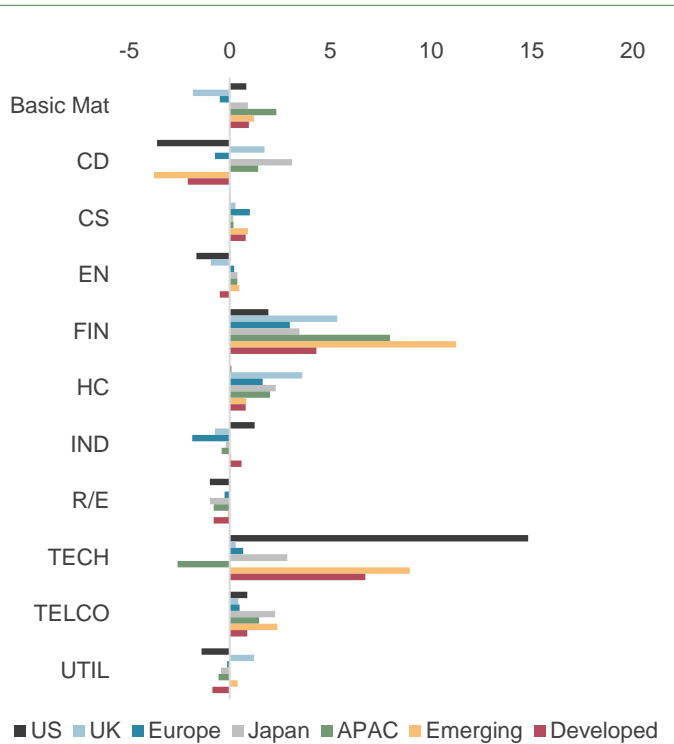


Chart 4: Contribution to TPI Management Quality uplift (%)

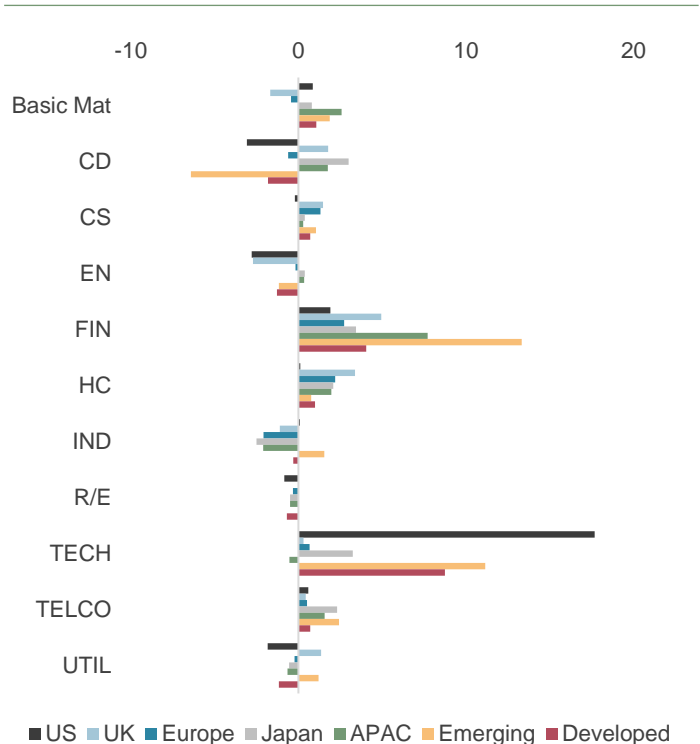
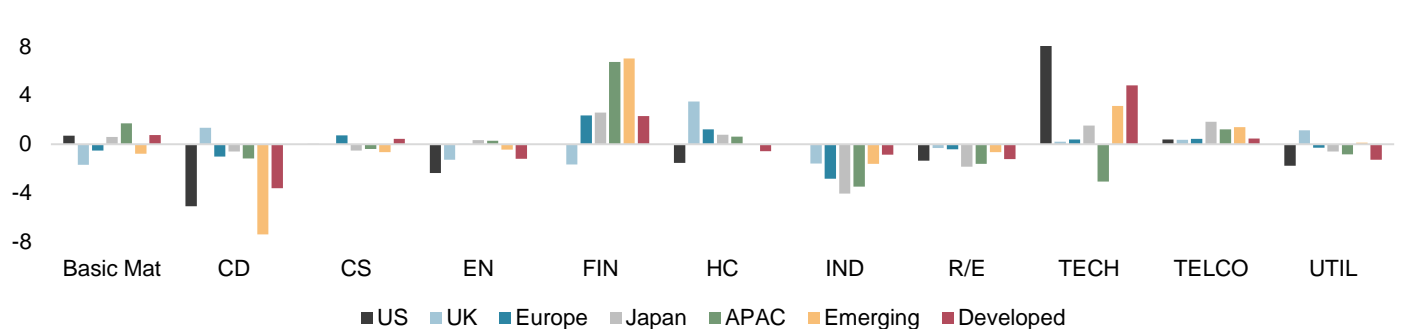


Chart 5: Active Industry Weights (%)



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FTSE Environmental Opportunities Indexes – Q4 2022

EO Indexes kept losing ground in Q4, except in Europe (3.6% excess return), where the large overweight in Industrial was the biggest positive contributor. The US lagged the most (-7.2%), mainly driven by another dire quarter for US Tech stocks. Green-revenue selection thresholds (20% or more) result in significant index concentration (see page 3) and large active weights (Chart 5) in Industrials, Technology & Utilities. Large green revenues uplifts (page 3) were broad-based in the US, but more concentrated in Financials & Utilities in the UK, in Industrials in the UK, Japan and Europe and in Technology in APAC (Chart 4).

Chart 1: Active Performance (TR, LC %)

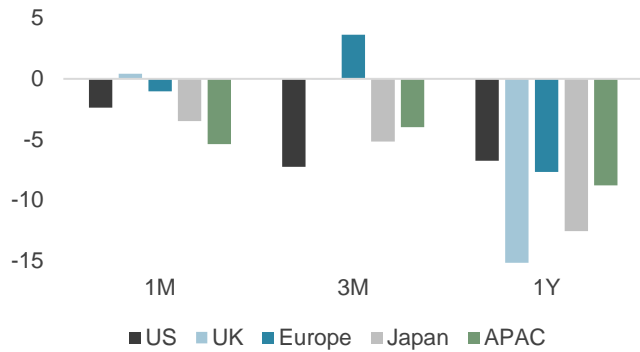


Chart 2: Benchmark Green Revenues Scores

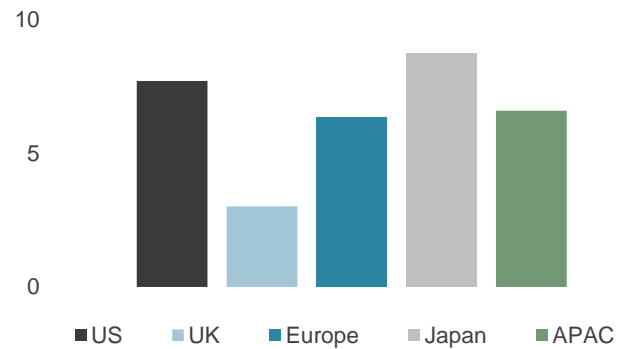


Chart 3: Contribution to ESG Uplift (%)

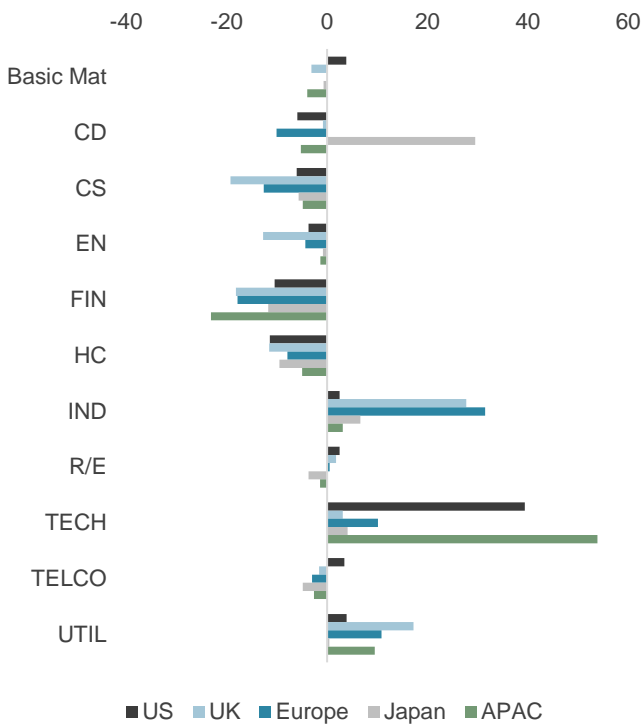


Chart 4: Contribution to Green Revenues Uplift (%)

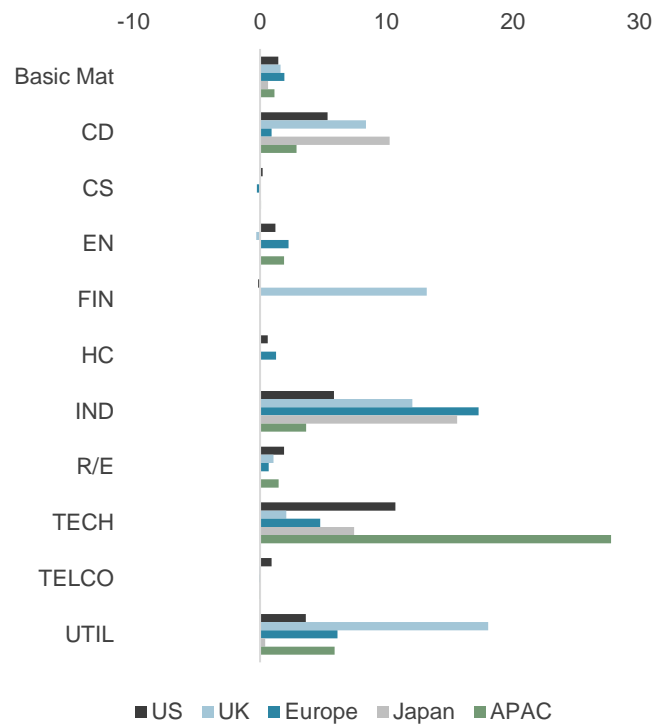
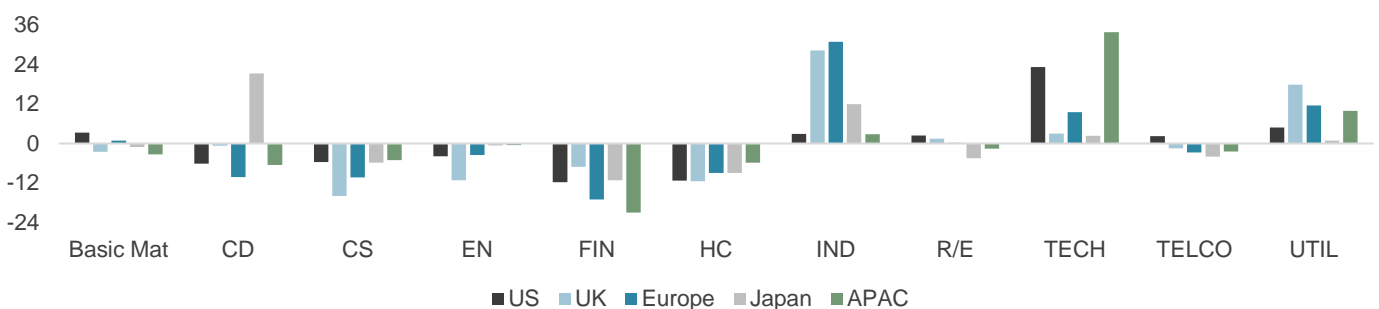


Chart 5: Active Industry Weights (%)



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FTSE ESG Low Carbon Target Exposure Indexes – Q4 2022

FTSE ESG Low Carbon lost value in the UK and Europe, but outperformed in all the other regions, with APAC ranking as the best performer (2.5%) and the UK the worst (-3%). The latter was hurt most by its large exposure to sell-offs in Telecom and Consumer Staples. Industry contributions to the targeted 20% uplift in ESG scores were relatively broad-based, with Financials playing the largest role. The targeted 50% carbon reduction was also broadly achieved, reflecting re-weightings to companies in carbon-intensive industries – i.e., Energy, Basic Materials, Industrials and Utilities.

Chart 1: Active Performance (TR, LC %)

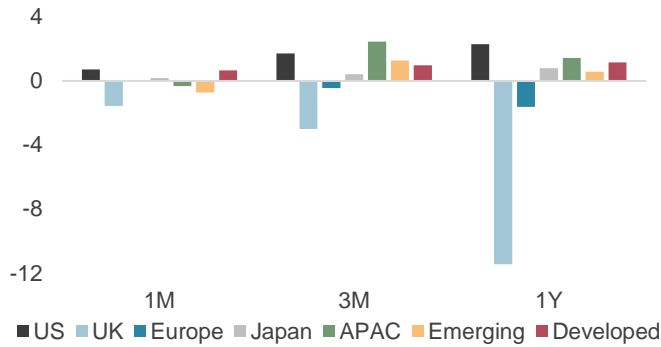


Chart 2: Benchmark Carbon Intensity/Revenues Scores

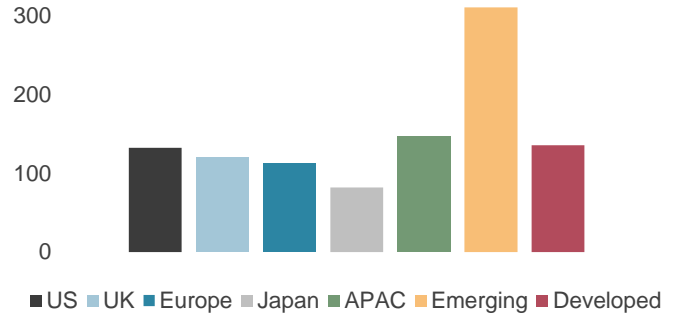


Chart 3: Contribution to ESG Uplift (%)

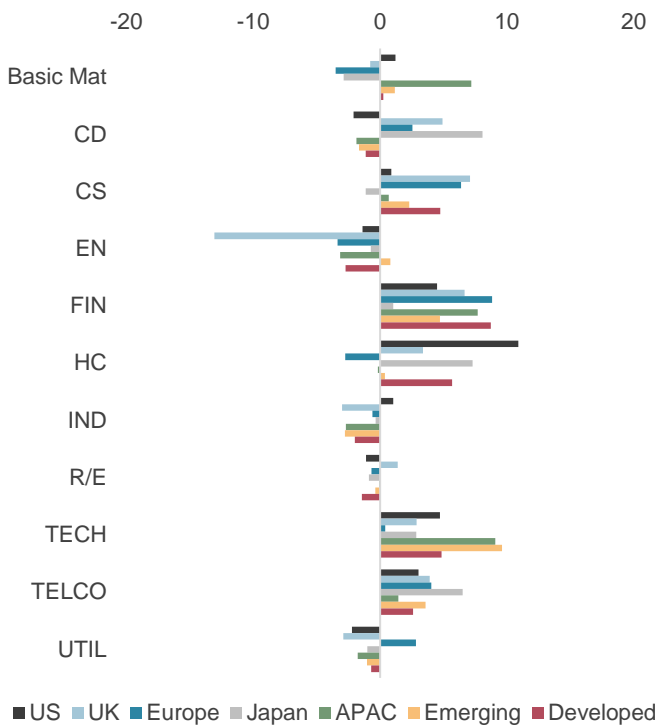


Chart 4: Contribution to Carbon Reduction (%)

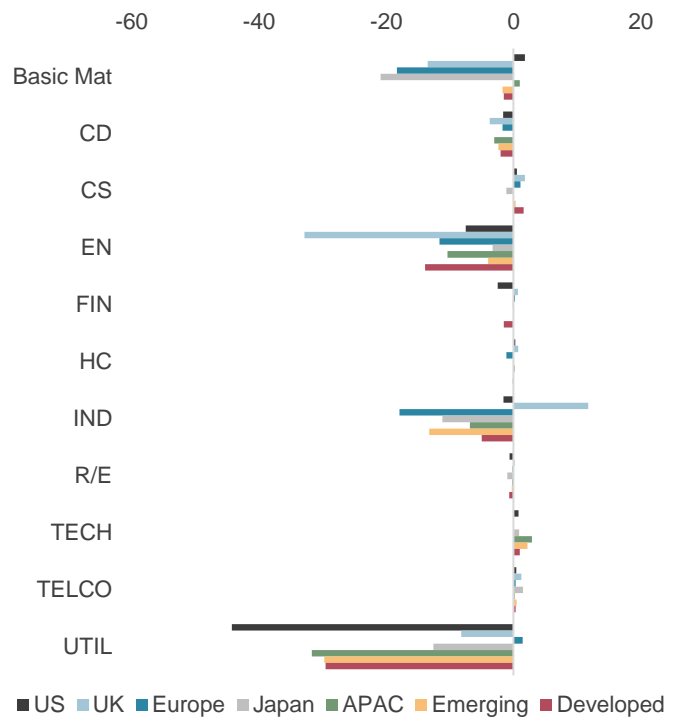
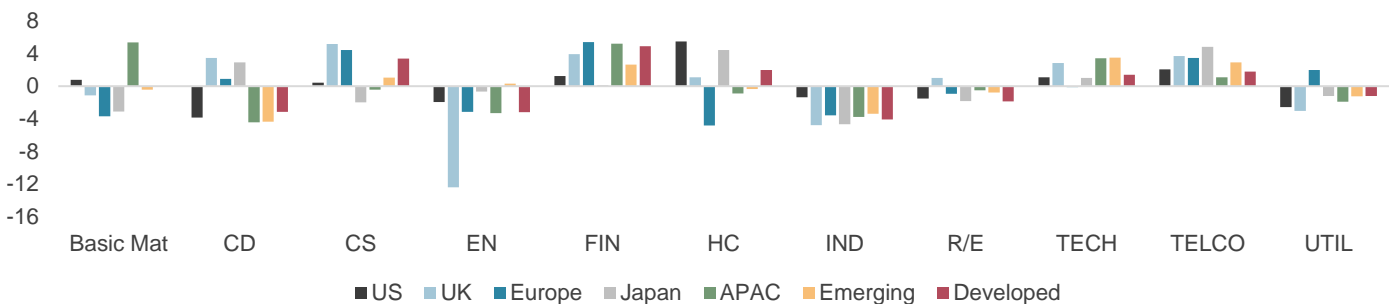


Chart 5: Active Industry Weights (%)



Source: FTSE Russell/Refinitiv. All data as of December 31, 2022. Past performance is no guarantee of future results. This report should not be considered "research" for the purposes of MIFID II. Please see the end for important legal disclosures. Results in this report are for research / illustrative purposes and do not represent the official performance of the indexes.

FTSE EU Climate Benchmark Indexes – Q4 2022

Performance for the EU Climate benchmark indexes was mildly negative in Q4 across regions. The UK performed the worst, with PAB trailing the benchmark by 1.1%, contributing to an already feeble performance in 2022. The large underweight in Energy detracted from UK returns early in 2022, while the high exposure to Technology was responsible for the more recent loss. PAB's more aggressive 50% carbon-reduction target, relative to CTB's 30%, required larger active bets in Materials & Energy (Chart 5). Green revenues uplifts (see page 4) can be attributed to Industrials, Technology and, in particular to the UK, Consumer Discretionary, Utilities and Telecoms (Chart 3).

Chart 1: Active Performance (TR, LC %)

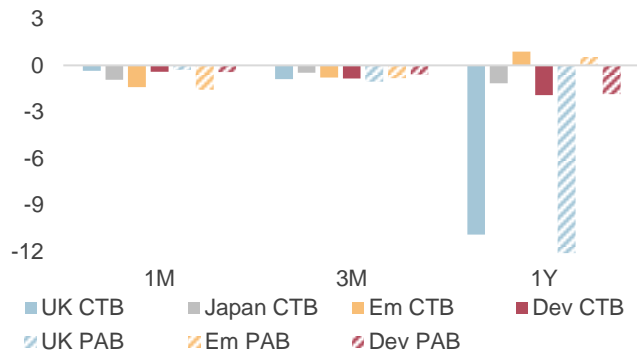


Chart 2: Active TPI Management Quality Score

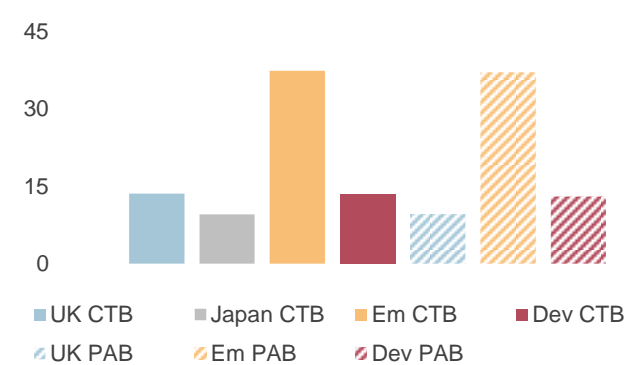


Chart 3: Contribution to Green Revenues Uplift (%)

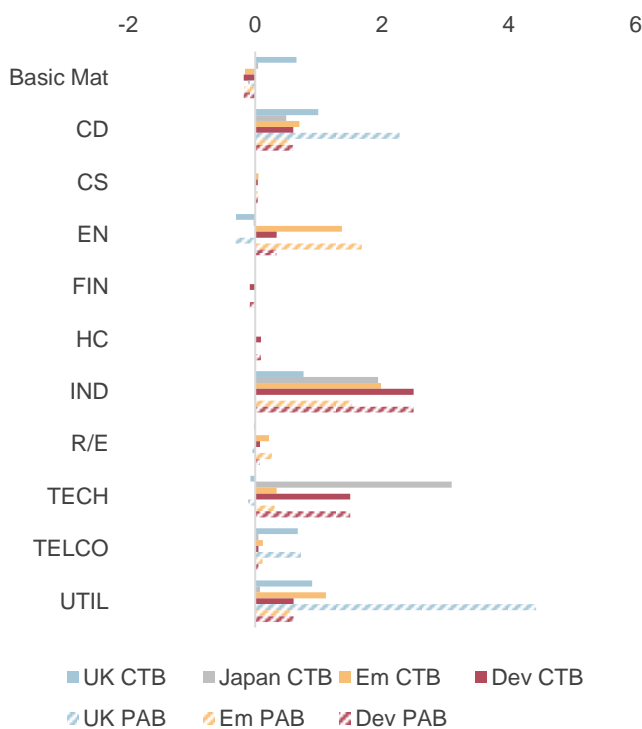


Chart 4: Contribution to Carbon Reduction (%)

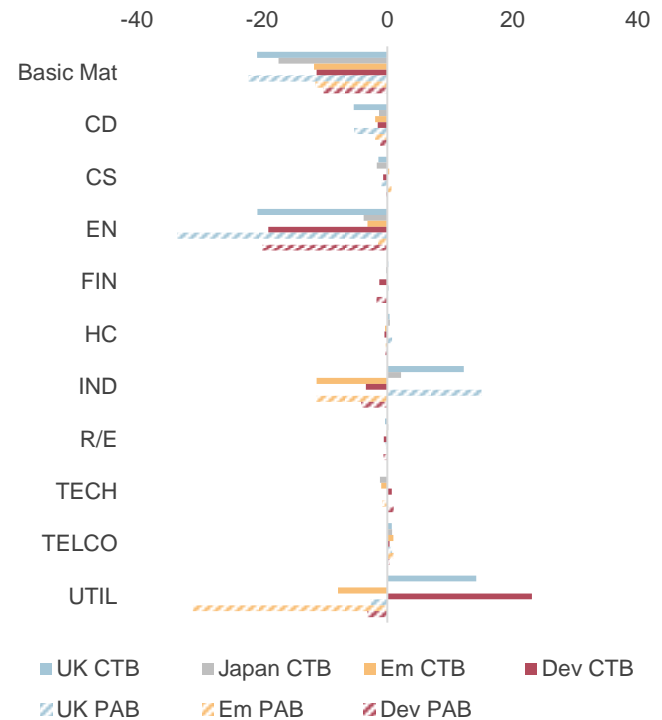
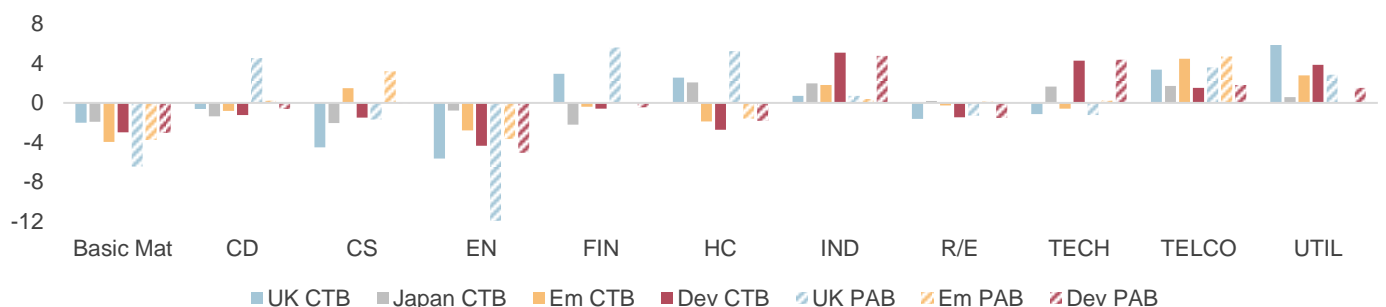


Chart 5: Active Industry Weights (%)



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US Index Comparisons – Q4 2022

US SI strategies performance was mixed in Q4. The ESG Low Carbon index outperformed 1.7% (Chart 1), driven by its overweight in Health Care and underweight in Consumer Discretionary (Chart 3 and 4). Large overweight in Technology and underweights In Financials and Healthcare posed headwind for EO, lagging the benchmark by 7.2%. Relative forward P/E's for the US SI indexes trade close to their five-year averages (Chart 5, left). Despite its sharp sell-off, EO is still trading at a premium relative to the broad-market benchmark (Chart 5, right). ESG Low Carbon Target, the cheapest US SI strategy, trades at a small discount.

Chart 1: Active Performance (LC %)

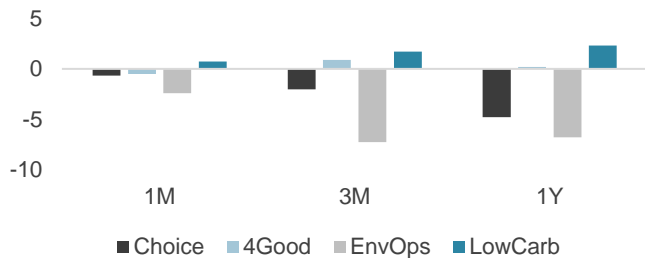


Chart 2: Index tracking error (%)

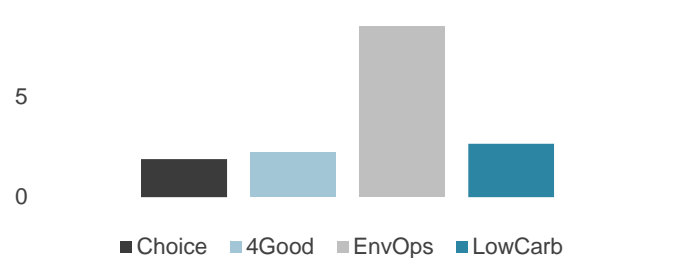


Chart 3: Active Industry weights (%)

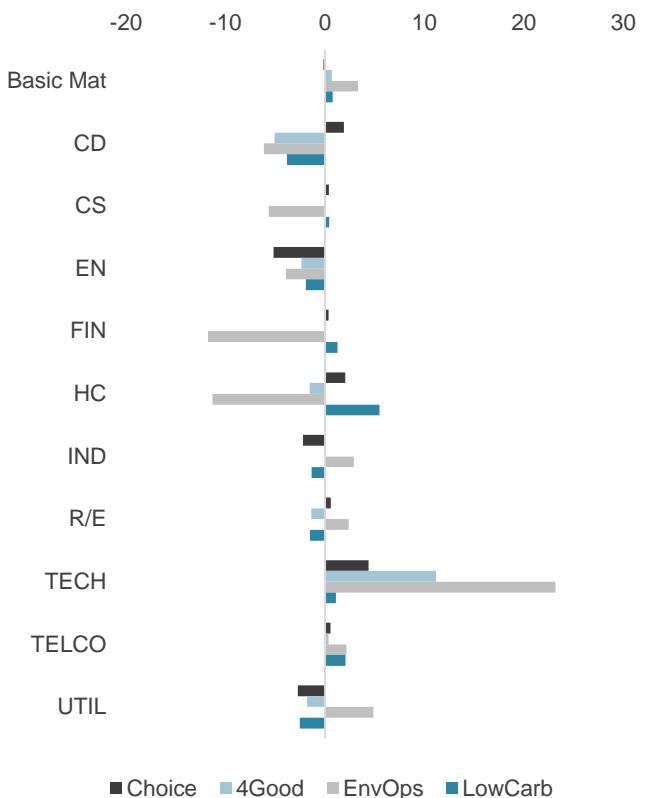


Chart 4: Industry allocation effect - 3M (LC %)

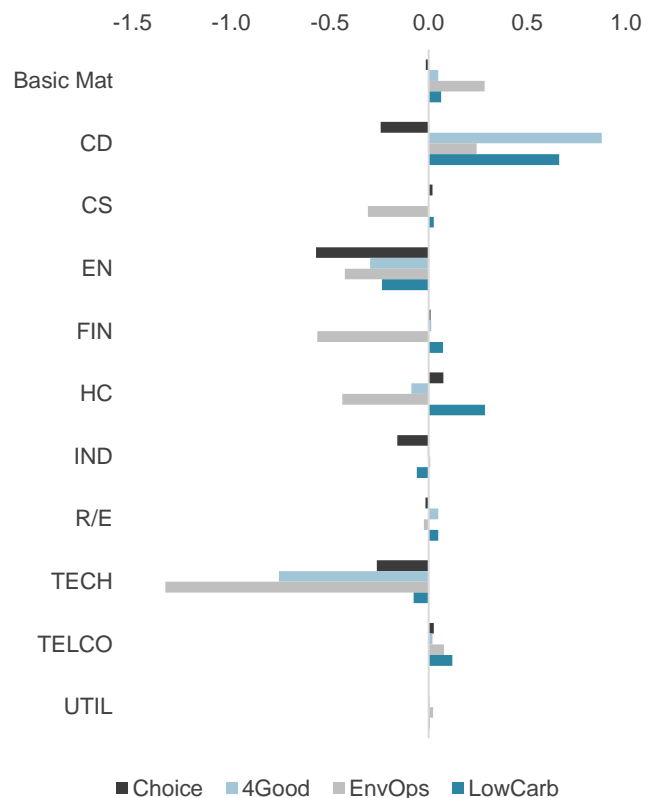
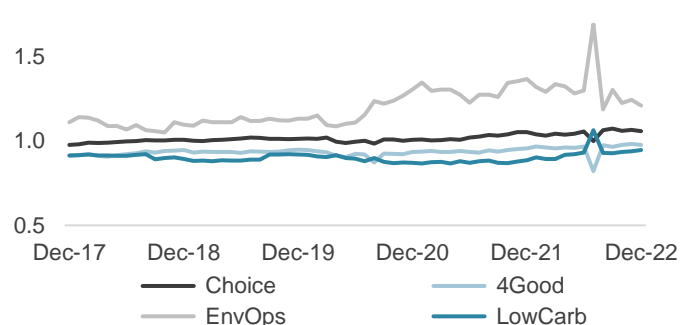
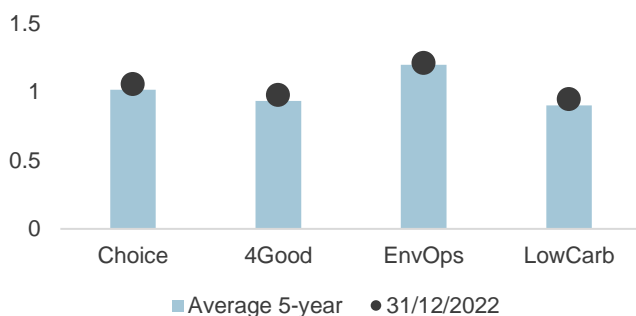


Chart 5: US Indexes relative valuations Latest 12-month forward P/E relative to 5-year average



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UK Index Comparisons – Q4 2022

The structural underweight in Energy across the UK SI indexes was additive in Q4, for the first time this year, leading to broadly flat performance for the quarter, with the exception of ESG Low Carbon Target (-3%). With the sharp Telcos sell-off, the small overweights to that industry in ESG Low Carbon, CTB, PAB hurt performance, with further headwind for ESG Low Carbon from an overweight in Consumer Staples. The UK SI strategies trade broadly around their five-year relative forward P/Es (Chart 5), with EO slightly below. The EO premium shrank considerably in 2022, bringing it in line with those of the other SI strategies.

Chart 1: Active Performance (LC %)

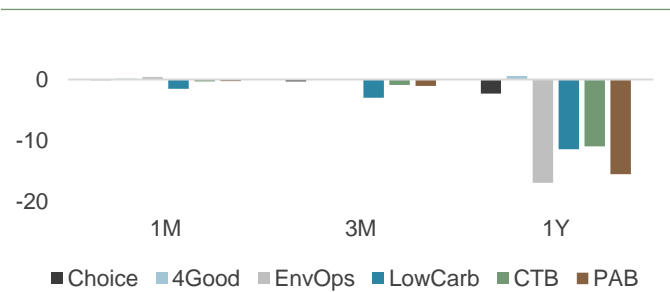


Chart 2: Index Betas

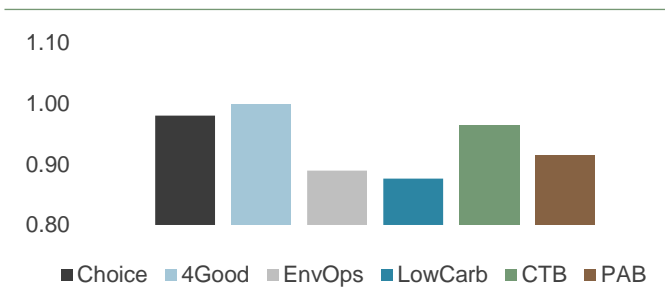


Chart 3: Active Industry weights (%)

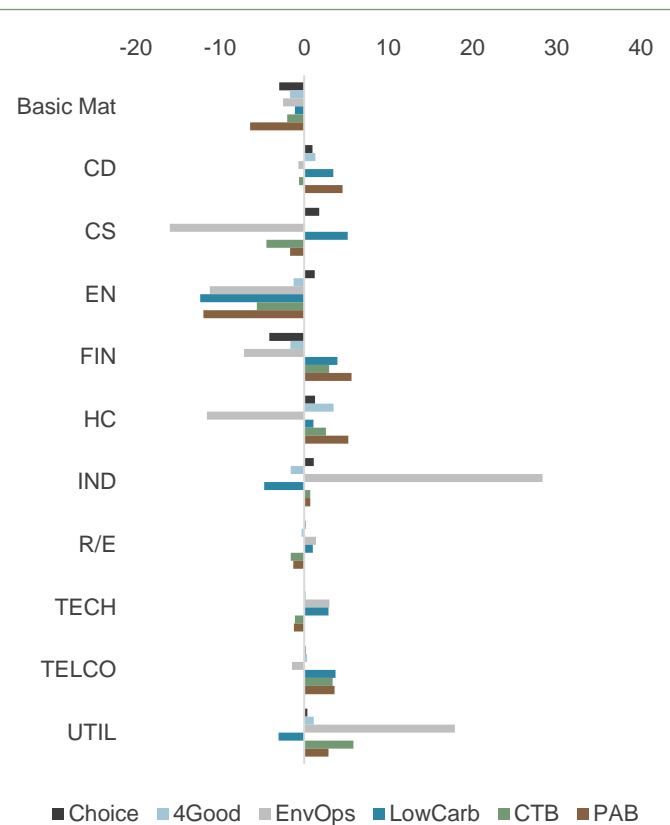


Chart 4: Industry allocation effect - 3M (LC %)

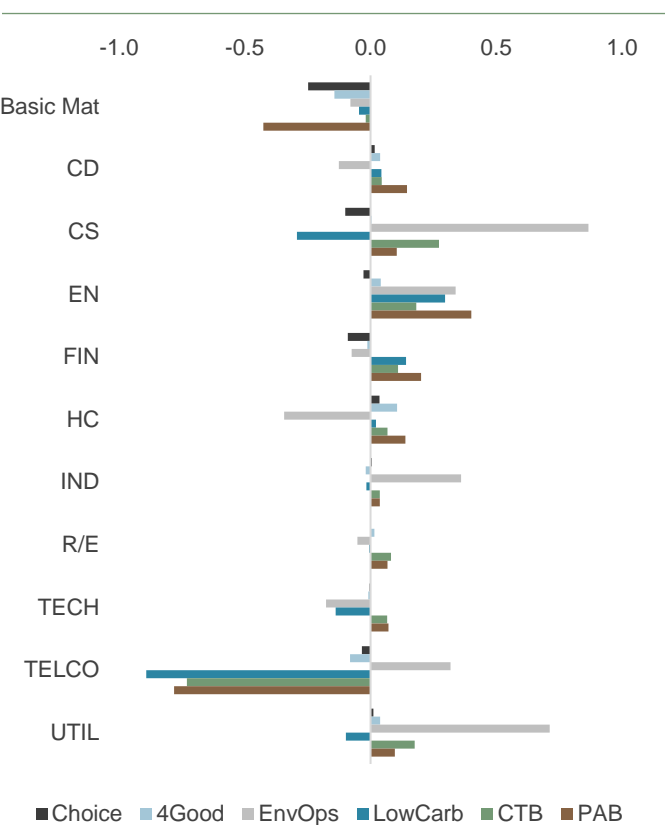
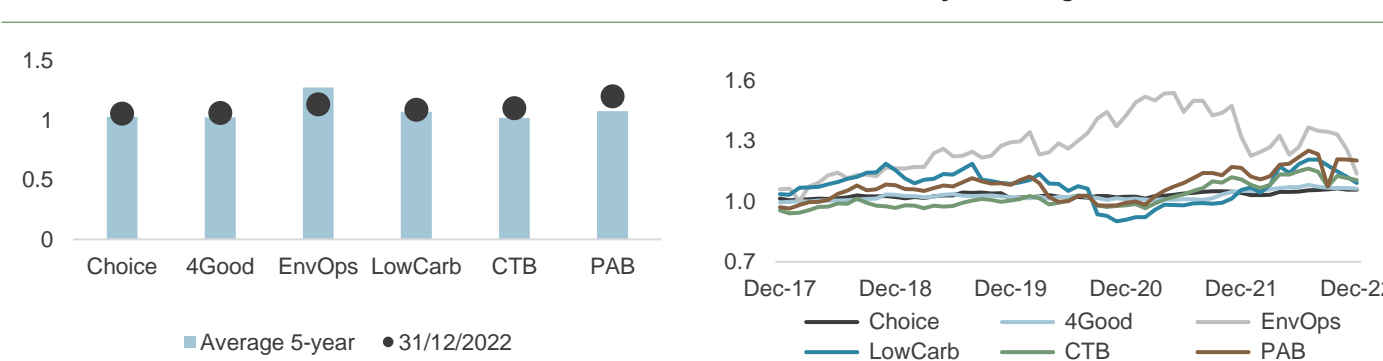


Chart 5: UK Indexes relative valuations: Latest 12-month forward P/E relative to 5-year average



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Europe Index Comparisons – Q4 2022

EO was the only outperforming SI strategy in Europe (3.6% excess return). Falling oil prices, high exposure to Industrials and low exposure to underperforming Consumer Staples kept the strategy buoyant. Other SI indexes were relatively flat, in line with their benchmark, where the different industry exposure compensated each other (Chart 4). EO focus on green technologies has resulted in a high index concentration, holding just 12.4% of the benchmark's stocks. Conversely, lower-conviction strategies such as Global Choice and FTSE4Good hold 82% and 68%, respectively. Relative forward P/E's of the SI indexes in Europe display similar patterns to those in other regions: The EO premium shrank in 2022, but not enough to fall in line with those of the other strategies (chart 5).

Chart 1: Active Performance (LC %)

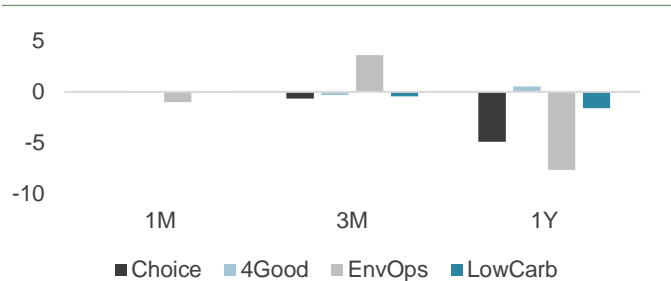


Chart 2: Index concentration

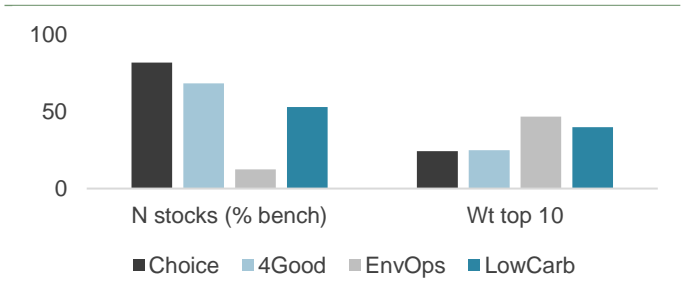


Chart 3: Active Industry weights (%)

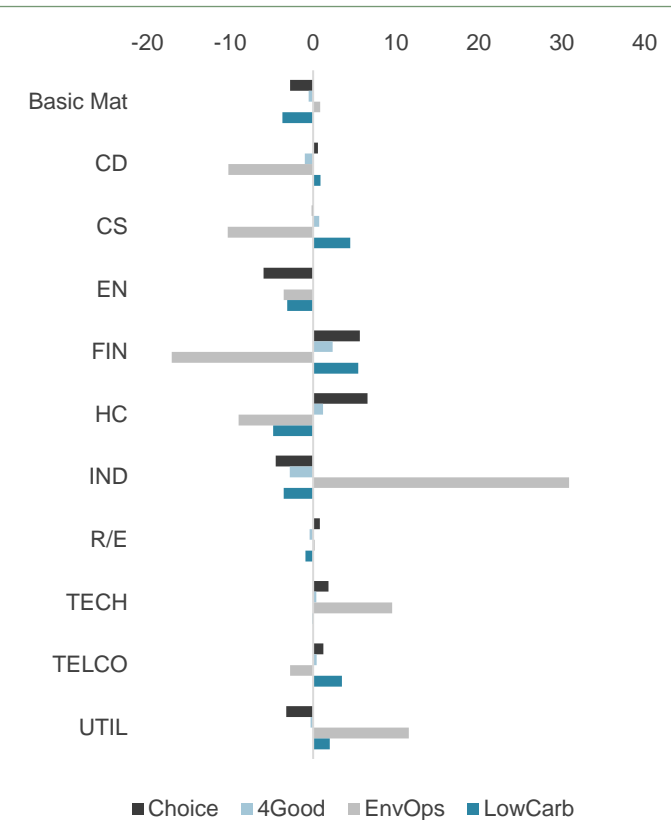


Chart 4: Industry allocation effect - 3M (LC %)

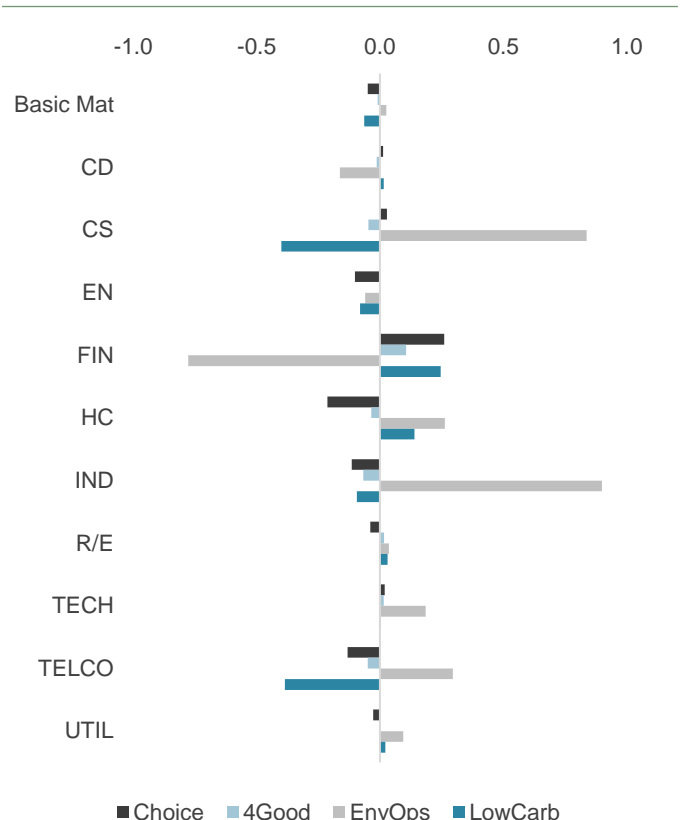
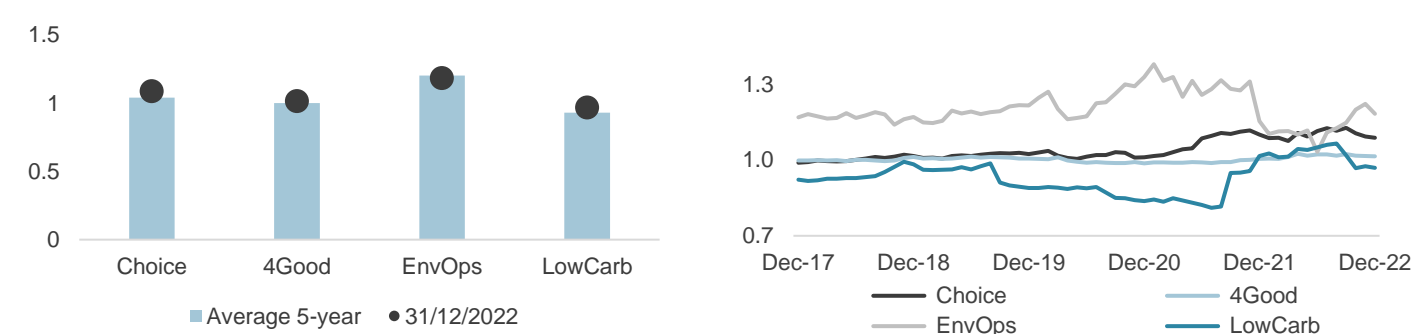


Chart 5: European Indexes relative valuations: Latest 12-month forward P/E relative to 5-year average



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Japan Index Comparisons – Q4 2022

Similarly to the US, the Japan EO index was the worst performer in Q4 (-5.2%), while the other indexes were relatively flat. EO underperformance was mainly due to its large underweight to the outperforming Financials sector (Chart 3 and 4). FTSE4Good was the best performer (1% excess return), benefiting from an overweight in Financials and underweight in Real Estate. EO's index concentration leads to a relatively high tracking error of 6.6% (Chart 2). EO's relative forward P/E has shrunk over the past two years and is now trading in line with that of the region's other SI indexes (Chart 5).

Chart 1: Active Performance (LC %)

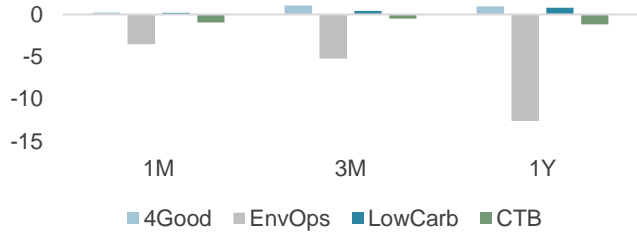


Chart 2: Index tracking error (%)



Chart 3: Active Industry weights (%)

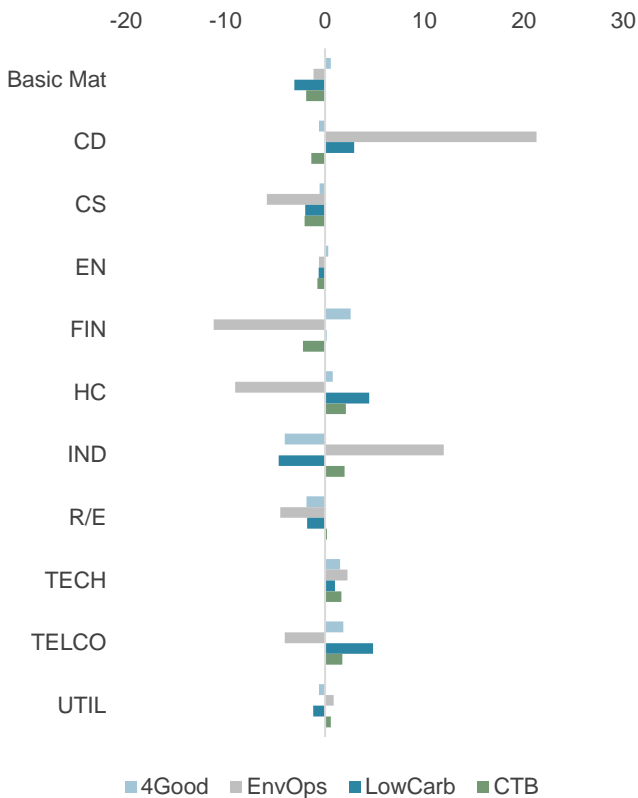


Chart 4: Industry allocation effect - 3M (LC %)

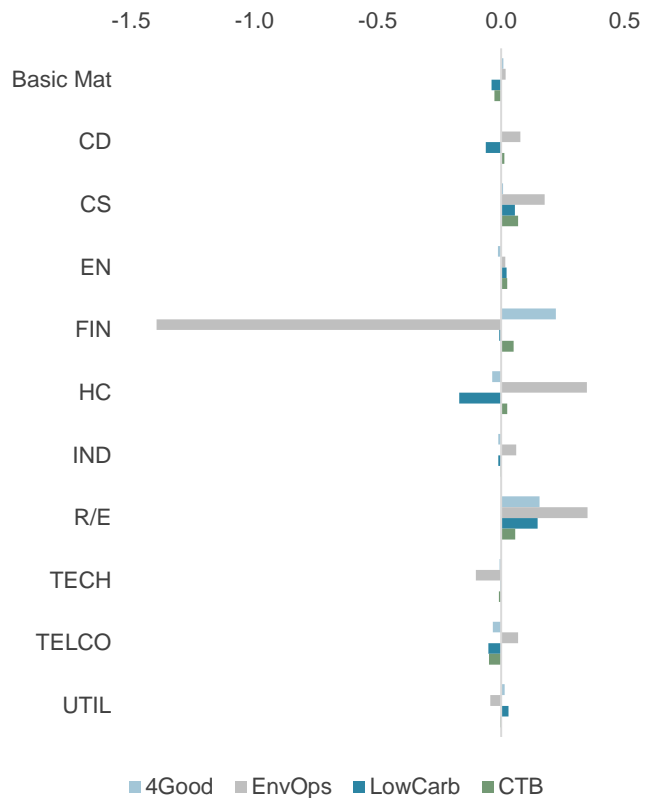
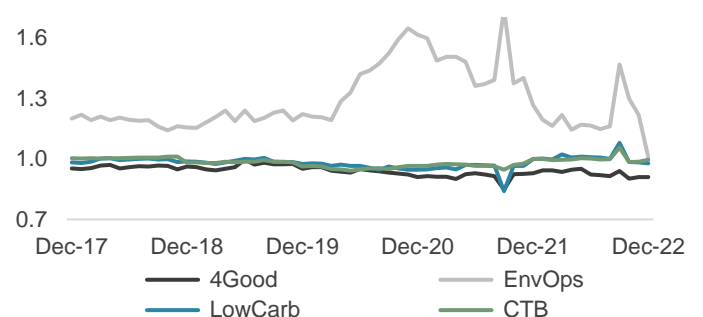
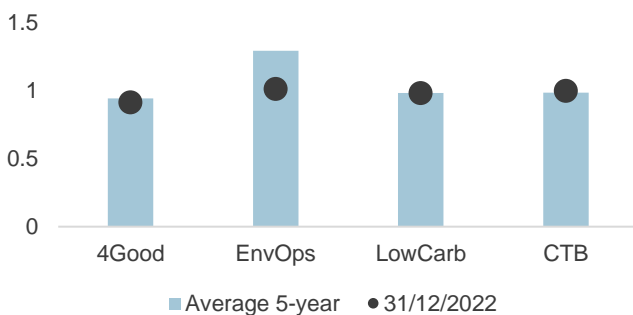


Chart 5: Japan Indexes relative valuations: Latest 12-month forward P/E relative to 5-year average



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Asia Pacific Index Comparisons – Q4 2022

In Asia Pacific, ESG Low Carbon was the best performer (2.5%), attributable to broad-based industry contributions (Chart 4). EO was the laggard (-3.9%) in Q4, hurt by its underweight in Financials and overweight in Utilities. EO's larger active industry exposures, higher index concentration (see page 3) and high tracking error (Chart 2) underpinned the strategy's more volatile performance. Relative forward P/E's of all APAC SI strategies are trading in line with their five-year averages. Similarly to other regions, EO saw its premium decrease in 2022 (Chart 5).

Chart 1: Active Performance (LC %)

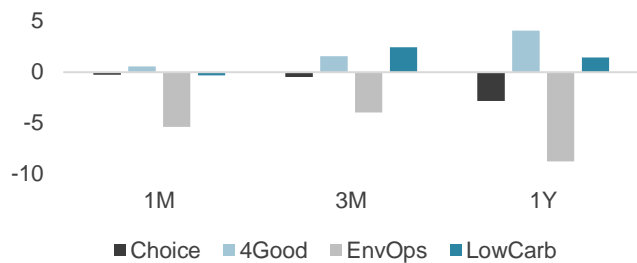


Chart 2: Index tracking error (%)

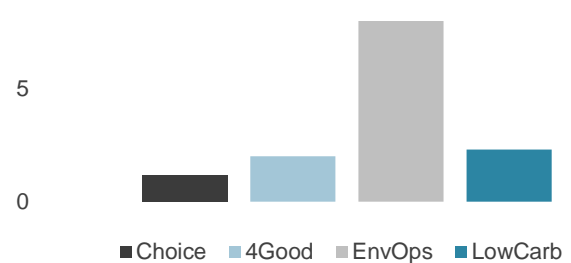


Chart 3: Active Industry weights (%)

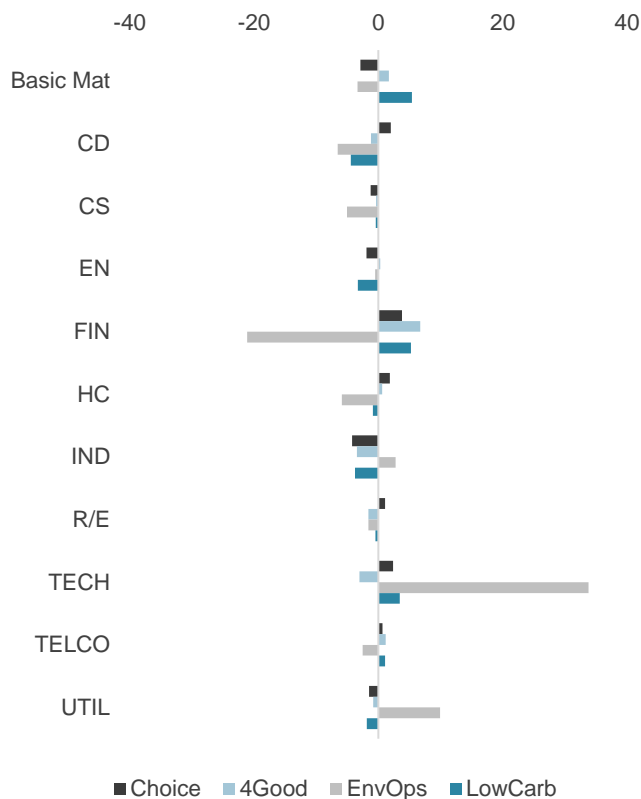


Chart 4: Industry allocation effect - 3M (LC %)

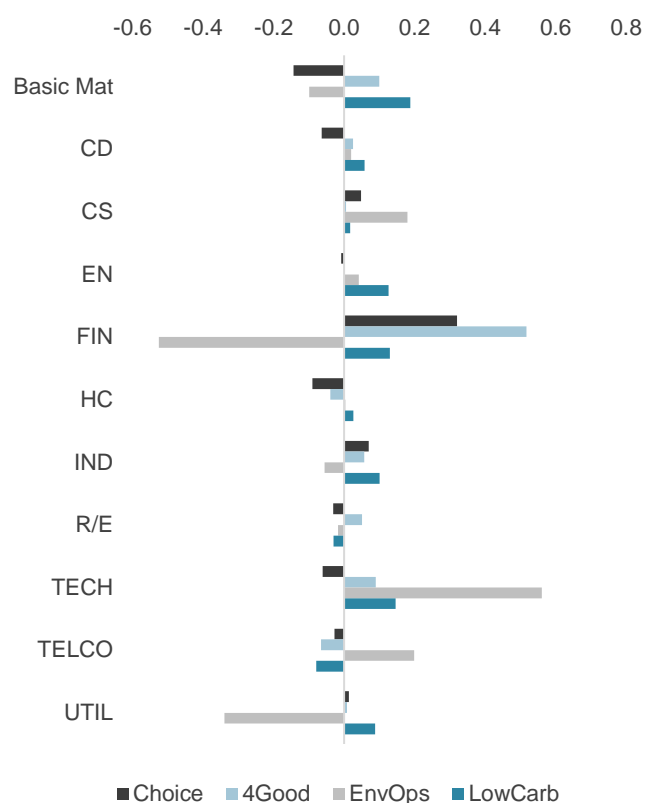
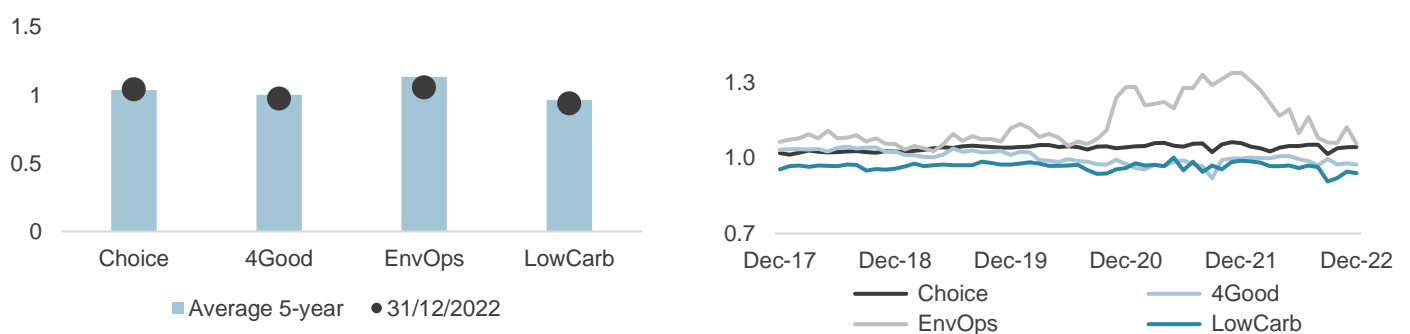


Chart 5: Asia Pacific Indexes relative valuations: Latest 12-month forward P/E relative to 5-year average



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Emerging Index Comparisons – Q4 2022

Most of the SI indexes in EM trailed their benchmark in Q4. ESG Low Carbon was the only exception, delivering an excess return of 1.3%, benefiting most of from Tech's outperformance in that market. Other SI strategies suffered from their underweight in Energy (Chart3, 4). Forward P/Es are in line with their five-year averages and the benchmark (Chart 5) , with ESG Low Carbon Target trading at a small discount.

Chart 1: Active Performance (LC %)

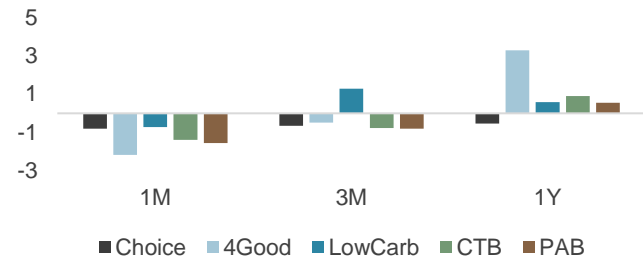


Chart 2: Index tracking error (%)

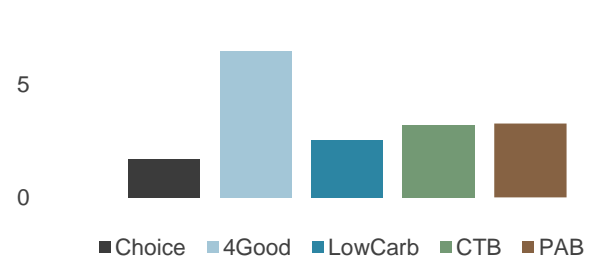


Chart 3: Active Industry weights (%)

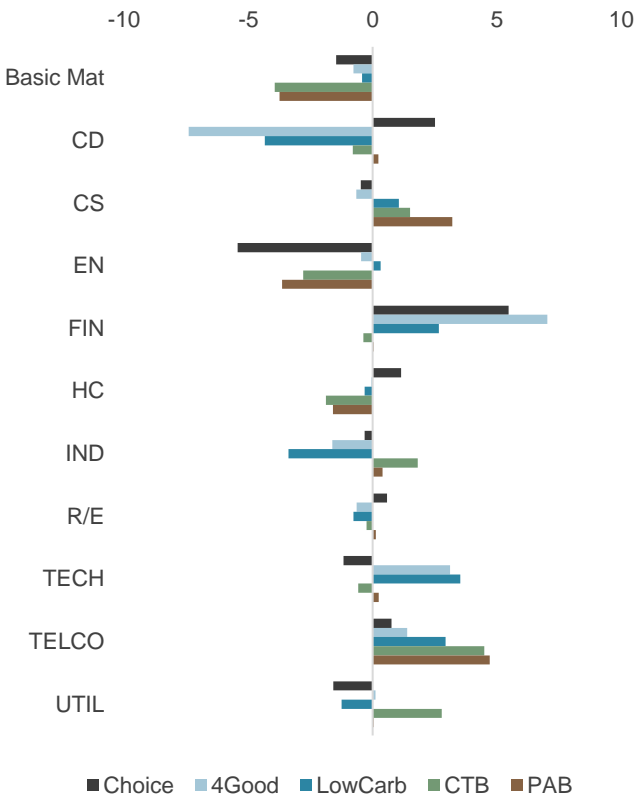


Chart 4: Industry allocation effect - 3M (LC %)

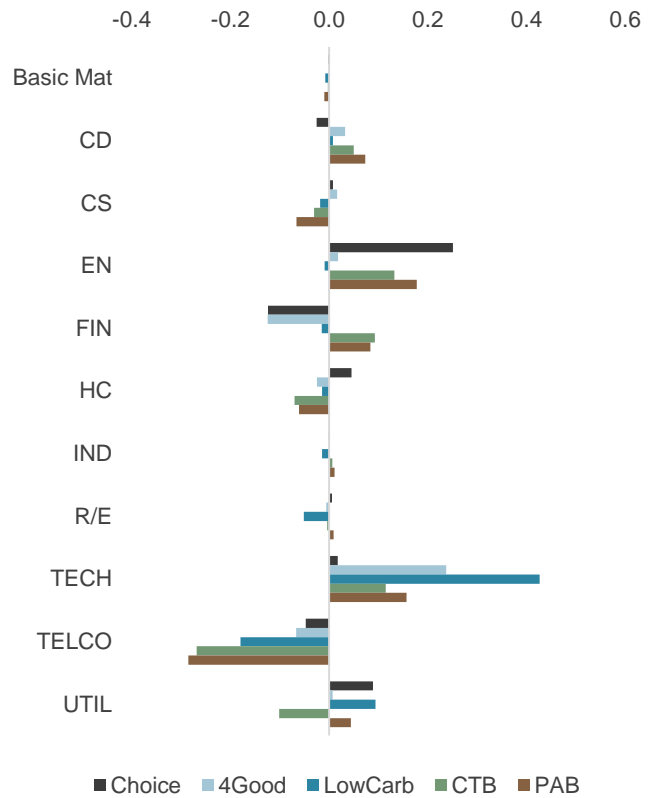
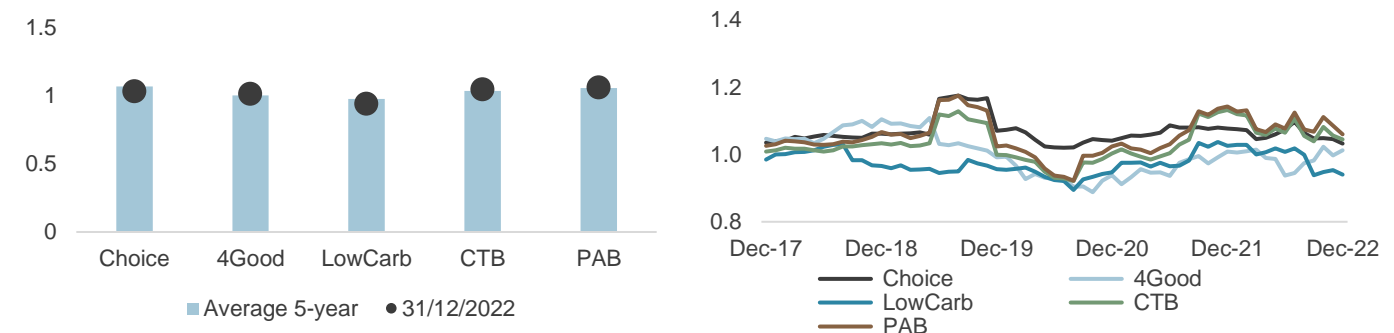


Chart 5: Emerging Indexes relative valuations: Latest 12-month forward P/E relative to 5-year average



Source: FTSE Russell/Refinitiv. All data as of December 31, 2022. Past performance is no guarantee of future results. This report should not be considered "research" for the purposes of MIFID II. Please see the end for important legal disclosures. Results in this report are for research / illustrative purposes and do not represent the official performance of the indexes.

Developed Index Comparisons – Q4 2022

The Developed Market SI Indexes performance was mixed in Q4. The underweight in Energy and overweight in Technology and Telecom generally hurt performance across the board. ESG Low Carbon and FTSE4Good outperformed the benchmark (by 1.0% and 0.8%, respectively), thanks mainly to underweights in underperforming Consumer Discretionary and overweights in Financials. Global Choice paid the price of its overweight in Consumer Discretionary (Chart 3 and 4). Relative forward P/E's of Developed SI Indexes have stabilized and are close to the underlying benchmark. Global Choice, CTB and PAB have been historically more expensive than FTSE4Good and ESG Low Carbon.

Chart 1: Active Performance (LC %)

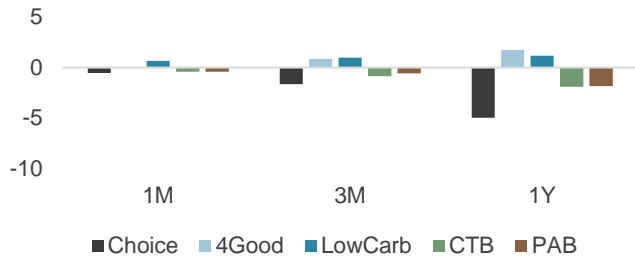


Chart 2: Index tracking error (%)

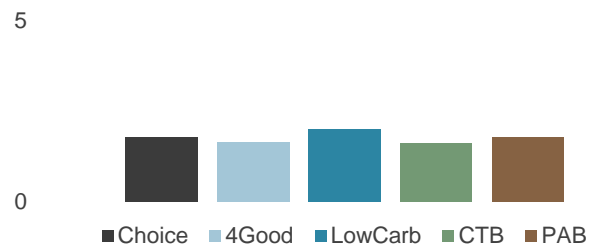


Chart 3: Active Industry weights (%)

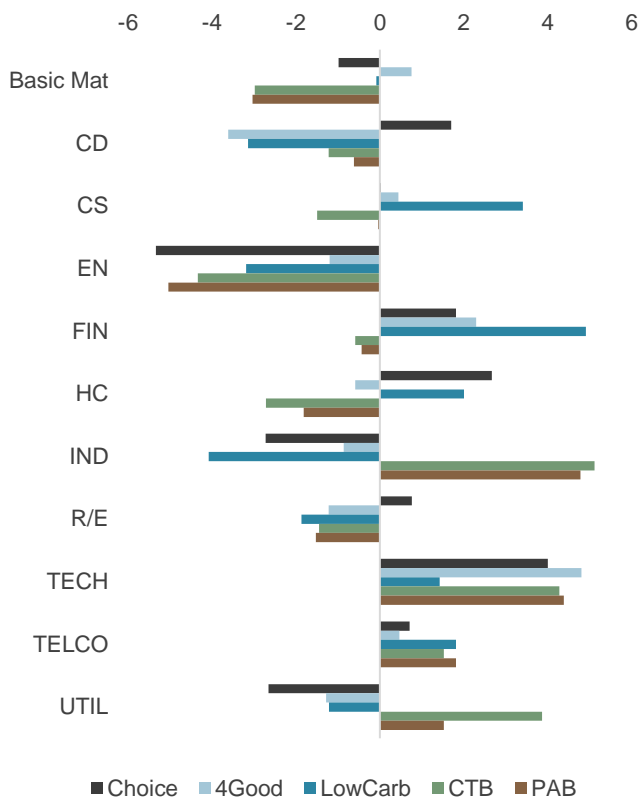


Chart 4: Industry allocation effect - 3M (LC %)

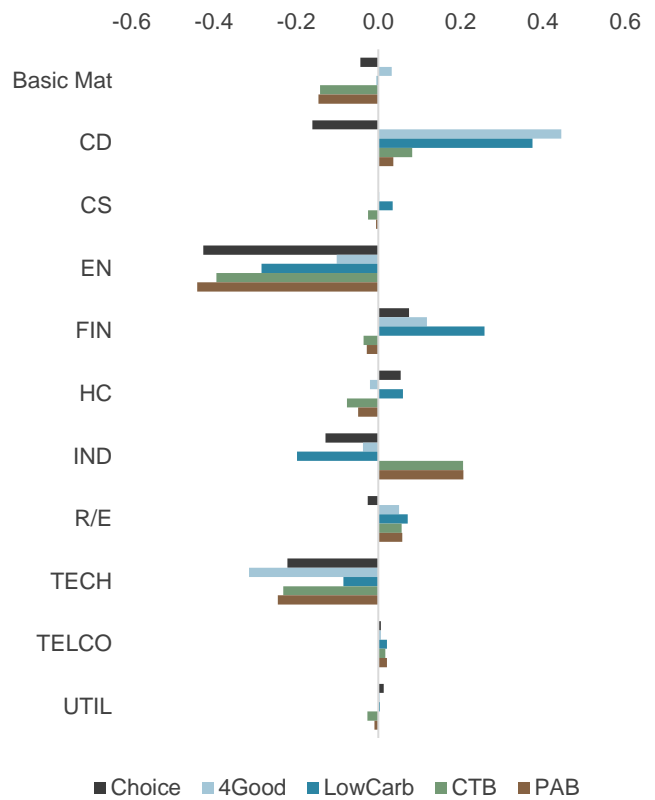
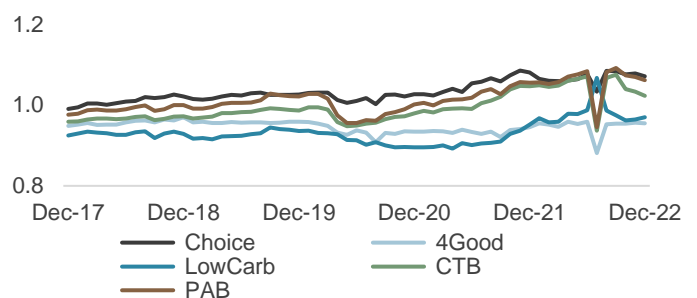
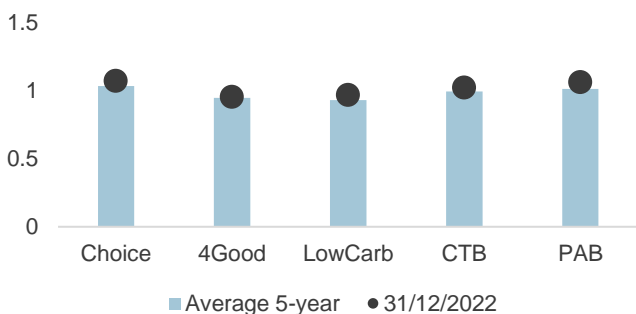


Chart 5: Developed Indexes relative valuations: Latest 12-month forward P/E relative to 5-year average



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Appendix 1: SI Index Coverage and Benchmarks – as of December 31, 2022

REGION	SI FAMILY	FTSE Russell Index	FTSE Russell Benchmark	Regional Coverage		Market Cap Coverage	
				DM	EM	Large + Mid Cap	Large + Mid + Small Cap
US	Global Choice	FTSE USA All Cap Choice	FTSE Global Equity USA All Cap	✓			✓
	FTSE4Good	FTSE4Good US	FTSE USA	✓		✓	
	Environmental Ops	FTSE Environmental Opportunities USA	FTSE Global Equity USA All Cap	✓			✓
	ESG Low Carbon Target	FTSE USA ESG Low Carbon Target Exposure	FTSE USA	✓		✓	
UK	Global Choice	FTSE UK ex Controversies ex CW	FTSE UK	✓		✓	
	FTSE4Good	FTSE4Good UK	FTSE All-Share	✓			✓
	Environmental Ops	FTSE Environmental Opportunities UK	FTSE All-Share	✓			✓
	ESG Low Carbon Target	FTSE UK ESG Low Carbon Target Exposure	FTSE UK	✓		✓	
	Climate Transition	FTS Climate Transition Benchmark	FTSE All-Share ex Investment Trusts	✓			✓
	Paris Aligned	FTSE Paris Aligned Benchmark	FTSE All-Share ex Investment Trusts	✓			✓
Europe	Global Choice	FTSE Developed Europe All Cap Choice	FTSE Developed Europe All Cap	✓			✓
	FTSE4Good	FTSE4Good Europe	FTSE Developed Europe	✓		✓	
	Environmental Ops	FTSE Environmental Opportunities Europe	FTSE Developed Europe All Cap	✓			✓
	ESG Low Carbon Target	FTSE Developed Europe ESG Low Carbon Target Exposure	FTSE Developed Europe	✓		✓	
Japan	FTSE4Good	FTSE4Good Japan	FTSE Japan	✓		✓	
	Environmental Ops	FTSE Environmental Opportunities Japan	FTSE Global Equity Series Japan All Cap	✓			✓
	ESG Low Carbon Target	FTSE Japan ESG Low Carbon Target Exposure	FTSE Japan	✓		✓	
	Climate Transition	FTSE Japan Climate Transition Benchmark	FTSE JPX Japan 500	✓		✓	
APAC	Global Choice	FTSE Developed Asia Pacific All Cap Choice	FTSE Developed Asia Pacific All Cap	✓			✓
	FTSE4Good	FTSE4Good Developed Asia Pacific	FTSE Developed Asia Pacific	✓		✓	
	Environmental Ops	FTSE Environmental Opportunities Asia-Pacific Ex Japan	FTSE Asia Pacific All Cap ex Japan	✓	✓		✓
	ESG Low Carbon Target	FTSE Asia ex Japan ESG Low Carbon Target Exposure	FTSE Asia Pacific ex Japan	✓	✓	✓	
EM	Global Choice	FTSE Emerging All Cap Choice	FTSE Emerging All Cap		✓		✓
	FTSE4Good	FTSE4Good Emerging	FTSE Emerging		✓	✓	
	ESG Low Carbon Target	FTSE Emerging ESG Low Carbon Target Exposure	FTSE Emerging		✓	✓	
Global	Global Choice	FTSE Developed All Cap Choice	FTSE Developed All-Cap	✓			✓
	FTSE4Good	FTSE4Good Developed	FTSE Developed	✓		✓	
	Environmental Ops	FTSE Environmental Opportunities All-Share	FTSE Global All Cap	✓	✓		✓
	ESG Low Carbon Target	FTSE Developed ESG Low Carbon Target Exposure	FTSE Developed	✓		✓	

*The indexes in bold are used as representative benchmarks on page 4.

Source: FTSE Russell/Refinitiv. This report should not be considered "research" for the purposes of MIFID II. Please see the end for important legal disclosures.

Appendix 2: Reference Guide

Report calculations

- Unless noted otherwise, all performance calculations are in local currency terms.
- Page 4: Regional benchmark performance are for representative benchmarks of the region and not the official benchmark for all listed SI indexes. Appendix 1 shows the full list of SI indexes covered in this report with their official benchmarks, which are used in the calculations throughout the report.
- Tracking error and Beta are calculated from 5-years of monthly returns. All other calculations on page 3 are 12-month averages.
- Index climate exposures are calculated as the index weighted average. Benchmark climate aggregates are absolute climate exposures. The percent deviations of index exposures from benchmark exposures are labelled “uplift” for ESG and Green Revenues and “reduction” for carbon.
- Contributions to climate “uplift” or “reduction” are the share of total index percent deviation such that the sum over industries equals the total index percent deviation.
- Three-month industry allocation effect is based on a Brinson attribution.

Sustainable Investment data inputs

- Carbon emissions: estimated annual CO2 equivalent GHG emissions (Scope 1 and 2) in metric tons scaled by annual sales (in USD) (metric tons/\$m).
- Green Revenues: the ratio of green revenues as classified by the FTSE Green Revenues Classification System to total revenues.
- FTSE Russell’s ESG Data Model ratings are objective measures of ESG exposure and performance in multiple dimensions.
- TPI Management Quality Data from the Transition Pathway Initiative
- An introduction to the FTSE ESG Ratings can be found in the following guide:
[Guide to FTSE Sustainable Investment Data used in FTSE Russell Indexes.pdf](#)

Naming convention

FTSE Russell Sustainable Indexes are abbreviated in the report as follows

Official Name	Report Abbreviation
FTSE Global Choice	Choice
FTSE4Good	4Good
FTSE Environmental Opportunities	Env Ops or EO
FTSE ESG Low Carbon Target Exposure	Low Carb
FTSE Paris-Aligned Benchmark	PAB
FTSE Climate Transition Benchmark	CTB

Source: FTSE Russell/Refinitiv. Please see the end for important legal disclosures.

Appendix 3: Glossary Products and Methodology - Extended Offering

INDEX SERIES	INVESTMENT SOLUTION	METHODOLOGY
Screened	Filter out controversial business areas	Market-Cap Weighted
FTSE Global Choice	The FTSE Global Choice Index Series is designed to help investors align their portfolios with their individual values by selecting companies based on the impact of their conduct and products on society and the environment.	Market-cap weighted series and can include negative screens in three product categories and two conduct categories. Individual indexes within the series may only apply a subset of the screening categories.
Thresholds	Apply Minimum Inclusion standards	Market-Cap Weighted
FTSE4Good	The FTSE4Good Index Series is designed to measure the performance of companies demonstrating strong Environmental, Social and Governance (ESG) practices.	Companies in the investment universe are given an ESG rating ranging from 0 to 5, with 5 being the highest. A minimum score is applied for inclusion and stocks fall out of the index if their score falls below a threshold. In addition a minimum Climate Change Score is applied. An exclusion list covers sectors like Tobacco, Controversial weapons, Coal and Investment Trusts.
FTSE Environmental Opportunities	The FTSE EO Index Series measure the performance of global companies that have significant involvement in environmental business activities, including renewable and alternative energy, energy efficiency, water technology and waste and pollution control.	To be included in the index, companies are required to have at least 20% of their business derived from environmental products and services, including renewable and alternative energy, energy management and efficiency, water infrastructure and technology, and waste and pollution control.
Target Exposure	Target climate change objectives	Non Market-Cap Weighted
FTSE ESG Low Carbon Target	The FTSE ESG Low Carbon Indexes target a percentage reduction in index level carbon emissions and a significant improvement in the aggregate ESG Rating.	FTSE Russell's Target Exposure methodology is applied to target an uplift of 20% in the ESG score, a 50% reduction in operational carbon emissions intensity and a 50% reduction in fossil fuel reserves intensity, remaining country neutral and limiting the maximum deviation from the ICB industry weights of the underlying index.
FTSE SDG-Aligned	The FTSE SDG Aligned Indexes adjust constituent weights to create alignment with United Nations Sustainable Development Goals (SDGs)	FTSE Russell's Tilt methodology is applied to overweight stocks to SDG-aligned ESG theme scores and the global green economy. Climate related aspects of the SDG's are further captured tilting away from company exposure to fossil fuels and operational carbon emissions.
FTSE Global Climate	The FTSE Global Climate Index Series is designed to reflect the performance of indexes incorporating Climate Change considerations. The index incorporates both the risks and the opportunities associated with climate change and the transition to a green economy.	FTSE Global Climate constituent weights are determined by adjusting the market capitalisation weight for three aspects of climate change: (1) Fossil Fuel Reserves (2) Operational Carbon Emissions (3) Green Revenues.
FTSE Smart Sustainability	The FTSE Smart Sustainability Index Series is designed to reflect the performance of stocks representing a specific set of factor characteristics, climate change considerations and or ESG practices.	FTSE Russell's Target Exposure and FTSE Russell's Tilt methodology are applied to achieve the sustainability and factor exposure profile sought.

Appendix 3: Glossary Products and Methodology

INDEX SERIES	INVESTMENT SOLUTION	METHODOLOGY
EU Taxonomy	Target climate change objectives	Non Market-Cap Weighted
FTSE EU Climate Benchmarks	<p>The FTSE EU Climate Benchmarks series are set to meet Paris aligned (PAB) objectives and Climate Transition (CTB) objectives and exceed the minimum requirements of the EU Climate Benchmark's Regulation.</p>	<p>The FTSE Russell's Target Exposure methodology is applied to target:</p> <p>50% reduction in carbon emissions (PAB), 30% (CTB) and an annual decarbonization targets (7% average annual carbon emissions reduction relative to the index base year) to reach 'net zero' over 10 year.</p> <p>An increased exposure to companies with Green Revenues and high climate governance.</p> <p>Exclusions of pure play (>50% revenues) oil sands, thermal coal extraction and thermal coal power generation companies.</p> <p>Limits on weights of companies in the Banking sector</p>
FTSE TPI Climate Transition	<p>The FTSE TPI Climate Transition Index Series capture the risks and opportunities arising from the climate transition while also adjusting exposure to companies based on their TCFD-aligned climate governance and commitments to " 2DC/Below 2DC pathways".</p> <p>The Index Series combines FTSE Russell's expertise in climate data and sustainable investment index design with the Transition Pathway Initiative's (TPI) analysis of how the world's largest and most carbon exposed / intensive public companies are managing the climate transition.</p>	<p>FTSE Russell's Tilt methodology is applied to reweight constituent weights based on five key climate considerations:</p> <p>Fossil fuel reserves: Underweight companies with fossil fuel reserves.</p> <p>Carbon emissions: Over/underweight companies based on their GHG emission within sector.</p> <p>Green revenues: Overweight companies engaged in the transition to a green economy.</p> <p>Management quality: Over/underweight companies based on their climate governance score.</p> <p>Carbon performance: Over/underweight companies according to their carbon performance (2DC/below 2DC) assessment.</p>

Appendix 4: Sustainable Indexes Benchmarked to ETF's

Illustrative selection of index-linked products benchmarked to FTSE Russell sustainable investment indexes

INDEX NAME	METHODOLOGY	MANAGER
FTSE Asia Pacific ex Japan ESG Low Carbon Select Net Tax Index	FTSE Target Exposure methodology	HSBC
FTSE Developed ESG Low Carbon Select Net Tax Index	FTSE Target Exposure methodology	HSBC
FTSE Developed Europe ESG Low Carbon Select Net Tax Index	FTSE Target Exposure methodology	HSBC
FTSE Emerging ESG Low Carbon Select Net Tax Index	FTSE Target Exposure methodology	HSBC
FTSE Japan ESG Low Carbon Select Net Tax Index	FTSE Target Exposure methodology	HSBC
FTSE USA ESG Low Carbon Select Net Tax Index	FTSE Target Exposure methodology	HSBC
FTSE UK ESG Low Carbon Select Index	FTSE Target Exposure methodology	HSBC
FTSE Developed ex Australia Choice Index	FTSE Global Choice Index Series	Vanguard
FTSE Global All Cap Choice Index	FTSE Global Choice Index Series	Vanguard
FTSE Global All Cap ex US Choice Index	FTSE Global Choice Index Series	Vanguard
FTSE US All Cap Choice Index	FTSE Global Choice Index Series	Vanguard
FTSE All-Share ex Investment Trusts ESG Climate Select Index	FTSE Target Exposure methodology	Invesco

Source: FTSE Russell/Refinitiv. Please see the end for important legal disclosures.

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