Insights
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Investing in Green and Climate Strategies

How to Achieve Climate and Net Zero Goals with Paris-Aligned Portfolio Strategies

Kartik Chawla
Senior Quantitative Research Analyst
SPDR Model Portfolio Solutions EMEA & APAC

Jedrzej Miklaszewski
Quantitative Research Analyst
SPDR Model Portfolio Solutions EMEA & APAC

Daniel Ung, CFA, CQF, CAIA, FRM
Head of Quantitative Research & Analysis
SPDR Model Portfolio Solutions EMEA & APAC

- **The climate-aware Paris-aligned framework, against which less than 1% of global assets are currently managed, adopts a multi-pronged, forward-looking approach to dealing with climate risks. We expect the approach to gain in popularity.**
- **In our historical analysis, risk was similar to the parent benchmark, leading to a low tracking error. Security selection, through the use of climate metrics, partly contributed to benchmark-relative returns.**
- **The strategies mitigated physical climate risks and transition risks while benefiting from green revenue opportunities.**

Overview

To start, it is important to highlight how climate-aware investing is different from ESG investing. ESG investing uses environmental, social and governance factors to evaluate companies on how sustainable they are along all three dimensions. Climate investing focuses on mitigating climate change and reaping opportunities.

For certain sectors, such as insurance writing, climate risks are tangible as any increase in the severity and frequency of natural disasters can adversely impact underwriting risks, especially in the property and casualty segments. Recognising the potentially huge costs associated with climate, the French central bank released the first results of its climate stress tests in 2021, which found that natural disaster-related insurance could rise up to five-fold in the country's most affected regions.[1]

In this paper, we examine how investors can incorporate climate-aware indices into an investment portfolio from a strategic asset allocation standpoint. To this end, we examine how climate-aware indices, namely the MSCI Climate Paris Aligned index series, differ from their traditional market-value-weighted counterparts.

As a reminder, the MSCI Climate Paris Aligned indices seek to maintain diversified exposure to equities within a tight tracking error budget, while improving on their green credentials through reducing climate risks and pursuing opportunities as well as aligning with the Paris Climate Accord commitments.

Invest in a Climate-Conscious Manner

The world is increasingly acknowledging the dangers of climate change and grappling with the challenges of its consequences. This awareness is present in the investment community, where investors continue to allocate huge sums of money into climate investment funds.

According to Morningstar, assets in European climate funds doubled in 2021 to $325 billion.[2] However, under 1% of global total assets have a temperature pathway that is aligned with the Paris Agreement, with the majority of the other assets aligned to over 2.75°C of global warming.[3] Recognising the increasing importance that investors attach to climate change issues, 457 investors (representing more than $41 trillion in assets under management) recently signed the 2021 Global Investor Statement to Governments on the Climate Crisis, which urges governments to work with institutional investors to “raise ambition and accelerate action to tackle the climate crisis by reducing global net carbon emissions by 45% from 2010 levels by 2030.”[4]

Other initiatives undertaken by investors include the commitments made by some asset owners (for example, signatories to the Net Zero Asset Owner Alliance) to set targets to reduce emissions and increase allocation to climate solutions.

The rising investor focus on climate change issues and sustainable finance had existed for some years but was further bolstered by the European Commission’s launch of the Sustainable Finance Action Plan in 2018, which created standards for benchmarks that seek to address climate risks and avoid “greenwashing.” Two types of benchmarks, the EU Climate Transition Benchmark and the EU Paris-aligned Benchmark, were defined. The former is seen as a tool to facilitate the transition to a low-carbon economy while the latter, which is much more ambitious, seeks to favour companies with sustainable business models and serves as a tool for investors at the forefront of the climate transition.

EU Climate Benchmarks: Climate Transitions vs. Paris-Aligned

In an attempt to re-allocate investment capital toward a low carbon and climate-resilient economy, the European Commission’s Technical Expert Group established minimum standards that an index must observe to qualify as a climate benchmark, either as a climate transition benchmark or as a Paris-aligned benchmark. Both benchmarks incorporate specific objectives related to greenhouse gas emissions and the transition to the low-carbon economy through the selection of underlying constituents but the latter one is much more ambitious. In particular, in comparison to the Climate Transition benchmark, the Paris-aligned benchmark minimum standards require a more stringent decarbonisation target (50%, rather than 30% relative to the universe), additional exclusion of fossil fuels and electricity producers with high carbon emissions and a stronger focus on green revenues generation).

These standards, which adopt components of the EU Taxonomy[5] and self-decarbonisation targets, aim to help investors align with ambitious climate scenarios and stay on track with the undertakings made in the Paris Agreement (see Figure 1).

The MSCI Climate Paris-aligned Index: Going Above and Beyond

> **The climate-aware Paris-aligned indices seeks to adopt a multi-faceted and forward-looking approach to managing climate risks.**

Undoubtedly, there are many different Paris-aligned benchmarks and, depending on the jurisdiction, there may be additional requirements to consider. In the case of the MSCI Climate Paris Aligned indices, they go beyond the minimum standards for the EU Paris-aligned Index as stipulated by the Technical Expert Group of the European Commission. These indices include more stringent exclusions and more aggressive decarbonisation targets and also focus on generating green revenues and benefitting from decarbonisation opportunities while attenuating climate risks.

Figure 1 **Minimum Requirements as Stipulated by the EU Paris-Aligned Benchmark Standards versus the MSCI Climate Paris-Aligned Index Series**

EU Minimum Standards	MSCI Climate Paris-Aligned Requirements Above and Beyond EU Minimum Standards
Exclusions • Baseline and Activity Based[1]	**More Stringent Exclusions**
1.5°C Climate Scenario Alignments[2] • Carbon Intensity Reduction[3] • Scope 3 Emissions Inclusion[4] • Self Decarbonisation[5]	**Faster Implementation of Alignment Objectives** **More Aggressive Decarbonisation Targets** **Increase in Green Revenues and Their Share to Brown Revenues** **Favouring Companies that Benefit from the Decarbonisation Shift**
Transition • Neutral exposure to high impact sector[6]	**Focus on reducing climate-related risk** **Transition Risk** **Physical Risk**

Source: State Street Global Advisors, EU Commission, MSCI. For illustrative purposes only.

1 This includes controversial weapons, societal norms (UNGC) violations, controversial business activities (e.g. oil & gas, coal, tobacco) and EU Taxonomy (i.e. "Do No Significant Harm" to any of the six environmental objectives within the meaning of Article 17 of the Taxonomy Regulation).
2 Based on science-based IPCC's targets.
3 Carbon intensity (Scope 1 & 2) reduction of 50% with respect to the parent benchmark.
4 Scope 3 emissions inclusion to be phased in over time.
5 Self-decarbonisation refers to the carbon emissions reduction compared to the previous year. The minimum requirement is 7% p.a.
6 High impact sectors refer to the high carbon-emitting sectors and refer to NACE (Nomenclature of Economic Activities) Section Codes A,B,C,D,E,F,G,H,L.

The Climate-Aware MSCI Paris Aligned Index Stock Selection

The climate-aware MSCI Paris Aligned indices are designed to exceed the minimum requirements for a Paris-aligned benchmark, as specified by the European Commission's Technical Expert Group. In this approach, **climate risks, both historical and forward-looking measures, are assessed through a multi-pronged approach in order to capture the full spectrum of climate risks (such as physical and transition risks) as well as opportunities (such as green revenues).**

The climate-aware strategy starts from a broad-based benchmark and then excludes companies engaged in controversial business activities (such as controversial weapons, fossil fuels and tobacco) as well as those involved in environmental and ESG infringements. After this step, companies are selected and given an appropriate weight in such a way that climate transition and physical risks are mitigated and climate opportunities reaped, while ensuring that the strategy remains sufficiently diversified and the tracking error with the parent index remains reasonably tight (see Figure 2 for the key highlights of the methodology).

Figure 2 **Key Highlights of the Stock Selection Process in the MSCI Climate Paris Aligned Methodology**

Universe

Broad Market Index

"Controversy" Exclusions

Exclusions Based On

Controversial Business Activities

Norms and Environmental Violations

- **Controversial Business Activities**[1] Controversial weapons, fossil fuels (oil & gas, thermal coal mining and power generation — especially from thermal coal, natural gas or liquid fuel) and tobacco.
- **ESG and Environmental Violations** Severe or very severe environmental controversies as defined by the MSCI Environmental Controversy Score and very severe ESG controversies as defined by the MSCI ESG Controversy Score.

Constituent Selection and Weighting

Climate Objectives Are Met Through

Mitigating Transition and Physical Risks

Benefiting From Opportunities

Ensuring the Climate-aware Index Remains Diversified

Tracking Error is in Check

Minimise tracking error with the parent benchmark, subject to diversification requirements[2] while meeting the following additional climate objectives:

- **Limit Transition and Physical Risks** Reduce ongoing and potential emissions intensity,[3] reduce carbon intensity reductions with respect to the base date (June 2020),[4] increase Low Carbon Transition Score,[5] reduce extreme weather tail risk,[6] reduce climate tail risk to align with 1.5°C scenario,[7] increase exposure to companies setting climate targets[8] and a focus on high climate impact sectors.[9]
- **Benefit from Transition Opportunities** Increase Low Carbon Transition Score[10] and favour green revenues.[11]

Strategy

MSCI Climate Paris Aligned Index Series

Source: State Street Global Advisors. For illustrative purposes only.

1 Controversial business activities are excluded when they are at or exceed a certain revenue or ownership threshold. (Please refer to MSCI Index methodology for details).
2 To ensure diversification, the methodology establishes a number of constraints governing the minimum constituent absolute weight, constituent benchmark-relative weight, sector benchmark-relative weight, one-way index turnover and common and specific risk aversion factors.
3 Ongoing carbon intensity reduction, defined as the benchmark-relative carbon intensity emissions (Scope 1, 2 and 3), is set at 50% minimum and potential carbon intensity reduction, defined as the benchmark-relative potential carbon emissions, is set at 50% minimum.
4 Total carbon emissions reduction of 10% w.r.t. June 2020.
5 Benchmark-relative increase in Low Carbon Transition Score of 10% minimum
6 50% reduction of the benchmark-relative extreme weather climate tail risk (value-at-risk).
7 Reduce climate tail risk (value-at-risk) so as to align to the 1.5oC climate scenario.
8 Benchmark-relative Increase in companies setting climate targets by 20% minimum.
9 Active weight in Climate High Impact sector to be 0% minimum.
10 Benchmark-relative increase in Low Carbon Transition Score of 10% minimum.
11 Benchmark-relative Increase in the amount of green revenues generated at least 100% and ratio of benchmark-relative green to brown revenues at least 4 times.

How to Incorporate Climate-Aware Paris Aligned Indices in a Portfolio Context

Climate-aware Paris-aligned indices can form part of a strategic (core) allocation within investment portfolios. By construction, the risk profile is similar to that of the underlying parent benchmarks. Tracking error between the MSCI Climate Paris Aligned indices and their corresponding benchmarks stood at about 1–2.5%[6] over the study period, while their climate profile substantially improved. This is done by adopting a multi-faceted view to climate risks, which can be divided into transition risks and physical risks.

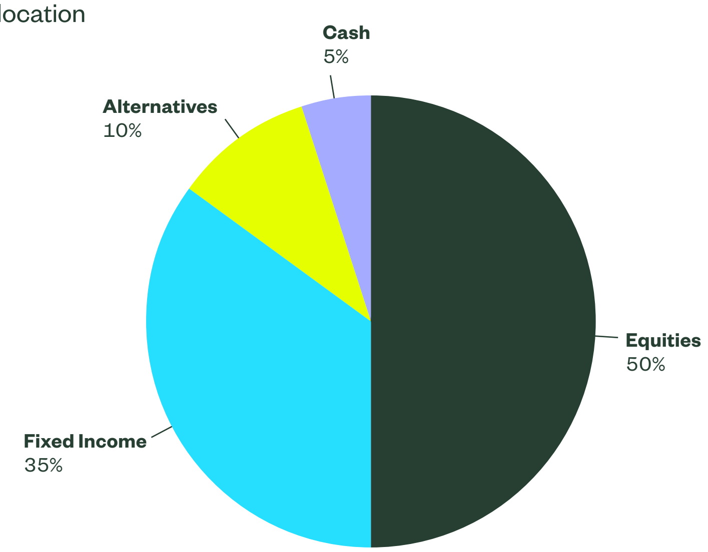
Physical risks refer to the manifestations of a changing climate and their associated costs and include both chronic changes (i.e. long-term shifts in climate) as well as acute events that may go up in frequency or severity in light of these changes. This goes hand-in-hand with transition risks, which are business-related risks (including policy, regulatory, technological and reputational risk, among others) that follow societal and economic shifts toward a greener future. With risks also come opportunities as companies adopt a lower-carbon business model can benefit from the ongoing decarbonisation trend that the world is witnessing.

Assessing the Role of Climate-aware Paris-aligned Indices in Portfolios

Incorporating climate-aware Paris-aligned indices can improve the green credentials of a portfolio while maintaining a similar risk profile to that of the parent benchmark. To understand the impact of using the Paris-aligned indices in place of their market-cap-weighted benchmarks, we created a carbon-aware, simulated portfolio using a range of MSCI Climate Paris Aligned indices and compared the results against a market-cap, multi-asset benchmark (market-value-weighted multi-asset benchmark) (see Figure 3).

Figure 3
Sample Multi-asset Portfolios Using Paris-aligned Benchmarks

Asset Class Allocation



Climate Aware Paris Aligned Multi Asset Hypothetical Portfolio (%)

MSCI US Climate Paris Aligned Index	**33**
MSCI Europe Climate Paris Aligned Index	**8**
MSCI Japan Climate Paris Aligned Index	**3**
MSCI Emerging Markets Climate Paris Aligned Index	**6**
Bloomberg Global Aggregate Index	35
Morningstar Diversified Alternatives Index	10
Barclays 3 month USD LIBOR Cash Index	5

Market Value Weighted Multi Asset Portfolio (%)

MSCI US Index	**33**
MSCI Europe Index	**8**
MSCI Japan Index	**3**
MSCI Emerging Markets Index	**6**
Bloomberg Global Aggregate Index	35
Morningstar Diversified Alternatives Index	10
Barclays 3 month USD LIBOR Cash Index	5

Source: State Street Global Advisors, as of March 2022. Weights are as of the date indicated, are subject to change, and should not be relied upon as current thereafter.

Historically, the climate-aware multi-asset portfolio delivered slightly stronger return over multiple periods.

The results in Figure 4 show that the climate-aware Paris-aligned multi-asset portfolio often generated a higher return (c. 0.64% over the benchmark during the study period) than its market-value-weighted benchmark, with a similar level of risk. Of course, we cannot simply extrapolate historical results into the future, especially in view of recent financial market turbulence. However, it is clear that the move toward lower-carbon assets and decarbonisation strategies will persist under the auspices of an increasing number of institutional investors.

In fact, the Paris Aligned Asset Owners Group grew to 28 investors in June 2021, with combined assets under management of $1.9 trillion.[7] **While not directly linked to Paris-aligned benchmarks, there are more academic studies that have found evidence of a carbon premium, e.g. Bolton, Kacperczyk (2020).[8]** Based on historical analysis, the authors found that lower-carbon-emissions stocks led to higher returns. Considering all the evidence as a whole, our view is that these investments could continue to perform well in the longer term.

The analysis above is based on replacing all the general equity building blocks with their Paris-aligned equivalents. A reasonable question to pose is what would happen if only one building block, rather than all of them, were replaced. Figure 5 shows that replacing just the US equity or European equity exposure managed to improve risk-return efficiency during the study period, as both portfolios are situated on the upper left hand side of the efficient frontier. In fact, our analysis shows that this result is consistent, apart from Japan where the Paris-aligned benchmark slightly detracted from returns.

Figure 4
Risk-return Profile of Hypothetical Multi-asset Portfolios Using Paris-aligned Benchmarks

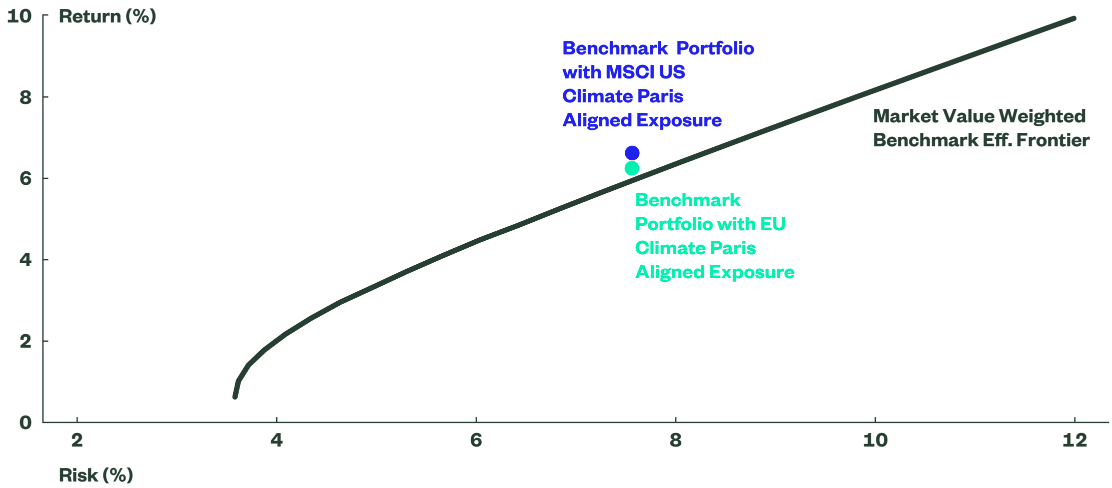
	Climate Aware Paris Aligned Portfolio	Market Value Weighted Multi Asset Benchmark
Annualised Returns (%)		
Full period	6.75	6.11
1-year	2.04	2.67
3-year	8.45	8.17
5-year	7.68	7.23
Annualised Risk (%)		
Full period	7.60	7.60
1-year	7.90	7.00
3-year	10.00	9.90
5-year	8.70	8.60
Downside Stats (%)		
Max Drawdown	-11.65	-12.07
Historical VaR (95%)	-3.28	-3.31
Downside Deviation	1.40	1.40
Tracking Error (%)		
Full period	0.81	—
1-year	1.50	—
3-year	1.09	—
5-year	0.91	—
Other Performance Stats		
Excess Return (%)	0.64	—
Sharpe Ratio	0.89	0.81

	Climate Aware Paris Aligned Portfolio	Market Value Weighted Multi Asset Benchmark
Climate Metrics (For Equity Alloction of the Respective Portfolios)		
Aggregate Climate VaR — 1.5 Degree Scenario (%)[1]	0.06	-6.91
Weighted Average Extreme Weather VaR — Aggressive Scenario (%)[2]	-2.08	-4.29
Weighted Average Green Revenues (%)[3]	6.15	2.91
GHG Intensity (tCO_2e/million USD revenue)[4]	103.13	277.18
Weighted Average Potential Emissions Intensity (tCO_2e/million USD revenue)[5]	0.01	669.76

Source: State Street Global Advisors, Bloomberg Finance L.P., MSCI, as of 31 March 2022. The inception date for the MSCI Climate Paris-aligned Index was Oct 2020. Climate metrics are as of May 2021. Results prior to this date were calculated by using available data at the time in accordance with the Index's current methodology. Index returns reflect capital gains and losses and income. The results were generated over Dec 2013 and Mar 2022 period. Returns of the Climate-Aware Paris Aligned Portfolio were achieved by mathematically combining the actual performance data of the MSCI USA Climate Paris Aligned Index, MSCI Europe Climate Paris Aligned, MSCI Japan Climate Paris Aligned Index, MSCI EM Climate Paris Aligned Index, Morningstar Diversified Alternatives TR Index, Bloomberg Global Aggregate TR USD (Unhedged) Index and Barclays 3 month USD LIBOR Cash Index. Returns of the market-value-weighted multi-asset benchmark made up of MSCI USA Index, MSCI Europe Index, MSCI Japan Index, MSCI EM Index, Morningstar Diversified Alternatives TR Index, Bloomberg Global Aggregate TR USD (Unhedged) Index and Barclays 3 month USD LIBOR Cash Index. The performance assumes no transaction and rebalancing costs, so actual results will differ. Numbers highlighted in green indicate the more favourable numbers. Past performance is not a reliable indicator of future performance. Index returns are unmanaged and do not reflect the deduction of any fees or expenses. Index returns reflect all items of income, gain and loss and the reinvestment of dividends and other income as applicable.

1 Aggregated costs to portfolio related to specific climate risks over next 15 years.
2 Worst — case (95th percentile) donwside or upside potential, expressed as percentage of equity's market value assuming trends in extreme weather events conitnue along business as usual.
3 Revenues from environmental goods and services (ie. technologies that resolve water scarcity, building retrofitting, alternative energy fuels).
4 Efficiency of the index in terms of total Scope 1 and 2 carbon emissions divided by total assets.
5 Weighted average of security level potential carbon emissions intensity.

Figure 5
Efficient Frontier Comparing Paris-aligned Exposures and Parent Benchmark Equivalents



Source: State Street Global Advisors, Bloomberg Finance L.P., MSCI, as of 31 March 2022. The inception date for the MSCI Climate Paris-aligned Index was Oct 2020. Results prior to this date were calculated by using available data at the time in accordance with the Index's current methodology. Index returns reflect capital gains and losses and income. The results were generated over Dec 2013 and Mar 2022 period. Returns of the Climate-Aware Paris Aligned Portfolio were achieved by mathematically combining the actual performance data of the MSCI USA Climate Paris Aligned Index, MSCI Europe Climate Paris Aligned, MSCI Japan Climate Paris Aligned Index, MSCI EM Climate Paris Aligned Index, Morningstar Diversified Alternatives TR Index, Bloomberg Global Aggregate TR USD (Unhedged) Index and Barclays 3 month USD LIBOR Cash Index. Returns of the market-value-weighted multi-asset benchmark made up of MSCI USA Index, MSCI Europe Index, MSCI Japan Index, MSCI EM Index, Morningstar Diversified Alternatives TR Index, Bloomberg Global Aggregate TR USD (Unhedged) Index and Barclays 3-month USD LIBOR Cash Index. The performance assumes no transaction and rebalancing costs, so actual results will differ.

Sources of Risk

> **The tracking error of the climate-aware indices was low and a material amount of that came from stock-specific risks.**

Based on the results in Figure 4, the multi-asset portfolio assembled with the Paris-aligned benchmarks incurred about the same level of absolute risk (c. 7.6% p.a. over the study period) as the market-value-weighted benchmark. This can be expected, as the aim of the Paris-aligned benchmarks is to maintain broad equity exposures while improving their green credentials, through reducing their overall exposure to climate risks and aligning with Paris Agreement requirements.

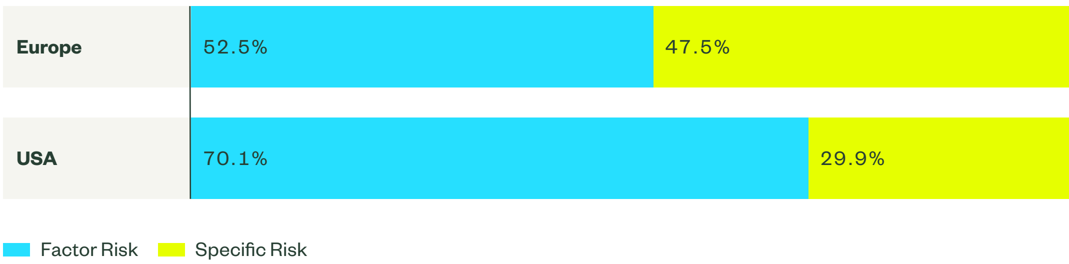
To understand the genesis of the portfolio tracking error, we examined the regional Paris-aligned building blocks and decomposed their ex-ante tracking error with respect to their parent benchmarks using the appropriate Axioma regional fundamental mid-term models (see Figure 6 for the decomposition of the MSCI Europe and USA Climate Paris-aligned indices).

Unsurprisingly, the total ex-ante tracking error of the Paris-aligned benchmarks against the regional parent benchmarks was low. Of that tracking error, around 30–60% came from stock-specific risks, which suggests the importance of security selection in the methodology that goes beyond simply targeting known equity factors. With regard to the tracking error that derives from equity factors, more than 60% of the risk came from industry, with the exception of emerging market climate-aware Paris-aligned indices, where industry made up just under 40% of the risk (see Figure 6).

Overall, style risk explained less than half of the factor tracking error, regardless of the region. **In the context of an already meagre tracking error between the climate-aware strategies and the benchmark, it is clear that the importance of style risks in explaining the behaviour of these climate-aware strategies is rather modest** (see Figure 7).

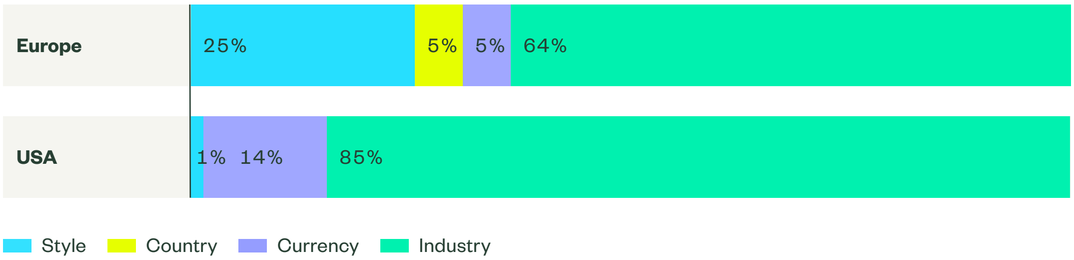
Though style risks may not have made a substantial contribution to the overall tracking error, it is nonetheless interesting to understand whether there are persistent biases toward certain equity factors and, if so, what they are. This is relevant because factor biases contribute directly to the generation of tracking error. Analysis shows that the climate-aware Paris-aligned strategies do not tilt toward the same set of equity factors across all universes. For instance, there was a statistically significant (see the footnote in Figure 8 for a definition of statistical significance) low volatility tilt in the US while there was a tilt toward both profitability and earnings growth in Europe (see Figure 8). Factor tilts are also largely inconsistent across the other universes.

Figure 6
Proportion of Ex-ante Tracking Error of the MSCI Climate Paris Aligned Benchmarks From Factor and Specific Risks (2013 to 2022)



Source: State Street Global Advisors, FactSet, as of end of March 2022. Ex-ante tracking error of the MSCI Climate Paris Aligned indices against the parent benchmarks is calculated on a semi-annual basis using the respective regional Axioma Fundamental Mid Term Model 4.0.

Figure 7
Sources of Ex-ante Tracking Error Attributable to Systematic Factors in MSCI Climate Paris Aligned Benchmarks (2013 to 2022)



Source: State Street Global Advisors, FactSet, as of end of March 2022. Ex-ante tracking error of the MSCI Climate Paris-aligned Indices against the parent benchmarks is calculated on a semi-annual basis using the respective regional Axioma Fundamental Mid Term Model 4.0.

Figure 8
Factor Exposure of Select Factors in the MSCI Climate Paris Aligned Benchmarks (2013 to 2022)

Europe	
Style	**-0.22**
Value	**-0.15**
Dividend Yield	-0.07
Earnings Yield**	-0.01
Value	-0.06
Quality	**0.02**
Leverage	-0.04
Profitability***	0.03
Growth***	0.04
Beta	**-0.05**
Momentum**	**0.02**
Exchange Rate	**0.02**
Liquidity	**0.00**
Size	**-0.09**
Volatility**	**0.00**
Country	**0.00**
Denmark (%)**	0.6
Sweden (%)***	1.5
Currency (%)	**0.0**
Industry	**0.00**
Energy (%)	**-6.4**
Energy Equipment & Services (%)***	0.0
Industrials (%)	**5.1**
Commercial & Professional Services (%)*	-1.1
Construction & Engineering (%)**	1.8

USA	
Style	—
Value	**-0.17**
Dividend Yield	-0.09
Earnings Yield***	-0.01
Value	-0.06
Quality	**0.03**
Leverage	0.05
Profitability	-0.02
Growth	0.00
Beta	**0.01**
Momentum	**0.03**
Exchange Rate	**-0.01**
Liquidity	**0.02**
Size	**-0.02**
Volatility***	**-0.02**
Country (%)	**0.0**
Currency (%)	**0.0**
Industry	—
Energy (%)**	**-5.7**
Energy Equipment & Services (%)***	-0.8
Oil, Gas & Consumable Fuels (%)*	-4.9
Information Technology (%)***	**2.0**
Semiconductors & Semiconductor Equipment (%)***	0.8
Software (%)***	0.7

Source: State Street Global Advisors, FactSet, as of end of March 2022. Ex-ante tracking error of the MSCI Climate Paris-aligned Indices against the parent benchmarks is calculated on a semi-annual basis using the respective regional Axioma Fundamental Mid Term Model 4.0. (*) denotes statistical significance at the 10% level based on the factor impact calculation (**) denotes statistical significance at the 5% level based on the factor impact calculation (***) denotes statistical significance at the 1% level based on the factor impact calculation. Factor impact is the average active exposure multiplied by the pure factor return and factor impact t-statistics, which measures the statistical significance of a specific factor's allocation decision in generating active return, is mathematically defined as:

$$\frac{E(\text{Factor Impact})}{E(\sigma(\text{Factor Impact}))/\sqrt{\text{Number of Subperiods}}}$$

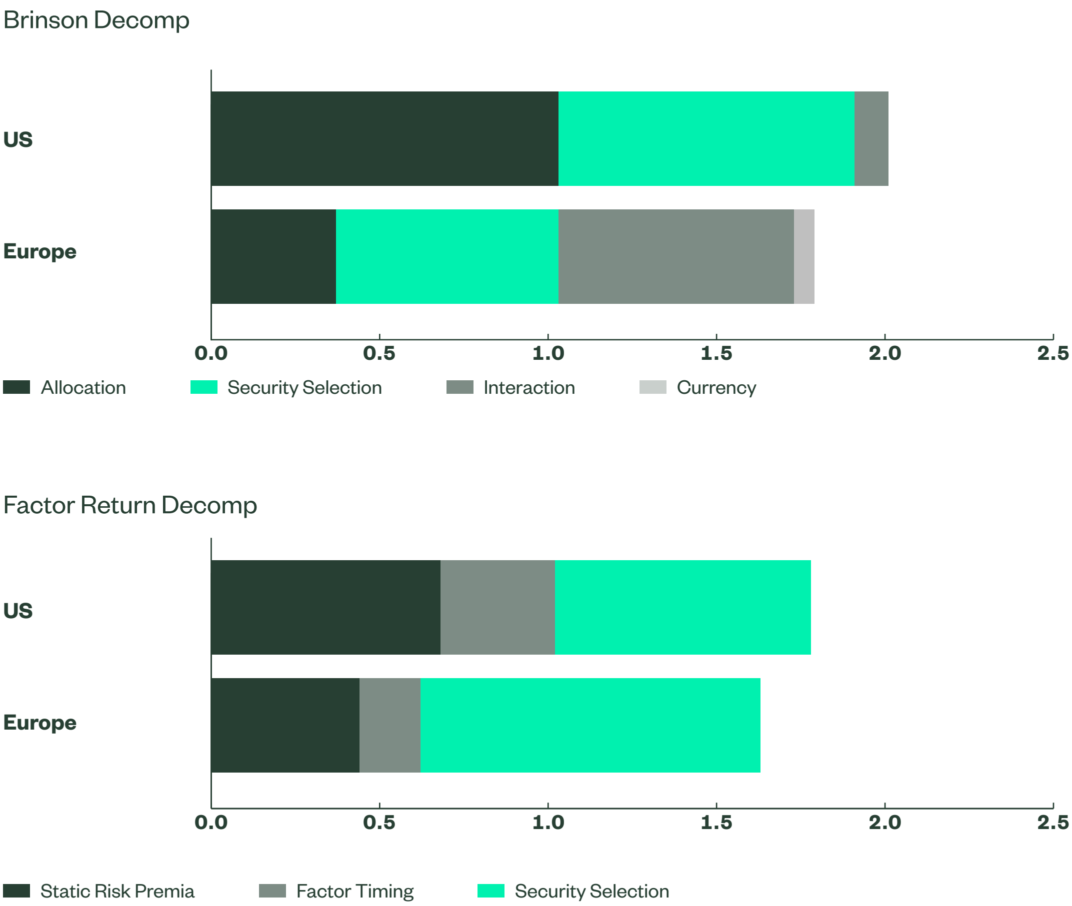
Sources of Return

> **Historical analysis shows that security selection was key in generating returns across most universes within the small tracking error that the climate strategies run.**

Over the entire study period, the carbon-aware multi-asset portfolio achieved a higher return than the market-value-weighted benchmark. Looking again at the individual regional building blocks, we employed both the 3-factor Brinson return attribution model as well as the factor return attribution model, as proposed by Lo (2008)[9] and Hsu, Kalesnik and Myers (2010),[10] to break down return into the static factor alpha, dynamic factor timing alpha[11] as well as the security selection alpha. Results show that return was generated from security selection across all universes, except Japan, where security selection slightly detracted from return (see Figure 6) and is consistent across different time horizons.[12]

The return due to security selection most likely derives from the selection of stocks that mitigate climate physical and transition risks and takes advantage of climate transition opportunities from green revenues.

Figure 9
Return Attribution Using 3-Factor Brinson Return Attribution and Factor Return Attribution



Source: State Street Global Advisors, FactSet, as of end of March 2022. Return of the MSCI Climate Paris-aligned Indices against the parent benchmarks is calculated on a semi-annual basis using the respective regional Axioma Fundamental Mid Term Model 4.0.

Climate Metrics

Financial performance aside, another important objective of the climate-aware Paris-aligned indices is their ability to mitigate climate risk and capture climate opportunities. Climate-related risks and opportunities have been measured under three main pillars: physical risks, transition risks and green revenue opportunities.

Overall, the climate-aware Paris-aligned portfolio outperformed the value-weighted multi-asset benchmark by having a lower level of climate tail risk (c. -7%), as measured by the aggregate climate value at risk, a lower level of current carbon emissions intensity (-63%) and potential emissions intensity as well as a higher level of green revenues (c. 3%).

> **The climate-aware indices incurred lower climate physical tail risks than the parent benchmark.**

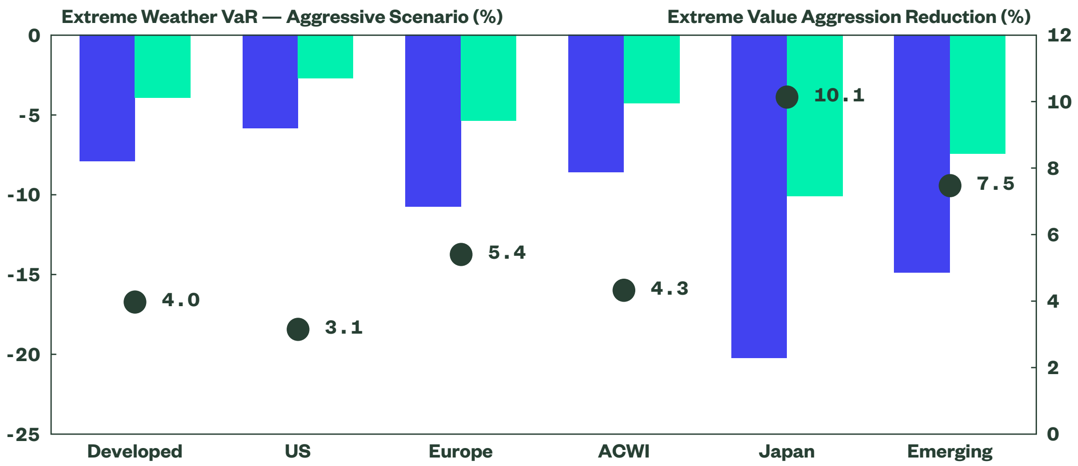
Lower Physical Risk

Physical risk refers to the general vulnerability to risks from weather impacts (such as extreme heat, coastal flooding and tropical cyclones, among others) that could have an adverse effect on businesses. Potential economic impacts include physical asset damage at various locations of company facilities and business interruption as a direct consequence of an extreme weather event. According to Carbon Disclosure Project's 2019 report, the financial value of assets with exposure to extreme weather events could reach $24.2 trillion by the end of 21st century.

For the purpose of our analysis, we focus our attention on the weather tail risk through the extreme weather value at risk (VaR) measure, which represents a "worst-case" (95th percentile) downside or upside potential, expressed as a percentage of the equity's market value, given the trends in extreme weather events.[13] Simply put, the climate VaR provides a forward-looking and return-based valuation assessment to measure climate-related risks and opportunities in an investment portfolio.

We examine the extreme weather VaR for each of the regional building blocks that make up the climate-aware Paris-aligned portfolio (see Figure 3). In line with the objective of the methodology, **the MSCI Climate Paris Aligned indices led to a reduction in the climate VaR, particularly the extreme weather VaR, across all universes** (see Figure 10).[14]

Figure 10
Extreme Weather Value at Risk (VaR) of Climate Paris-aligned Indices vs. Parent Benchmarks



Source: State Street Global Advisors, MSCI ESG Research. The results were generated as of March 2022, based on data in November 2021.

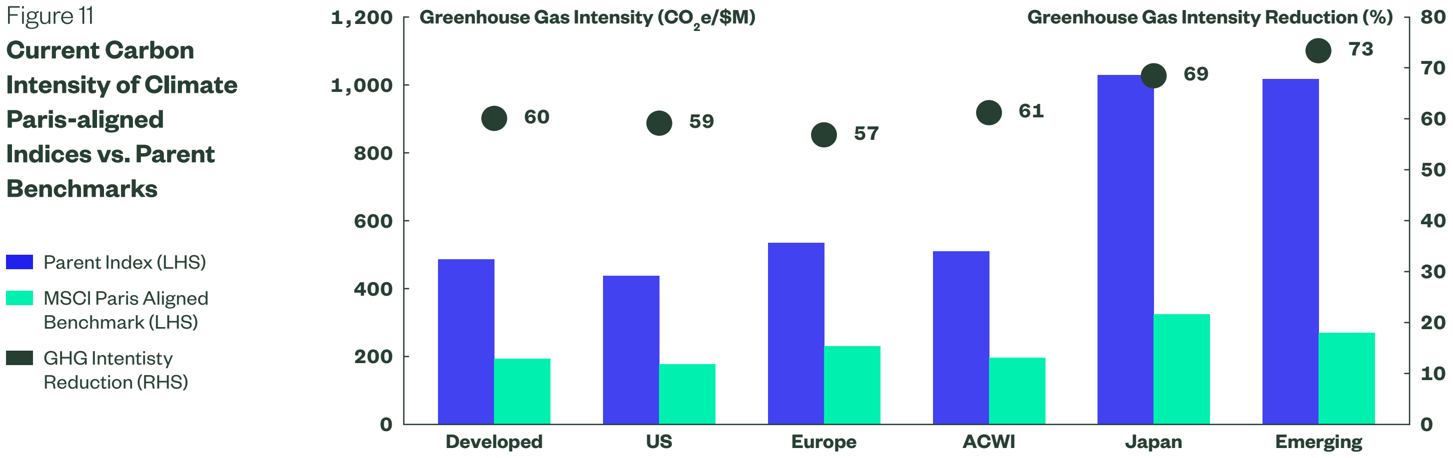
Lower Climate Transition Risk

> **The climate-aware indices reduced transition risks and reaped climate opportunities.**

Transition risk deals with the decrease in demand for goods and services produced by carbon-intensive companies and industries. As the world increasingly moves away from these business models, companies that do not adapt will find that their assets and goods become outmoded and obsolete, especially since more institutional investors are waking up to the risks of climate change. The recent Emissions Gap Report[15] highlights that there is still much to do to align with the commitments of the Paris Climate Accord, as the current path suggests that the global temperature rise is almost twice as much as what had been anticipated in the Paris Accord in a 1.5°C temperature rise scenario.

As expected, our analysis shows that the climate-aware Paris-aligned indices had lower carbon intensity across all universes (see Figure 11). In addition, fossil-fuel-based revenues declined to less than 0.5% across all the universes, with the highest reduction observed in emerging markets (3.74%).[16]

Figure 11
Current Carbon Intensity of Climate Paris-aligned Indices vs. Parent Benchmarks



Source: State Street Global Advisors, MSCI ESG Research. The results were generated as of March 2022, based on data in November 2021.

Higher Green Revenue Opportunities

Though certain companies face transition risks, they could also potentially see great opportunities through decarbonisation by increasing their research and development investments. In a recent paper written by Kruse, Mohnen, Pope and Sato (2020),[17] the authors found that green investments can enhance company economic performance. It further noted that the majority of the green revenues (i.e. revenues from building retrofitting, technologies that resolve water scarcity and alternative energy fuels, among others) came from the utilites sector. This is very much in line with our finding based on the MSCI Climate ACWI Paris Aligned Index (see Figure 12).

Figure 12a
MSCI ACWI
Green Revenues
Absolute

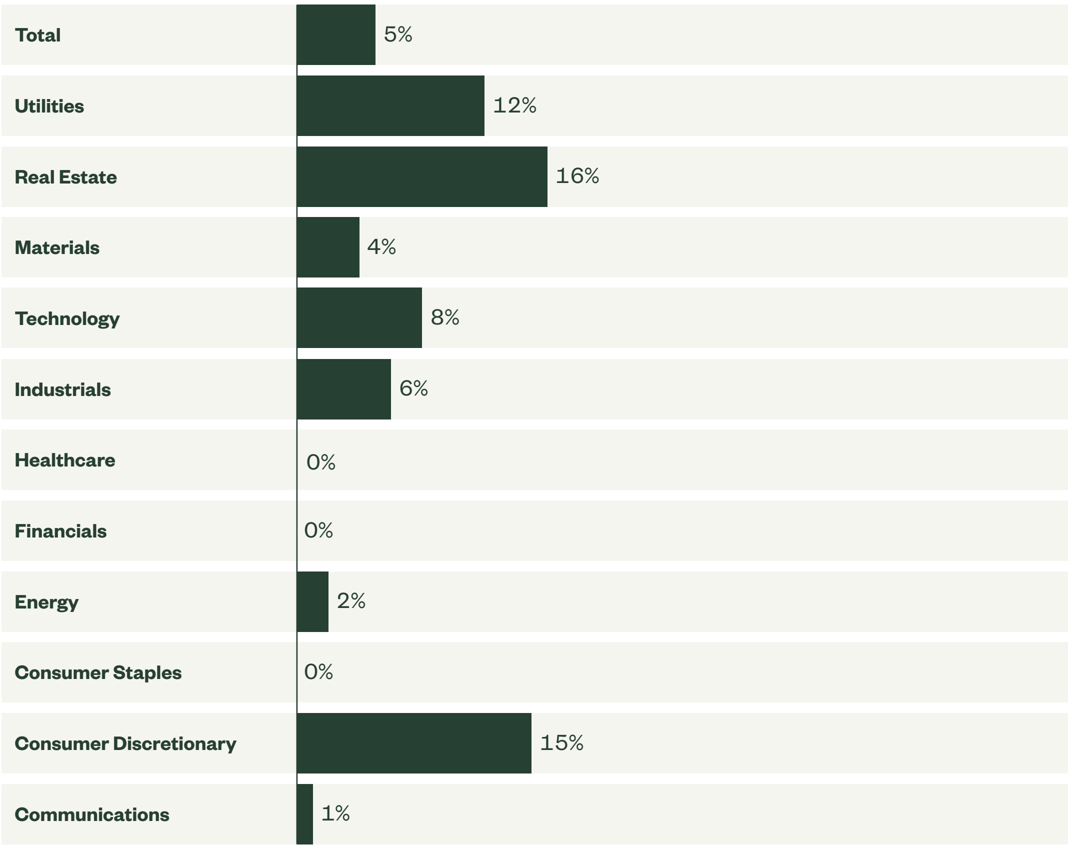
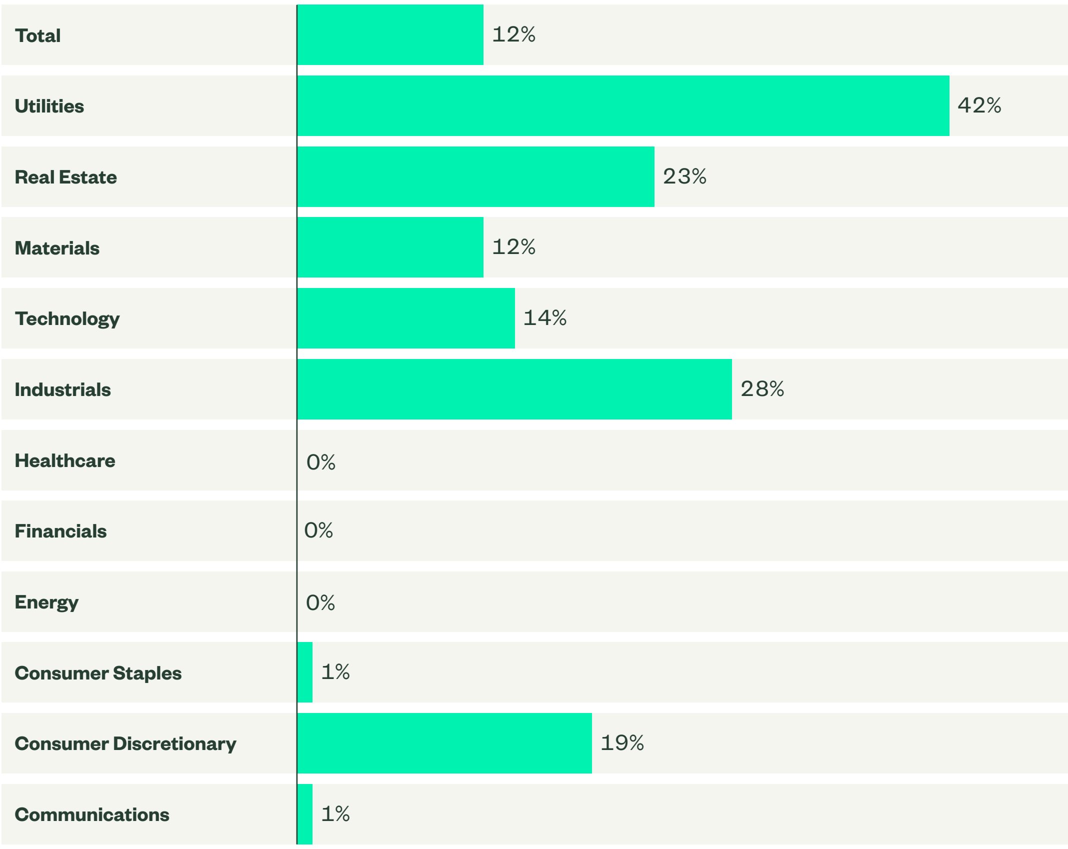


Figure 12b
MSCI ACWI
Climate Paris Aligned
Green Revenues
Absolute

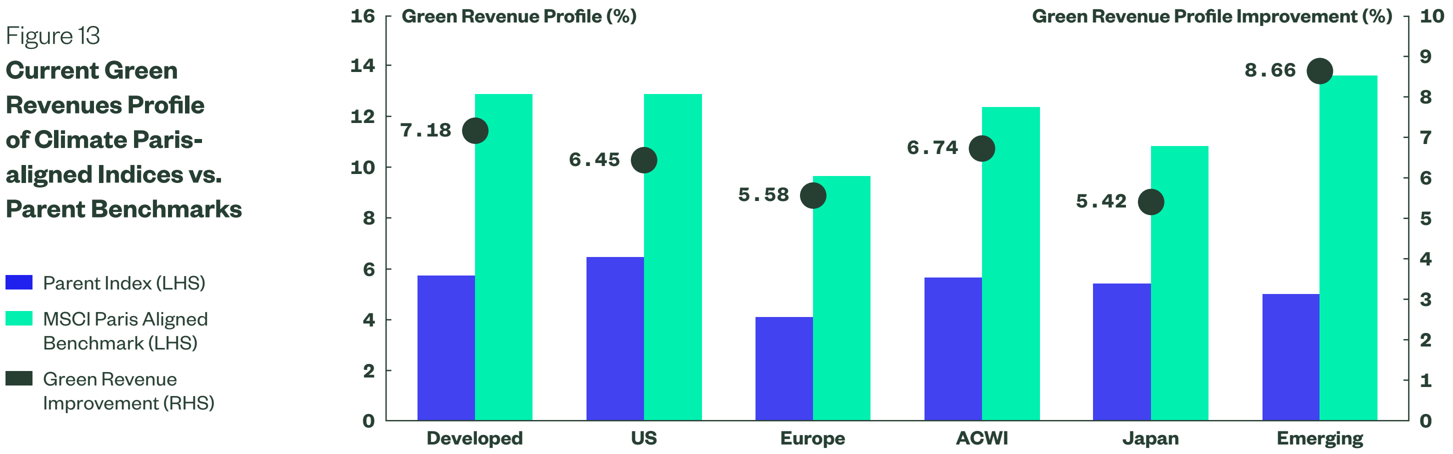


Source: State Street Global Advisors, MSCI ESG Research. The results were generated as of March 2022, based on data in November 2021.

Regulators are also playing their part in support of investors wishing to make greener choices by means of stronger regulation. A case in point is the launch of the EU taxonomy in 2020, a classification system designed to clarify which investments are environmentally sustainable, with a view to support a shift toward a greener economy and to prevent greenwashing.

Results in Figure 12 show that the climate Paris-aligned indices roughly doubled the amount of green revenues across all sectors, with the highest improvement seen in emerging markets (8.66%), followed by developed markets (7.18%).[18]

Figure 13
Current Green Revenues Profile of Climate Paris-aligned Indices vs. Parent Benchmarks



Source: State Street Global Advisors, MSCI ESG Research. The results were as of March 2022, based on data in November 2021.

Endnotes

1 Source: Climate risk for insurers, S&P Global.

2 *Climate Investing in 2022: Our Bumper Report*, Morningstar.

3 Source: October 2021, CDP.

4 Halper et al. (2022), *Asset Management Industry Confronts the Challenges Presented by Climate Change Transition*, Harvard Law School Forum on Corporate Governance.

5 The EU taxonomy is a complex system to classify which parts of the economy can be marketed as sustainable investments.

6 Source: State Street Global Advisors, Bloomberg. From December 2013 to March 2022. Tracking error is stated on an annualised basis and relates to the MSCI ACWI, World, US, Europe, Japan and Emerging Climate Paris Aligned Indices against their corresponding benchmark indices.

7 Paris Aligned Asset Owners Group grows to $1.9 trillion as ABP, National Trust, TPT and others join.

8 Bolton and Kacpareczyk (2020), *Do investors care about carbon?* National Bureau of Economic Research.

9 Lo, *Where Do Alphas Come From?: A New Measure of the Value of Active Investment Management,* SSRN, 2008.

10 Hsu, Kalesnik, Myers, *Performance Attribution: Measuring Dynamic Allocation Skill,* Financial Analyst Journal 2010.

11 The factor timing component of the return relates to the part of the return that is generated through the strategy varying its exposure to different factors. It is defined as the covariance of the average factor exposure and the average pure factor return.

12 We examined both the entire period as well as two sub-periods of equal length.

13 Source: MSCI ESG Metrics Calculation Methodology, Dec 2020.

14 Source: State Street Global Advisors, MSCI ESG Research. The results were generated as of 2021 using rebalanced data from November.

15 Emissions Gap Report 2021 (unep.org). The Emissions Gap Report 2021: The Heat Is On is the 12th edition in an annual series that provides an overview of the difference between where greenhouse emissions are predicted to be in 2030 and where they should be to avert the worst impacts of climate change.

16 Source: State Street Global Advisors, MSCI ESG Research. The results were generated as of 2021 using rebalanced data from November.

17 Green revenues, profitability and market valuation: Evidence from a global firm level dataset, Tobias Kruse, Myra Mohnen, Peter Pope and Misato Sato, Jan 2020, Centre for Climate Change Economics and Policy Working Paper No. 363 ISSN 2515–5709.

18 Source: State Street Global Advisors, MSCI ESG Research. The results were generated as of 2021 using rebalanced data from November.

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Glossary

Carbon Emissions (t CO_2e/$M Invested) Scope 1 + Scope 2 Carbon emissions normalised for the index.
Carbon Intensity (t CO_2e/$M Sales) Efficiency of the index in terms of total Scope 1 and Scope 2 carbon emissions divided by total sales.
Wtd Avg Carbon Intensity (t CO_2e/$M Sales) Exposure to carbon intensive companies based on Scope 1 and Scope 2 emissions.
Low Carbon Transition Score Weighted average low Carbon Transition (LCT) score measuring companies' level of alignment to the LCT. Companies with higher LCT score are more aligned with the LCT compared to the companies with lower scores. Scores range from 0 to 10.
Solutions (%) Exposure to companies involved in low/zero carbon solutions that would have negative total carbon intensity and are likely to benefit in a low carbon scenario.
Product & Operational Transition (%) Exposure to companies with moderately to highly carbon intensive products or operations. Such companies' products or operations could go under transition in a low carbon scenario.
Asset Stranding (%) Exposure to companies with very high risk exposure to transition risk and may face asset stranding risk in the short to medium term.
Potential Carbon Emissions (t CO_2e/$M Invested) Carbon potential emissions normalised for the index.
Fossil Fuel Reserves (%) Exposure to companies that own proved & probable coal and/or oil and natural gas reserves used for energy purposes. The definition is based on the MSCI Global Ex-Fossil Fuel Indexes Methodology.

State Street Global Advisors Worldwide Entities