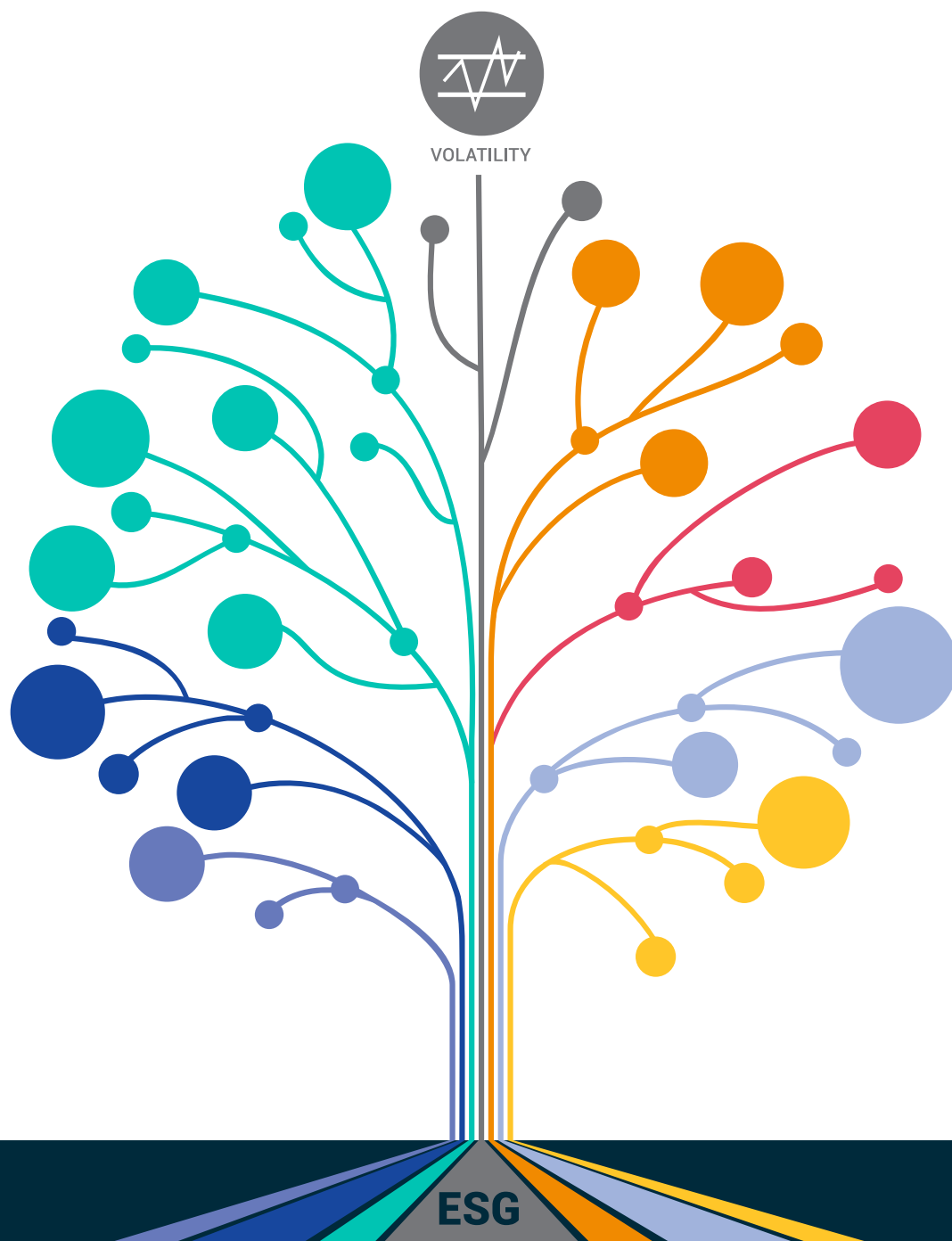


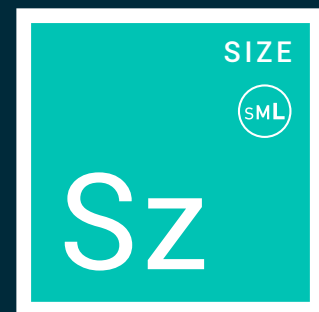
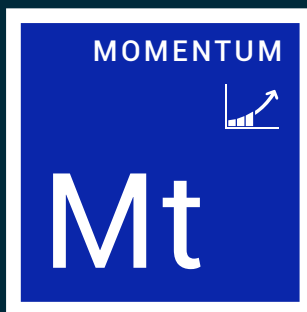
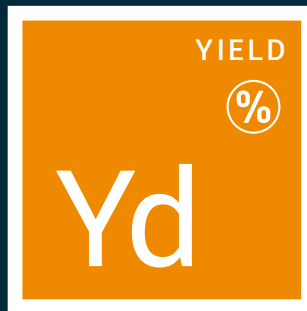
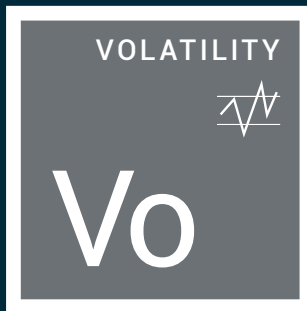


Minimum Volatility ESG Reduced Carbon Target Indexes



Elements of performance™

Factors by MSCI



Factors are the building blocks of many portfolios – the elements capable of turning data points into actionable insights.

Introduction



Two of the fastest growing trends among institutional investors is the incorporation of factor and environmental, social and governance (ESG) principles to manage and attribute risk. While factor investing has long been a part of the investment discussion, the use of factor models and indexes has grown more common today among mainstream investors who seek to manage portfolio risk as well as identify investment opportunities.

Factor Investing has experienced significant growth – with ETF based assets crossing \$680 billion in assets under management¹. The growth in ESG is similarly strong, with the number of UN Principles for Responsible Investment (PRI) signatories reaching 1,900 as of year-end 2018².

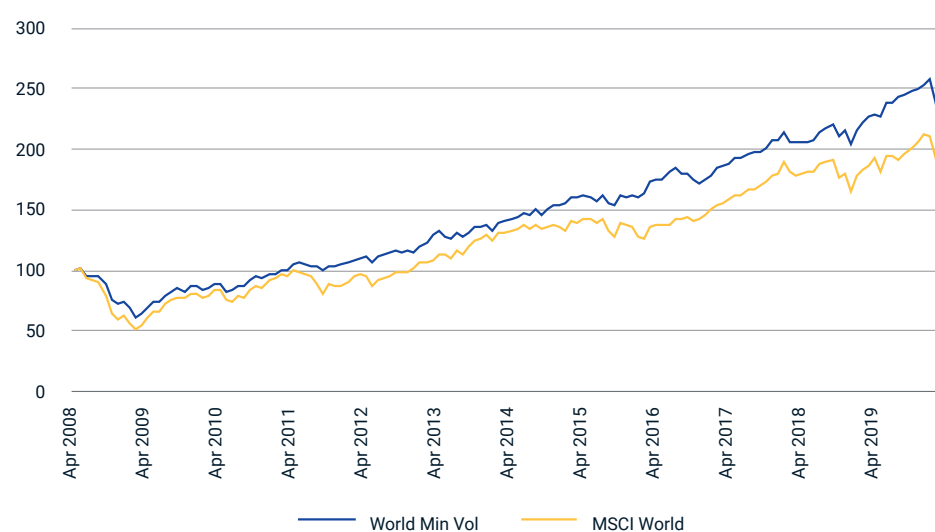
ESG investors have long focused on exclusions of weapons, alcohol or tobacco producers. Today, we are seeing a more holistic view of ESG being used to manage risk placing ESG principles within factor models in the risk management toolbox.

For many investment managers and product providers, the key challenge of combining factor and ESG into a single portfolio has been to construct an appropriate methodological framework to balance the desired factor exposure while meeting ESG considerations.

MSCI is at the forefront of the integration of ESG into factor portfolios to enable investors to better manage key drivers of risk and return with an extensive set of risk factor models, ESG research and factor and ESG indexes³.

The MSCI Minimum Volatility ESG Reduced Carbon Target Index series uses an exclusion and optimization-based framework. The exclusions include environmental (thermal coal, oil sands), social (tobacco, controversial weapons, nuclear weapons and civilian firearms) and governance (exclusion of 'red flag' controversies represented by those businesses which are involved in very severe business controversies as defined by the MSCI ESG controversies methodology).

The MSCI World Minimum Volatility Index outperformed its parent since its launch



MSCI World Minimum Volatility (USD) was launched on April 14, 2008.

1. ETFGI reports Smart Beta ETFs and ETPs listed globally gather net inflows of US\$7.38 billion during January 2019
2. United Nations Principles for Responsible Investing. <http://www.unpri.org/>
3. ESG research, rating and data are produced by MSCI ESG Research LLC. MSCI ESG Indexes and Analytics utilize information from, but are not provided by, MSCI ESG Research LLC. MSCI Indexes and Analytics are products of MSCI Inc. MSCI Indexes are administered by MSCI Limited (UK).



Index methodology⁴

review

The MSCI Minimum Volatility ESG Reduced Carbon Target Indexes are designed to represent the performance of a strategy that seeks systematic integration of ESG, along with the minimum volatility factor. The Indexes are constructed by selecting constituents of a market capitalization weighted index (the 'Parent Index') through an optimization process that aims to minimize the index's volatility risk, reduce its carbon-equivalent exposure to CO₂ and other greenhouse gas (GHG) emissions as well as its exposure to potential discharge risk of fossil fuel reserves, by 30%. They also aim to improve the weighted-average industry-adjusted ESG score of the Index portfolio by 20% in relation to their respective underlying Parent Index under certain constraints.

Constructing the Indexes involves the following steps:

- › Defining the Parent Index and base currency for optimization
- › Defining the exclusion criteria (as described above)
 - › **Environmental exclusions:** oil sands, thermal coal
 - › **Social exclusions:** nuclear weapons, controversial weapons, civilian firearms and tobacco
 - › **Governance:** red flag controversies
- › Defining the security level carbon exposure
 - › Measured in terms of GHG emissions and potential carbon emissions from fossil fuel reserves



- › To maintain diversity and meet the index objectives, the methodology constrains the weights to securities, sectors and countries, exposure to non-target factor and minimum improvement constraints across carbon and ESG characteristics relative to the Parent Index. The primary optimization constraints are defined below:
 - ›› **Stock level:** maximum weight will be 1.5% or 20 times the weight of the security in the Parent Index, whichever is lower. A minimum weight is 0.05%.
 - ›› **Country level:** countries with weight greater than 2.5% in the Parent Index, the weight in the MSCI Minimum Volatility ESG Reduced Carbon Target Index will not deviate more than +/-5% from the country weight in the Parent Index
 - ››› For countries with weight less than 2.5% in the Parent Index, the weight in the MSCI Minimum Volatility ESG Reduced Carbon Target Index will be capped at three times their weight in the Parent Index
 - ››› The above country weight constraint will also apply on China A Stock Connect listings as a group separately in addition to the usual country weight constraint on China
 - ›› **Sector weights:** will not deviate more than +/-5% from the Parent Index
 - ›› **Factor exposure constraints:** No constraint will be applied on the exposure to the volatility risk factors
 - ››› Exposure to all other risk factors will be restricted to +/-0.25 STD relative to the Parent Index
 - ›› The weighted-average industry-adjusted ESG score of the Index portfolio will be at least 20% more than the weighted-average industry-adjusted ESG score of the Parent Index portfolio (at the time of rebalancing)
 - ›› Minimum reduction in carbon intensity relative to the parent will be 30%
 - ›› Minimum reduction in potential emissions relative to the parent will be 30%



Index

review

We back-tested the index methodology from May 2010 through March 2020 and compared the risk and return characteristics as well as the ESG profile of the MSCI World Minimum Volatility ESG Reduced Carbon Target Index relative to MSCI World and the standard MSCI World Minimum Volatility Index⁵. We found that the MSCI World Minimum Volatility ESG Reduced Carbon Target Index generated higher returns and lower risk relative to MSCI World and delivered similar risk and return to the standard MSCI World Minimum Volatility Index – but with

error (7.1% versus 7.6%) and improved information ratio (of 0.26 versus 0.22, as shown below in table 1).

One question institutional investors may consider when evaluating the construction of a combined factor and ESG strategy is the impact on the factor exposure and the net change in ESG and climate metrics. In this regard we found similar factor exposure and attribution between the standard MSCI World Minimum Volatility Index and the MSCI Minimum Volatility ESG Reduced Carbon Target Index (shown below). In fact, in both cases the exposure to stocks

with lower risk and more stable earnings, as shown by the negative exposure to residual volatility and earnings variability, were the biggest contributors to active return. Similarly, both benefited from exposure to securities with higher profitability and momentum. Historically, the inclusion of ESG principles did not materially impact the exposure or contribution of the desired factor exposure – Minimum Volatility. However, adding elements of ESG into the index construction, the overall ESG and climate metrics improved, meeting the overall index methodology objective. See Table 2 for more detail.

5. This paper contains analysis of historical data, which may include hypothetical, backtested or simulated performance results. There are frequently material differences between backtested or simulated performance results and actual results subsequently achieved by any investment strategy. The analysis and observations in this paper are limited solely to the period of the relevant historical data, backtest or simulation. Past performance – whether actual, backtested or simulated – is no indication or guarantee of future performance. None of the information or analysis herein is intended to constitute investment advice or a recommendation to make (or refrain from making) any kind of investment decision or asset allocation and should not be relied on as such.

Table 1 - Key metrics



| | MSCI World Index | MSCI World Min. Vol. Index | MSCI World Min Vol ESG Red. Carbon Tgt. Index |
|------------------------------|------------------|----------------------------|---|
| Total Return* (%) | 7.8 | 9.4 | 9.6 |
| Total Risk (%) | 13.6 | 9.5 | 9.4 |
| Return/Risk | 0.57 | 0.99 | 1.02 |
| Sharpe Ratio | 0.52 | 0.91 | 0.94 |
| Active Return (%) | 0.0 | 1.6 | 1.8 |
| Tracking Error (%) | 0.0 | 7.6 | 7.1 |
| Information Ratio | NaN | 0.22 | 0.26 |
| Historical Beta | 1.00 | 0.59 | 0.60 |
| No of Stocks*** | 1636 | 277 | 266 |
| Turnover** (%) | 1.7 | 20.1 | 20.0 |
| Price To Book*** | 2.1 | 2.5 | 2.5 |
| Price to Earnings*** | 17.5 | 19.3 | 18.6 |
| Dividend Yield*** (%) | 2.5 | 2.8 | 2.7 |

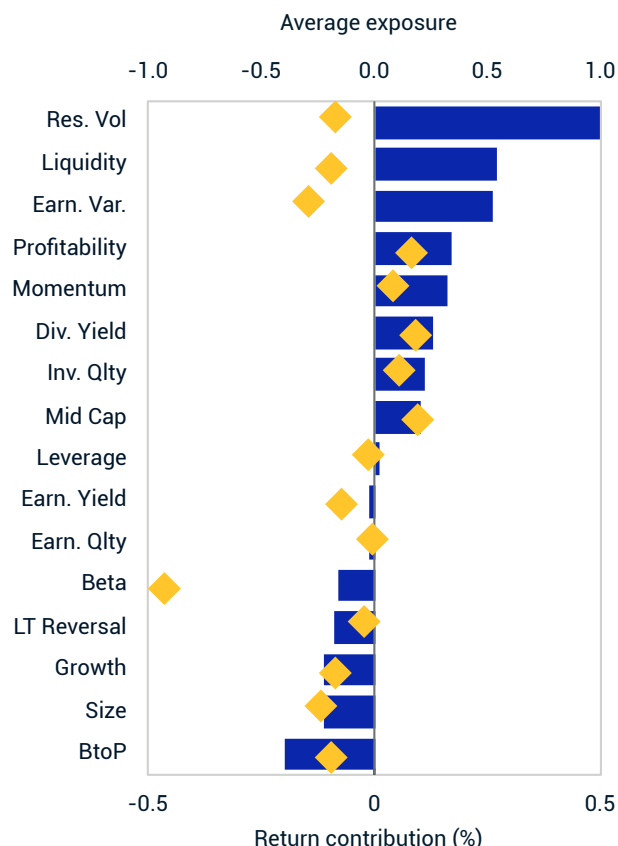
Period: 31 May 2010 to 31 Mar 2020

* Net returns annualized in USD

** Annualized one-way index turnover over index reviews

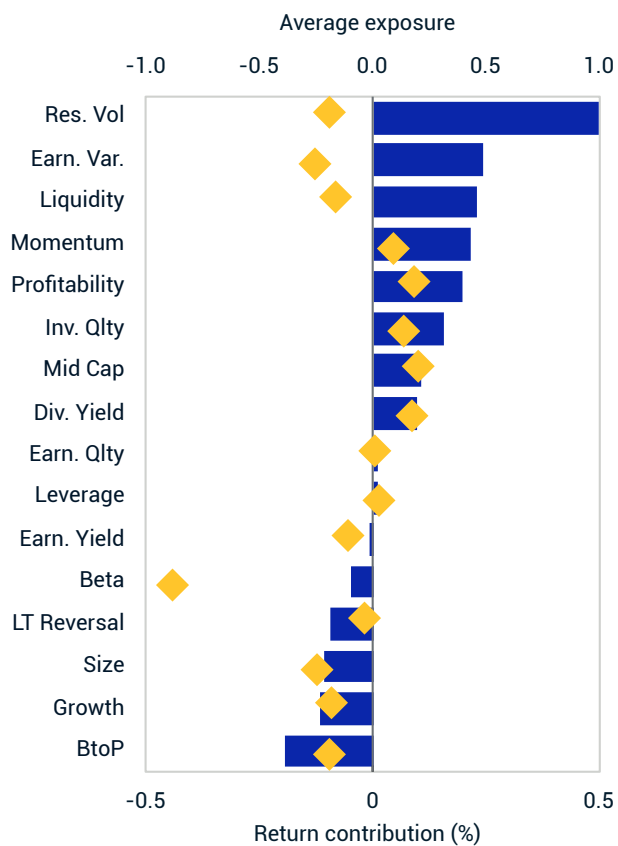
*** Monthly averages

MSCI World Min Vol Index



● Return contribution ◆ Average exposure

MSCI World Min Vol ESG Reduced Carbon Target Index



● Return contribution ◆ Average exposure

Table 2 - ESG Metrics > Climate Change

| | MSCI World Index | MSCI World Min. Vol. Index | MSCI World Min Vol ESG Red. Carbon Tgt. Index |
|---|------------------|----------------------------|---|
| Carbon Footprint | | | |
| Carbon Emissions (t CO2e/\$M Invested) | 133 | 140 | 52 |
| Carbon Intensity (t CO2e/\$M Sales) | 188 | 253 | 95 |
| Wtd Avg Carbon Intensity (t CO2e/\$M Sales) | 166 | 368 | 142 |
| Low Carbon Transition Risks | | | |
| Low Carbon Transition Score | 6.1 | 6.0 | 6.2 |
| Solutions (%) | 3.0 | 3.3 | 5.6 |
| Product & Operational Transition (%) | 15.1 | 19.3 | 15.9 |
| Asset Stranding (%) | 0.2 | 0.0 | 0.0 |
| Exposure to Asset Stranding Risks | | | |
| Potential Carbon Emissions (t CO2e/\$M Invested) | 2324 | 144 | 0 |
| Fossil Fuel Reserves (%) | 5.3 | 3.2 | 0.1 |
| Thermal Coal Mining (%) | 1.2 | 1.2 | 0.1 |
| Thermal Coal-based Power Generation (%) | 3.7 | 7.9 | 4.0 |
| Unconventional Oil & Gas Extraction (%) | 2.6 | 0.3 | 0.0 |
| Exposure to Clean Technology Solutions | | | |
| Clean Technologies Solutions (>= 20% Revenue) | 4.4 | 5.2 | 7.1 |
| Clean Technologies Solutions Revenue (Wtd Avg %) | 3.7 | 4.2 | 5.5 |
| Green Share/Brown Share Ratio (Wtd Avg % Revenue) | 2.0 | 1.3 | 4.7 |
| Other Climate Metrics | | | |
| Exposure to Carbon-related Assets (%) | 7.0 | 9.2 | 8.5 |
| Climate-related Controversies (% , Score <= 4) | 0.8 | 1.3 | 1.8 |
| Low Carbon Transition Management Score (% Top Quartile) | 70.0 | 63.3 | 73.4 |

As of 31 Mar 2020



Potential

applications

Indexes are often used as performance benchmarks for active managers. Investors may also use policy benchmarks in their strategic asset allocation to define eligible markets and the universe of eligible securities for their portfolios. At the same time, they may use them to define active or passive allocations when implementing their asset allocation strategies. We have observed an increasing number of investors incorporating factor indexes and ESG considerations into their investment process through index replication.

Conclusion

Addressing corporate ESG considerations and the risks of not transitioning to low-carbon portfolio exposure has become increasingly important for many global investors. At the same time, an increasing number of European regulators are requiring institutional investors to consider ESG and carbon risks that may be financially relevant to their investment processes. Simultaneously, minimum volatility index based strategies have been used to

lower equity risk at the policy benchmark and portfolio level while preserving their total overall allocation to equities.

The MSCI Minimum Volatility ESG Reduced Carbon Target Indexes are designed to help investors utilize a minimum volatility approach combined with ESG principles. These indexes were constructed to preserve the factor exposure and have historically, generated higher risk-adjusted returns vs.

cap-weighted indexes. We have observed similar risk-return characteristics to standard minimum volatility indexes but with improved ESG scores and reduced carbon footprint. In addition, these indexes exclude business activities that are commonly seen as controversial, such as tobacco production and weapons manufacturing.



About MSCI Inc.

MSCI is a leading provider of critical decision support tools and services for the global investment community. With over 45 years of expertise in research, data and technology, we power better investment decisions by enabling clients to understand and analyze key drivers of risk and return and confidently build more effective portfolios. We create industry-leading research-enhanced solutions that clients use to gain insight into and improve transparency across the investment process.

To learn more, please visit www.msci.com/esg-investing.

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