

Playing by the rules

Incorporating sustainability factors
in **rules-based equity strategies**



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Practical sustainability

This paper focuses on the practicalities of incorporating sustainability factors in rules-based equity strategies in a robust and efficient way. We firstly introduce some portfolio management aspects of replicating ESG/SRI indices; then we demonstrate several methods of constructing custom ESG/SRI rules-based portfolios, including stock exclusions and strategies with systematic tilts.

In the second part, we focus on the implementation of rules-based strategies that integrate sustainable themes. In particular, our UBS AM approach with regards to climate and governance aware strategy types is briefly discussed, from which we show encouraging initial results to inspire the embedding of ESG factors as a return/risk resource in tilted strategies.

Not many investment themes have sparked as much controversy and divergence in opinion as sustainable investing. This is not surprising—most investment strategies are constructed with the intention or expectation to achieve certain risk and/or return objectives that are well defined and measurable. Sustainable investing, on the other hand, tends to be multi-dimensional, and its impacts on long-term risk and return are not yet fully understood. Additionally, this investment style is characterized by a number of complexities, including multiple objectives (e.g. ethical and long-term investment) and modelling difficulties arising from data coverage, quality and standards. While there is a growing belief that rules-based strategies incorporating sustainable factors may offer investors potential long-term outperformance compared to standard market cap weighted indices, sustainable strategies are not yet directly associated with a particular risk-return profile. It is an undisputed fact, however, that the popularity of this invest-

ment theme continues to grow, especially in the index/rules-based space: more than USD 100 billion in index AUM currently track ESG/SRI indices globally.¹ This move towards index-like products could be explained, amongst other things, by the increase in automation processes, which is closely related to the pace of technological innovation. The increased availability of more sophisticated software technologies and data is disrupting different industries, including the financial sector.² Furthermore, this push in rules-based types of investment driven by technology is also a reflection of the boost in alternative smart beta products. For example, Kahn and Lemmon 2015 discuss how any static exposure can be implemented as a smart beta factor and the potential disruption this process could inflict on the investment industry. Consequently, index managers need to adapt and navigate successfully the fast moving waters of sustainable investing. In this article, we will not be adding further to the debate on if and why to invest sustainably via indices/rules-based strategies, but will focus on the practical topic of incorporating sustainability factors in rules-based equity strategies and implementing these strategies efficiently.

This article is organized as follows: first, we discuss some of the portfolio management aspects of replicating ESG/SRI indices; we then look at several methods of constructing custom ESG/SRI rules-based portfolios, including exclusions and tilts.

Replicating ESG/SRI indices: portfolio management aspects

As the ESG/SRI index space has grown and evolved rapidly over the past several years in terms of number of different index series and construction methodologies, so have the portfolio management considerations related to implementing these indices efficiently, including liquidity, turnover, valuation levels, and treatment of corporate actions. These considerations are particularly relevant to non-market cap weighted indices that either weight stocks by sustainability metrics or by a combination of sustainability and risk premia metrics. Two factors are specific to trading for constituent changes in these

¹ Source: MSCI, FTSE Russell. Data as of June 2018.

² See Frey and Osborne 2013 for an overall discussion on this topic.

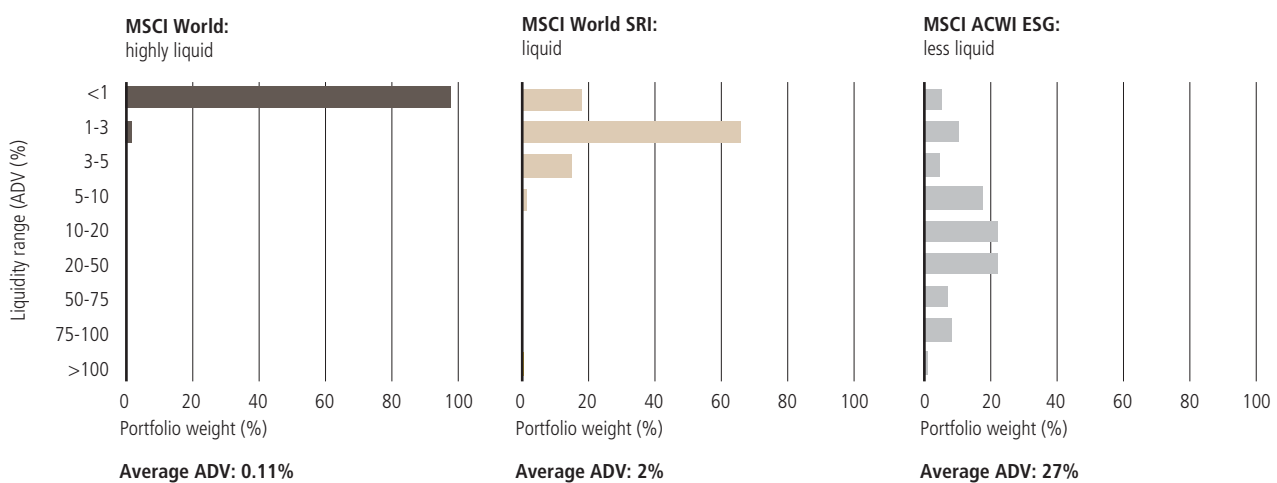
indices: size and relative illiquidity. There are significantly fewer assets currently managed against these indices (over USD 100 billion³) compared to market capitalization indices (estimated at USD 10 trillion⁴), however, the former tend to be relatively less liquid, and turnover levels higher, hence there are more opportunities for incremental efficiencies. These opportunities may increase as the size of assets managed against non-market cap weighted indices grows. Therefore, the implementation process of index portfolios combining sustainability and risk premia factors involves timely, detailed, precise and pragmatic consideration of liquidity (tends to be lower than market cap), turnover and cost (tends to be higher than market cap), and corporate events (specific rules apply to treatment of corporate actions).

- Liquidity: by construction, both sustainable and risk premia indices aim to exploit a particular theme or market segment, therefore they could comprise fewer liquid securities compared to a broad market cap index. Additionally, some of these indices are more concentrated than their parent market cap index, consequently they could have significant overweight positions in certain stocks vs. a broad market cap index. Exposure to particular market segments and large

positions in certain stocks could potentially create liquidity problems for some sustainable indices at rebalancing, as shown in the below graphs which show an example of a rebalancing trade involving a USD 1 billion index portfolio tracking MSCI ACWI ESG Universal Index, MSCI World SRI Index and MSCI World Index.

- Turnover: in the construction and maintenance of index equity portfolios tracking sustainable indices, we consider three key factors simultaneously: transaction costs, tracking error and index imbalances, using our in-house proprietary portfolio management system. Portfolios are therefore constructed to minimize costs and risks while closely replicating the index, as we believe that this is the most effective approach to ensuring efficient portfolio management, especially when managing index portfolios with higher turnover, such as SRI/ESG indices. For reconstituted annually in May (as well as reviewed quarterly) and ESG Universal indices (reconstituted semi-annually in May and November (as well as reviewed quarterly) tends to be in the range of 20–30% p.a. two-way, compared to approximately 5% p.a. two-way for MSCI World Index.

Exhibit 1: Liquidity analysis for USD 1 billion rebalancing trade in index equity portfolios



Source: Citigroup BECS Pre Trade Analytics in USD, UBS Asset Management, MSCI, RIMES. Data as at June 14, 2018. Rebalance trade based on MSCI Semi-Annual Index Review in May 2018. Note: Assuming neutral markets. ADV=Average daily volume. For illustration purposes only.

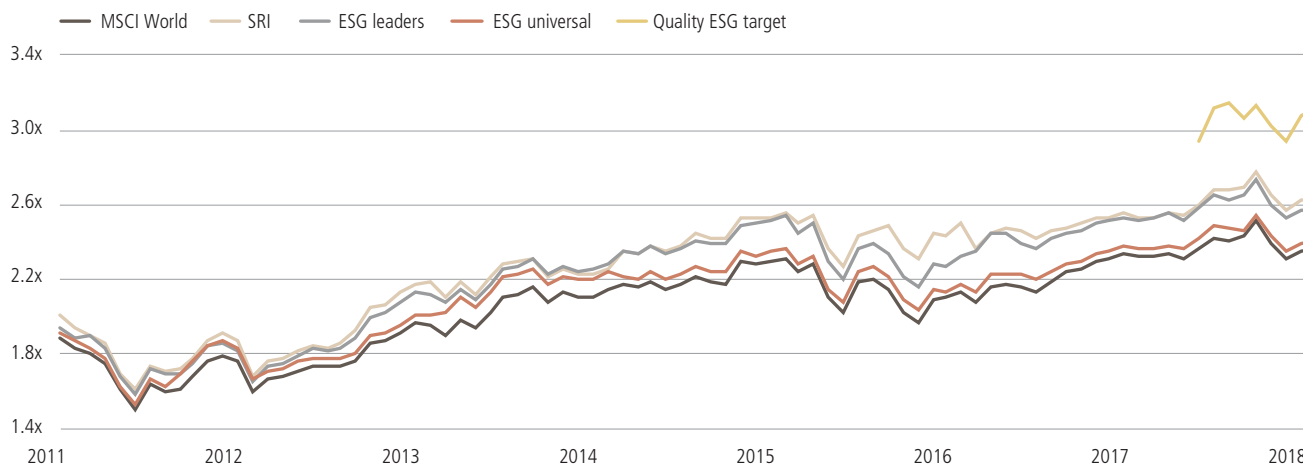
³ Source: MSCI, FTSE Russell. Data as of June 2018.

⁴ Source: UBS Asset Management estimates, MSCI, FTSE Russell, S&P Dow Jones. Data as of June 2018.

– Corporate events: specific rules apply to corporate actions’ treatment in sustainable indices compared to market cap indices. Additionally, rules regarding the treatment of certain corporate events differ amongst the various sustainable indices. When corporate actions affecting index constituents are announced, we have to decide how to trade and implement them in our clients’ portfolios. Due to the abovementioned nuances and intricacies, often the treatment of the same stock impacted by the same event would differ between our standard market cap and ESG/SRI portfolios. Corporate activity in market cap indices is largely

self-rebalancing. This might not be the case with sustainable indices. The main difference in treatment between standard market cap and sustainable indices is in the case of corporate events, such as spin-offs, mergers, takeovers, and rights issues. While these events require little or no action in market cap indices, they may result in far more significant trading in sustainable indices. When events are treated on a case-by-case basis, we analyze carefully the treatment of the event in question in different indices and, if necessary, we seek further clarity from the index providers, in order to determine our trading and implementation strategy for our

Exhibit 2: Price-to-book multiples for MSCI World and global sustainable indices



Source: UBS Asset Management, MSCI, RIMES. Price-to-book value monthly data from March 2011 to April 2018. Data for sustainable indices contains live and back-tested data sourced from MSCI. Past performance is not a reliable indicator of future results.

clients' portfolios. We maintain an ongoing dialogue with the index providers to ensure we are fully aware of the correct treatment of corporate events within the indices, allowing us to make optimal decisions.

- Valuation: we mentioned earlier that sustainable index strategies do not tend to be directly associated with a particular risk-return profile. Nevertheless, their valuation levels should not be ignored altogether, especially given their growing popularity and the increasing amount of money tracking this type of index. As the focus of these indices is on capturing better-quality companies with long-term sustainable prospects, one would expect them to trade at higher multiples compared to market cap indices. Looking at the price multiples of four global ESG/SRI indices and a global market cap index, we note the sustainable indices traded at a premium compared to the market cap index. An index combining ESG and quality metrics traded at the highest multiples amongst the group of examined indices. Investors should not base their decision on whether or not to invest in sustainable indices or try to market-time such investments based on valuation metrics alone. However, valuation analysis should be one of a number of tools used when examining this type of strategy, in our view.

Applying ESG/SRI exclusions to rules-based portfolios

Many institutional clients maintain lists of stocks/sectors they do not want to hold in their portfolios because these stocks/sectors contravene their ethical policies. Excluding stocks/sectors based on ESG criteria remains popular in the index investment space and a frequent discussion topic with our clients. In fact, more than 50% of our indexing book of business by AUM⁵ has a degree of customization, including ESG-themed exclusions. There are two potential approaches to implementing exclusion lists in index equity portfolios. In the first approach, stocks/sectors are excluded both from the index and from the portfolio, therefore the portfolio tracks a modified version of the original index, assuming these stocks do not exist. In the second approach, the original index remains unchanged, but stocks are excluded from the portfolio by using stratified sampling or optimization techniques to minimize tracking error. Clients often ask us which approach is better. We implement both approaches successfully and recognize that both have merits and deficiencies, which we discuss next.

Many institutional clients maintain lists of stocks/sectors they do not want to hold in their portfolios because these stocks/sectors contravene their ethical policies.

⁵ UBS Asset Management. Data as at 31 March 2018.

- The first approach is simpler. One of the key attractions of investing in indices is their simplicity and transparency. This applies to custom indices as well. Excluding stocks from the index and the portfolio allows the portfolio to be managed vs. the modified index, without the need to apply stratified sampling or optimization to keep the tracking error low.
- The second approach tends to produce lower tracking error between the portfolio and the original index compared to the first approach, as the portfolio is optimized vs. the original index with one of the optimization parameters being tracking error minimization. The resulting portfolio also tends to have broader representation compared to the resulting portfolio in the first approach.
- The first method is also the approach applied by index providers when they construct indices excluding stocks/sectors.
- Performance attribution tends to be somewhat clearer when stocks are excluded from the index and from the portfolio. The resulting index and portfolio are proportionally re-weighted after the exclusions and retain their original shape. Consequently, it is fairly straightforward to attribute the performance impact of the exclusions. The situation is more opaque when stocks/sectors are excluded from the portfolio only, as the portfolio would need to be sampled or optimized, therefore the calculated impact of the exclusions could be less accurate or meaningful.
- When stocks are excluded from the index and the portfolio, the resulting portfolio is typically more economically sound, as it retains the original shape and weighting. In contrast, when stocks are excluded from the portfolio only, the optimizer might generate a solution that, even if feasible from an optimization perspective, might be counterintuitive and less sensible. For example, if a client's stock exclusion list contains the largest tobacco producers, the optimizer would likely increase the weights of the smaller tobacco producers in order to reduce the sector-level deviations and minimize the tracking error. Consequently, the resulting portfolios might not reduce exposure to tobacco manufacturers at all, and in certain situations could even increase the exposure.
- While an optimizer can help reduce the factor risk when the second approach is applied, most risk models do not typically account for ESG factors. Consequently, it is unclear to what extent the factor risk reduction is related to reduction in the risk associated with the excluded stocks. We expect that in the future risk models will likely incorporate ESG factors.

Constructing custom rules-based portfolios via tilts

A number of sustainable investing themes have emerged recently, including:

- Determining potential sources of material risk and alpha. For example, the opportunities emerging from the transition to the low carbon economy are likely to be a potential source of long-term returns.
- Impact investing, characterized by a move from output-driven ESG integration to measuring and reporting the social and environmental impact of investments in companies, funds, etc.
- Increasing the diversity of approaches to integrate sustainable factors in rules based portfolios, driven by heterogeneity of investors' time horizons, risk tolerance, beliefs relating to sources of risk premia, etc.

ESG data is increasingly seen as an additional source of information, unrelated to traditional sources of risk premia (e.g. governance-related factors).

In this section we focus on the third point. Some of the factors behind this increasing diversity of approaches include:

- Different motivations for ESG integration: ethical and/or value-based considerations (e.g. labor management), or long-term risk-return management (e.g. risk and opportunities arising from the transition to the low carbon economy).
- Different data sources in terms of coverage and quality: e.g. MSCI ESG Metrics, Trucost, Sustainalytics, South Pole, etc.
- ESG data is increasingly seen as an additional source of information, unrelated to traditional sources of risk premia (e.g. governance-related factors).
- Different levels of investors' knowledge, awareness and preferences for implementing sustainable factors (e.g. exclusions, tilts, engagement, etc.).

We next review two examples of our work in this area: incorporating climate-related factors in a portfolio, and integrating governance scores in a portfolio.

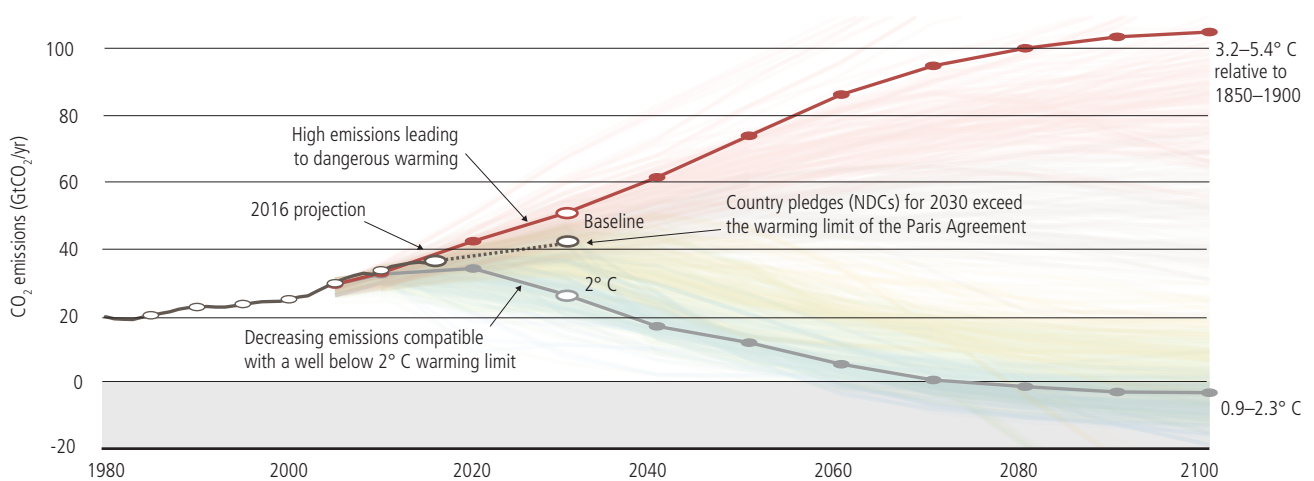
Case study 1: Constructing the UBS Climate Aware Rules-Based Global Equity Strategy

According to recommendations by the Financial Stability Board’s (FSB) Task Force on Climate-related Financial Disclosures (TCFD), climate change is one of the most significant and yet misunderstood risks that companies and financial organizations face today. The potential impacts are physical, regulatory and technological, and manifest both in the short and long term. In April 2016, 174 countries and the European Union officially signed the UN Climate Change Paris Agreement to reduce greenhouse gas emissions, limit global average temperature to a maximum of 2° C above pre-industrial levels and accelerate the transition to a lower-carbon economy.⁶ This transition will create both risks and opportunities and will affect all sectors and industries across the globe. Achieving this mission will not only require action by governments and companies. Investors also have a crucial role to play and need to adopt more resilient, long-term strategies to

tackle climate change, including investing in climate solutions, engaging with companies to encourage implementation of the TCFD disclosure recommendations, and adopting scenario analysis to assess climate-related risk and opportunities.

While the hope is that over time the world will be less reliant on carbon, it is clear that at the very least a prolonged transition period will be needed to achieve this, given current levels of fossil fuel dependence. Anyone who simply excludes this sector is unable to exert any influence on the means and timing of such a transition. Many responsible investors believe that being part of this process is an essential component of driving effective and long-lasting solutions. An alternative and, arguably from a big picture perspective, more responsible approach is for investors to mobilize behind the worldwide efforts under the Paris Agreement.

Exhibit 3: Global carbon emissions by target



Source: Future Earth, CDIAC/GCP/IPCC/Fuss et. al. 2014/Rogelj et. al. 2016. For illustration purposes only.

⁶ A key element of the deal negotiated at the 2015 Paris Climate Change Conference was a long-term goal to limit the increase in global average temperatures to “well below” 2° C, while pursuing efforts to limit the temperature increase to 1.5° C above pre-industrial levels.

Based on the scenario analysis related to the 2° C target, we have constructed an innovative forward-looking rules-based equity strategy that continues to invest in carbon-emitting companies, but engages with companies appearing less well positioned for the needed transition, and supports companies developing new technologies necessary for the transition. We adopted a forward-looking approach based on tilts and engagement, as we believe that an approach relying solely on historic carbon emissions data and exclusions has deficiencies, including:

- Unintended exposures to sector, country, style factor, beta, etc.
- Failure to consider the multi-dimensional aspects of climate change and carbon data itself. For example, large carbon emitters can be adjusting their business to the low carbon economy, investing in renewable energy, or disclosing their data.
- Possibly leading to unintended risks by focusing only on carbon risk. While much of the risks related to climate change might be removed, some opportunities related to transition could be missed at the same time.
- Failure to acknowledge the uncertainties of climate change.

The last point is very important and not often discussed, in our view. Brock and Hansen (2017) analyze the social cost of carbon under uncertainty, distinguishing three forms of uncertainty: risk, ambiguity and misspecification. Intuitively,

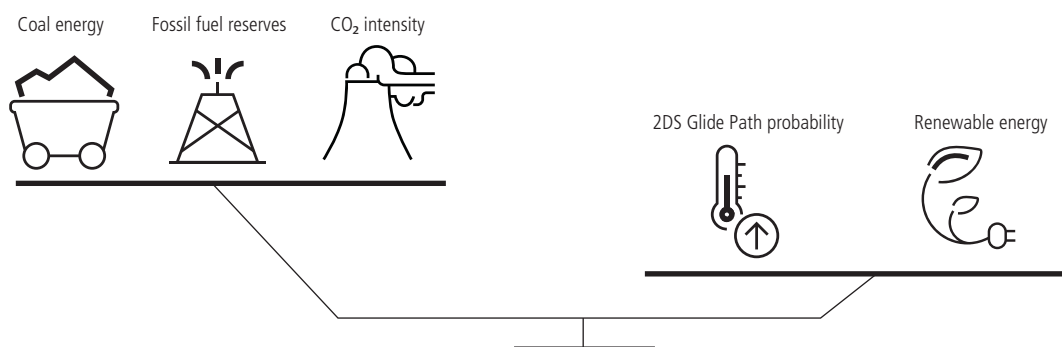
risk is related to an approach (model) unlikely to fit future events. Ambiguity is the uncertainty associated with how to use alternative approaches (models). Misspecification is related to the use of models that are not perfect. In constructing our Climate Aware strategy, we aim to address these different aspects of uncertainty.

Via a series of positive and negative tilts, illustrated schematically in Exhibit 4, our Climate Aware strategy aims to achieve several objectives:

- Substantially reduce the carbon (CO₂) footprint⁷ of a global index equity portfolio while increasing the exposure to forward-looking metrics related to the transition to the low carbon economy.
- Materially increase investment in companies that are best placed to benefit from the growth in demand for renewable energy and associated technologies.
- Achieve long-term returns broadly in line with the returns of the underlying index.

There could be trade-offs amongst these objectives since, all else being equal, the more the portfolio is reshaped away from the index benchmark, the greater the chance that investment returns will diverge. Our strategy aims to achieve balance by applying constraints on tracking error and stock and sector deviations.

Exhibit 4: UBS climate aware strategy—positive and negative tilts



Source: UBS Asset Management. For illustration purposes only.

⁷ In this context CO₂ footprint includes the six greenhouse gases covered by the UN Framework Convention on Climate Change and its Kyoto Protocol: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride.

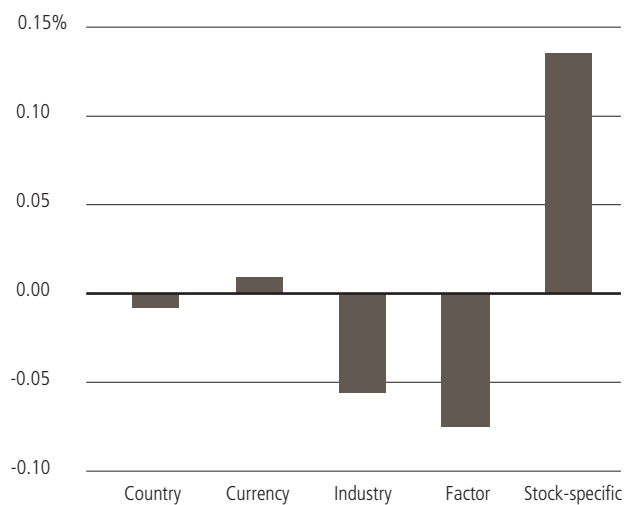
Amongst the back-test simulation data we generated, we looked at performance attribution. In Exhibit 5, we summarize the average monthly performance attribution by risk factor over the examined timeframe. It is notable that stock-specific risk, which can be viewed as an approximation to carbon risk, has been the dominant effect on performance attribution historically.

Below we outline some of the innovations we introduced in the construction of the strategy, which we believe differentiate it from more conventional approaches used to reduce a portfolio's carbon footprint.

- Based on a probabilistic structure that explicitly recognizes the uncertainties related to CO₂ emissions data.
- Incorporating carbon-related, forward-looking measures that reward companies moving towards an absolute target figure of 2° C set by the United Nations at the 2015 Paris Climate Change Conference.
- Incorporating qualitative insights, e.g. source and quality of reported data, disclosures on implementation of policies, objectives, initiatives related to carbon efficiency metrics.

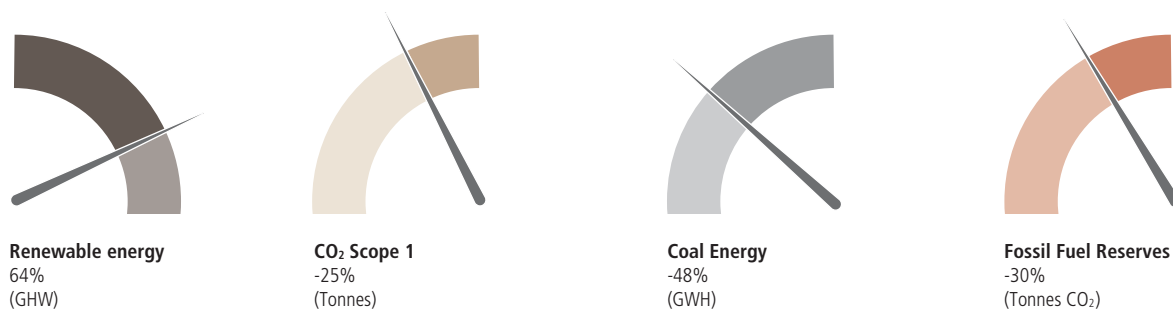
In Exhibit 6, we illustrate typical exposures of the strategy to several climate-related metrics relative to the underlying index.

Exhibit 5: Average monthly performance attribution in USD (December 2011-2017)



Source: UBS Asset Management. Performance attribution based on back-tested data from December 2011 to February 2017 and live data from February 2017 to December 2017.

Exhibit 6: UBS climate aware strategy—selected exposures vs. FTSE Developed Index



Source: UBS Asset Management. Data as at September 30, 2017. For illustration purposes only.

A key feature of our Climate Aware strategy is the voting and engagement element. Our approach reflects the long-term journey that the transition to a low carbon economy requires. The destination is reasonably well defined but precisely how the journey will unfold is more uncertain. Clarity around the engagement strategy and active voting will be crucial to keeping our approach on the right track. Our voting and engagement approach aims to encourage companies to:

- Report carbon emissions data.
- Have clear strategies and goals for reducing emissions and to commit to regular reporting on progress.
- Comply with best practice in reporting on their governance, strategy, risk management, metrics, and targets, in line with the recommendations of the TFCF.
- Undertake scenario testing and report implications in their annual reporting.

As mentioned above, climate change is an evolving and dynamic process. Our solution should thus keep pace with both the problem itself (for example, carbon as a core risk related to climate change) and the available data/research/innovations.

To that end, we have set up an advisory group that aims to keep abreast of climate-related trends and developments that impact listed companies, monitors the ongoing voting and engagement activities and continuously enhances the methodology applied by our approach.

Our approach reflects the long-term journey that the transition to a low carbon economy requires.

Case study 2: Integrating the UBS Governance Score in the MSCI ACWI Index

Corporate governance has been a widely discussed ESG factor from the perspective of investment process integration since the early '90s. One of the most notable publications on this topic is the 1992 Cadbury report published by the Committee on the Financial Aspects of Corporate Governance. The committee established by the the Financial Reporting Council and the London Stock Exchange, recommended best practice designed to achieve high standards in corporate behavior. In another paper on this topic, by Gompers et. al. (2003), a Governance Index is constructed to proxy the balance of power between shareholders and managers. Companies are scored based on the provisions that reduce shareholder rights, and Democracy and Dictatorship portfolios are formed. Ferreira and Laux (2007) examined corporate governance from

a different angle: in their paper they showed that companies with strong corporate governance policies exhibit lower future idiosyncratic risk.

In this context, and in collaboration with our Global Sustainable Equities team, we have developed a rules-based global equity governance aware strategy. The large availability of ESG data, broad range of approaches across data/index vendors, and biases in data collection provide an opportunity to enhance ESG factors, such as corporate governance. In our governance aware strategy, we constructed a composite governance factor capturing a range of metrics, outlined in Exhibit 7.

Exhibit 7: Pillars for corporate governance factor

Board Policy	Governance Risk
CEO Duality	Accounting Controversies
Percent of Independent Directors	Anti-Bribery and Ethics Policy
Percent of Women on the Board	Anti-Competition Controversies
Removal of Board Restrictions	Compensation of Senior Executives
Staggered Board Structure	Golden Parachute Policy
	Limitations to Shareholder Rights
	Poison Pill Policy
	Succession Plan for Executives
	Super Majority Vote Requirement

Source: UBS Asset Management, Thompson Reuters, MSCI. Metrics based on back-tested data from April 2010 to July 2017. Past performance is not a reliable indicator of future results. Historical tracking error is not a guide to the future.

In this context, and in collaboration with our Global Sustainable Equities team, we have developed a rules-based global equity governance aware strategy.

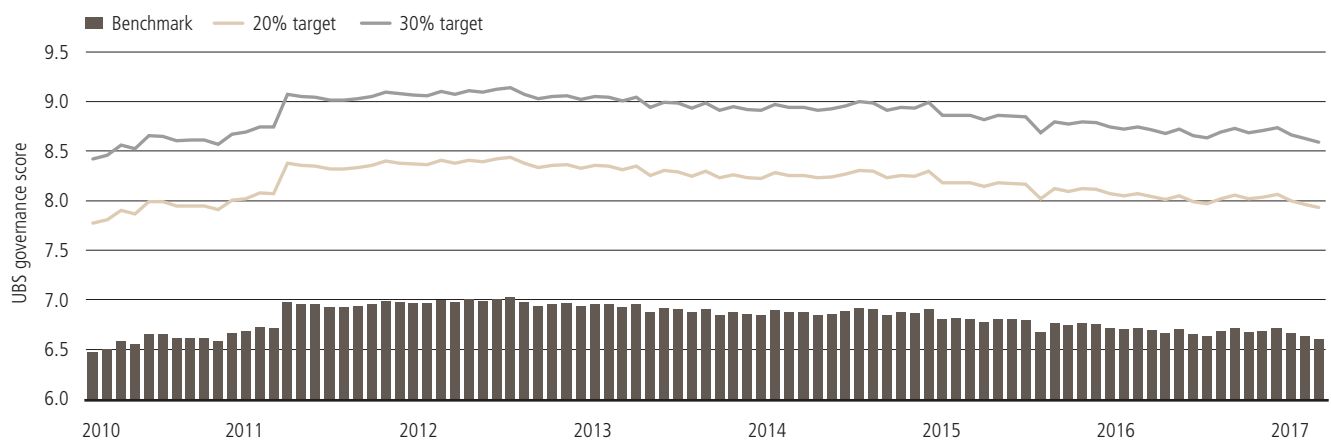
To construct the strategy, we used the MSCI ACWI investment universe. We built quarterly rebalanced long-only portfolios aiming to minimize the tracking error vs. MSCI ACWI Index and the transaction costs. We applied a series of relative constraints, including stock, country, sector, size level. Two important aspects in the construction and implementation of our strategy stood out:

- Isolating the added value associated with the exposure to the governance metric, i.e. removing the effects of other factors.

- Controlling the exposure to developed and emerging markets: companies in developed markets tend to show higher governance metrics and better coverage than in emerging markets, thus a governance aware strategy can build an unintended bias towards developed markets.

In Exhibit 8, we show the back-tested governance score for the MSCI ACWI Index and for two versions of the strategy: one, aiming to increase the governance score by 20%, and the other by 30%, vs. the underlying index.

Exhibit 8: Governance score for MSCI ACWI Index and for UBS Governance Strategy (20% and 30% target increase)



Source: UBS Asset Management, Thompson Reuters, MSCI. Governance score based on back-tested data from April 2010 to July 2017.

The simulation results shown in Exhibit 9 suggest that both versions of the governance strategy achieved annualized outperformance vs. the index of approximately 0.4% p.a. over the back-test timeframe. The ex-post tracking error fluctuated between 0.50–0.75% p.a., while the information ratio was higher for the 20% target version of the strategy.

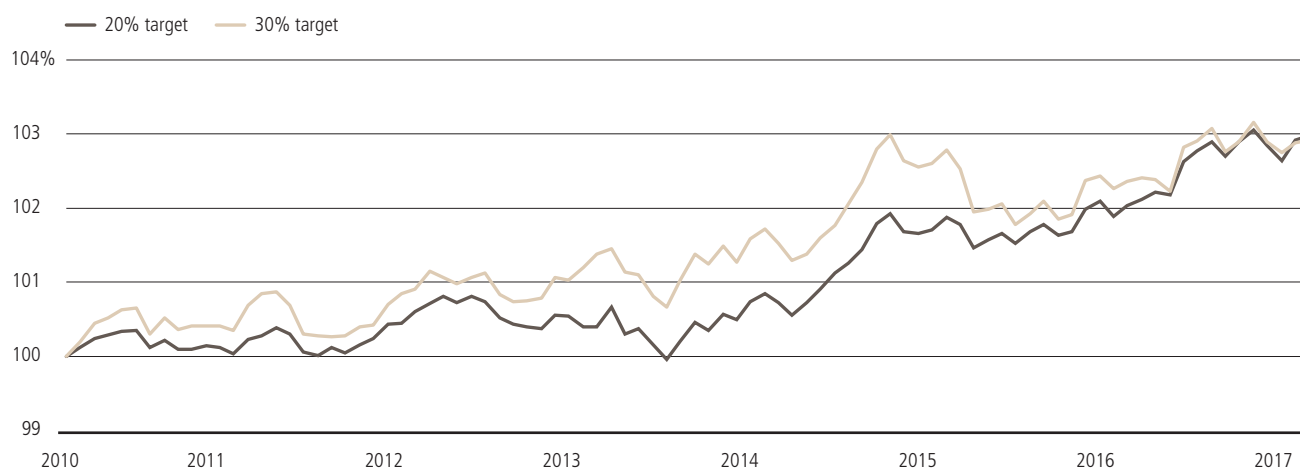
We note that from late 2013, the cumulative relative return of the strategy vs. the index displayed a positive trend, shown in Exhibit 10. While we acknowledge the limitations of our analysis, including a fairly short timeframe, changes in data disclosure across companies, and subjectivity on the data disclosure and measurement, we nevertheless find these initial results encouraging and indicative of a positive relationship between good governance and returns.

Exhibit 9: Selected annualized metrics in USD for the UBS Governance Strategy vs. MSCI ACWI Index

	Target 20%	Target 30%	Index
Return	9.44%	9.43%	9.01%
vs. Index	0.40%	0.39%	–
Risk	13.35%	13.37%	13.32%
Ex-post TE	0.55%	0.73%	–
Information ratio	0.72	0.53	–
One-way turnover	7.35%	14.76%	c. 3%
Max. drawdown	-20.4%	-20.6%	-20.3%

Source: UBS Asset Management, Thompson Reuters, MSCI. Metrics based on back-tested data from April 2010 to July 2017. Past performance is not a reliable indicator of future results. Historical tracking error is not a guide to the future.

Exhibit 10: Selected risk and return statistics for simulation (in USD)

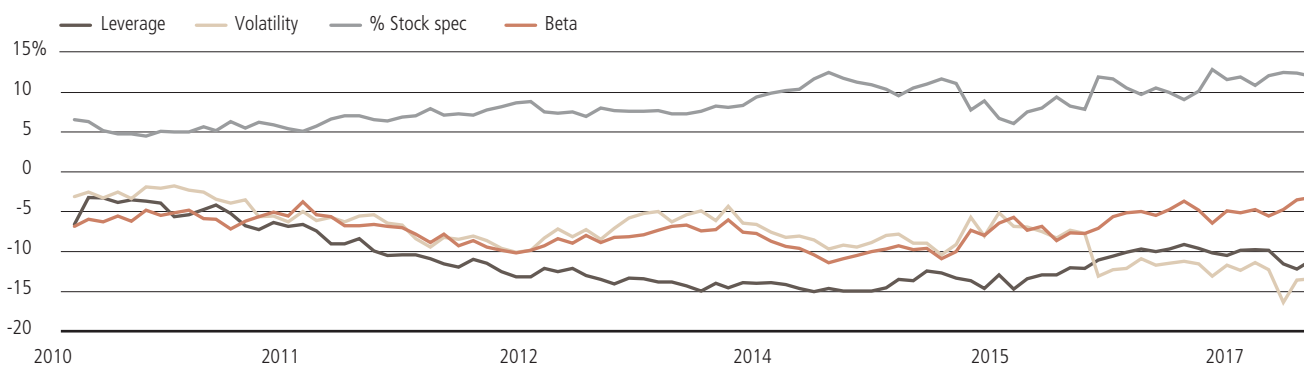


Source: UBS Asset Management, Thompson Reuters, MSCI. Metrics based on back-tested data from April 2010 to July 2017. Past performance is not a reliable indicator of future results.

We also examined the correlations between the governance signals and the factor exposures in the Barra risk model. It is widely discussed in the literature that governance scores tend to have a positive correlation to quality factors. This argument is justified in our back-test, shown in Exhibit 11, where the governance factor displays a negative correlation with the Leverage and Volatility factors. We also observe a positive correlation between the governance signal and the ratio of stock-specific and total volatility of the company, which is in line with Ferreira and Laux (2007). We propose similar analysis

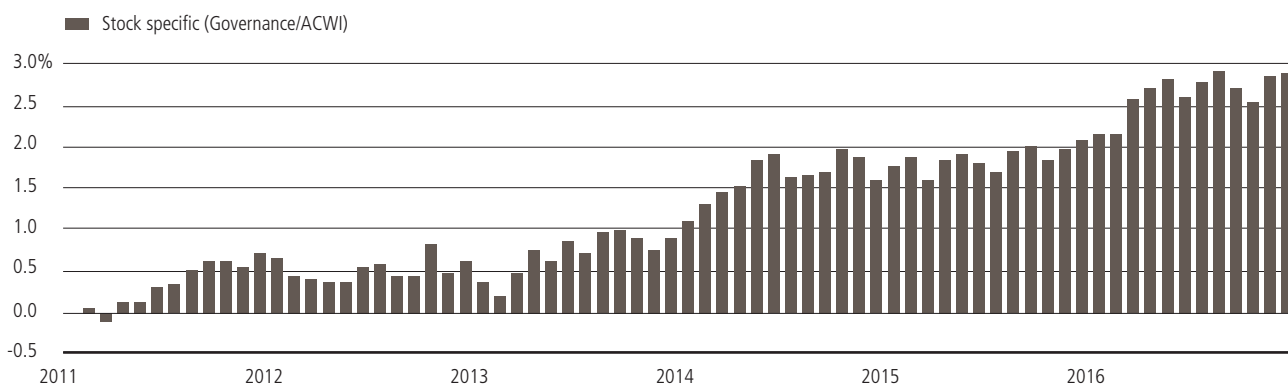
to the J-test for event-study analysis by Campbell et. al. (1997) and show in Exhibit 12 the cumulative excess return attributed to the governance scores excluding exposure to all Barra risk factors. From the statistical point of view, we can reject a 10% statistical level that the residual returns are a zero mean process given the t-value equals 1.9. These results suggest the governance factor contains information not captured by the risk model, and is likely being absorbed by the stock-specific component.

Exhibit 11: Correlation between strategy governance score and Barra factor exposures



Source: UBS Asset Management, MSCI. Metrics based on back-tested data from April 2010 to July 2017. Past performance is not a reliable indicator of future results.

Exhibit 12: Cumulative stock-specific return after Barra risk factor returns



Source: UBS Asset Management, MSCI. Metrics based on back-tested data from April 2010 to July 2017. Past performance is not a reliable indicator of future results.

Playing to win

We expect the role of sustainability in the investment process to continue to grow, including using ESG factors as alpha/risk sources in portfolio construction, portfolio analytics and reporting. In this article, we focused on topics related to the construction and implementation of rules-based strategies that integrate sustainable themes. We first discussed some of the portfolio management aspects of replicating ESG/SRI indices. We then looked at several methods of constructing custom ESG/SRI rules-based portfolios, including exclusions and tilts. One of the main difficulties in the construction is

how to incorporate ESG themes in investment processes for rules-based strategies in a robust and efficient manner. As investors, we plan to continue building and enhancing decision-making tools, which should help us assess and price ESG risks and opportunities, especially over a long-term investment horizon.

We expect the role of sustainability in the investment process to continue to grow, including using ESG factors as alpha/risk sources in portfolio construction, portfolio analytics and reporting.

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