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The Multiple Prices of Sustainability: Comparing the Implications of 'Do No Harm' Exclusion Policies on Equity Portfolios

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Abstract

This paper evaluates and decomposes the financial and extra-financial impacts of ESG "do no harm" exclusions on equity portfolios. Using two capitalization-weighted indices representative of the Developed Europe and United States equity universes, the study evaluates how exclusions based on each of the United Nations' sustainable development goals affect tracking error, factor exposure, sector concentration, and carbon intensity. The findings highlight that exclusions associated with social and governance issues, such as anti-competitive practices and internal governance controversies, related to sustainable development goal 8–decent work and economic growth– and 16–peace, justice, and strong institutions–, are the primary drivers of tracking error. Also, we find that the use of optimization techniques to reallocate capital after applying the exclusions effectively mitigates deviations in factor exposures and sector concentration. The impact on carbon intensity is mixed; environmental exclusions reduce carbon intensity, but social and governance exclusions can exclude low-emission companies, leading to unintended increases in carbon footprint. These results emphasize the need for asset owners to tailor exclusion strategies to their sustainability priorities and financial objectives.

Keywords: ESG screening, exclusion, risk, sustainable investment, tracking error.

1. Introduction

1. Introduction

Exclusion has long been a foundational approach in investment strategies. Its relevance has grown significantly in recent years, particularly within the context of sustainable investing. As a key component of broader sustainable investment strategies, exclusion serves to align portfolios with ethical, social, and environmental standards (Bouchet and Safaee, 2025). At its core, exclusion is often justified on moral grounds, reflecting investors' desire to avoid profiting from or endorsing activities deemed socially or environmentally harmful. Beyond ethical considerations, a growing body of theoretical literature suggests that exclusion can catalyze meaningful corporate reforms by incentivizing behavioral changes (Heinkel et al., 2001; Pástor et al., 2021; De Angelis et al., 2022). Furthermore, exclusion has been shown to complement and reinforce the implementation of effective climate policies, underscoring its potential to drive systemic change (Braungardt et al., 2019).

The financial impact of ESG exclusion remains a subject of debate in the literature, with findings often conflicting. Some studies, such as Capelle-Blancard and Monjon (2014) and Trinks and Scholtens (2017), suggest that ESG exclusion reduces financial performance, as controversial stocks tend to offer higher risk-adjusted returns. In contrast, Khajenouri and Schmidt (2021) report that ESG-screened indices outperformed their benchmarks in terms of risk-adjusted returns over certain periods. This divergence can be attributed to differences in sample characteristics, exclusion criteria, and regional contexts, as highlighted by Plagge (2023).

More recent research has shifted its focus from short-term performance to the risk implications of ESG exclusions. Porteu de la Morandière et al. (2025) conduct for example a comprehensive analysis of 493 indices, encompassing both conventional and sustainable instruments from Europe and the U.S., to assess the financial risks associated with various ESG exclusion strategies. They applied three exclusion screens of increasing restrictiveness—consensus exclusions[1], Paris-aligned benchmark standards, and exclusions based on negative contributions to the Sustainable Development Goals (SDGs). Their findings indicate that while the first two screens can lead to significant weight reductions in portfolios, optimized reallocation methods can mitigate tracking error and sector deviations. However, the SDG screen results in significant exclusions and a notable increase in tracking error. For the 128 European indices, the average exclusion for the SDG screen is 58%, compared to just 9% for the consensus screen. Even after optimization, the median tracking error increases to 2.3%, significantly higher than the 0.2% observed for the consensus screen.

The goal of this paper is therefore to investigate how exclusions based on ESG criteria contribute to risk. More specifically, we seek to identify which criteria, or combinations thereof, most contribute to risk, thus establishing the cost of each policy, be it based on themes (Environmental, Social, Governance), subthemes (biodiversity, climate, workforce, consumers, corporate governance and institutional relations), or specific Sustainable Development Goals (SDGs). To achieve this, the analysis focuses on two cap-weighted indices that are representative of the Developed Europe and United States equity stock universes. For each level of ESG exclusion analysis—ranging from individual criteria to overarching themes—the paper examines contributions to excluded weight, tracking error, changes in factor exposure, and portfolio concentration.

1 - Drawing from an analysis of exclusion screens implemented by the 100 largest asset owners.

1. Introduction

Regarding extra-financial impact, Porteu de la Morandière et al. (2025) demonstrate that, despite the substantial share of stocks excluded, the SDG screen does not result in a significant reduction in carbon footprint across the sample of indices analyzed. Although this screen incorporates climate-related criteria, its inclusion of social and governance issues results in the exclusion of companies with very low carbon footprint. Consequently, the impact on the aggregated carbon footprint varies significantly across indices, with no consistent trend towards reduction. To better understand this counterintuitive effect, this study further examines the carbon footprint impact of each individual ESG criterion.

This study identifies three key findings for asset owners wishing to develop sustainable strategies that align with their priorities while managing financial risks. First, social and governance themes are the primary drivers of tracking error in both EU and US indices, with issues such as anti-competitive practices and internal governance generating the most significant deviations. Second, across all exclusion sets, the impact on the risk factor profile and sector concentration remains limited due to the effectiveness of optimized reallocation. Finally, the impact on carbon intensity is mixed; while environmental exclusion sets tend to reduce carbon intensity, social and governance criteria often lead to the exclusion of low-emission companies, thereby increasing the portfolio's overall carbon footprint.

2. Data and Method

2. Data and Method

This section introduces several exclusion sets derived from individual and combined ESG criteria applied to the portfolios. Subsequently, the optimization method employed to rebalance the remaining stocks in portfolios is outlined. Finally, we introduce the risk metrics used to analyze changes observed before and after implementing the exclusions and performing the optimization.

2.1 ESG Criteria Underlying the Sustainable Development Goals Screen

This analysis focuses on exclusion criteria related to the achievement of the United Nations sustainable development goals (SDGs) adopted in 2015. This framework consists of 17 goals and 169 targets to be achieved by 2030, covering social, environmental, and economic issues. We have established 46 exclusion criteria to identify any activities or behavior that would hinder the achievement of these goals and targets, the complete list of which is given in the appendix.

The objective of this analysis is to identify which of these exclusion criteria exert the most significant influence on a portfolio's risk profile. However, ESG exclusion criteria are rarely implemented in isolation. Five levels of analysis are therefore defined. The first level – *specific issues* – organizes the 46 exclusion criteria into 28 exclusion sets (e.g., exclusion criteria "Atmospheric Emissions Controversy" and "Local Pollution Controversy" are grouped together under the specific "Pollution" issue). The second level – *sustainable development goals* - aggregates ESG exclusion criteria into 17 exclusion sets corresponding to each of the 17 SDGs. At the third level – *subthemes* –, the 21 specific issues are further consolidated into six subthemes. The fourth level of aggregation – *themes* – aligns with the traditional ESG dimensions (Exhibit 1).

Finally, the fifth and last level of aggregation – SDG screen – corresponds to the set of all specific issues (Exhibit 1). For each level of analysis, the study evaluates the impact of individual exclusion criteria sets as well as the impact resulting from the combination of multiple criteria, providing a comprehensive understanding of their influence on portfolio risk.

Exhibit 1: Levels of analysis

Level of analysis	Exclusion sets
Specific issues (28)	Anti competition; Corruption; Human rights violations; Energy efficiency; Biodiversity footprint; Pollution; Water; Waste; Labor rights violation; Controversial chemicals; Discrimination; Oil; Coal power generation; Alcohol; Lobbying; Controversial weapons; Child and forced labor; Tobacco; Pesticides; Gambling; Adult entertainment; Cannabis; Gas; Unconventional fossil fuels; Civilian firearms; Internal governance; Predatory lending, Remuneration
Sustainable development goals (17)	1. No poverty; 2. Zero hunger; 3. Good health and well-being; 4. Quality education; 5. Gender equality; 6. Clean water and sanitation; 7. Affordable and clean energy; 8. Decent work and economic growth; 9. Industry, innovation and infrastructure; 10. Reduced inequalities; 11. Sustainable cities and communities; 12. Responsible consumption and production; 13. Climate action; 14. Life below water; 15. Life on land; 16. Peace, justice and strong institutions; 17. Partnership for the goals
Subthemes (6)	Biodiversity; Climate; Workforce (Social internal); Consumers (Social external); Corporate governance (Governance internal); Institutional relations (Governance external)
Themes (3)	Environment; Social; Governance
SDG screen (1)	All specific issues

Notes: This table outlines the different levels of analysis employed in the study to represent various approaches to ESG exclusion strategies. At each level, the analysis evaluates the impact of both individual exclusion sets and their potential combinations on risk.

2. Data and Method

2.2 Optimized Reallocation

Once an exclusion filter – defined as one or a combination of exclusion sets for a given level of analysis – is applied to a portfolio, the remaining equities are reweighted using a method that minimizes the tracking error between the original index (w_{old}) and the adjusted index (w_{new}). This approach ensures that the portfolio remains as close as possible to the original benchmark while incorporating the specified exclusion criteria. The reallocation is the solution to the minimization program:

$$w_{new} = argmin_w \, (w - w_{old})^T \Omega (w - w_{old})$$

where the covariance matrix (Ω) is the sample covariance matrix normalized following the methodology proposed by Ledoit and Wolf (2003). This matrix is subsequently employed to measure the ex-post tracking error[2]. The resulting adjusted indices are long only, reflecting the approach of an investment manager who divests from controversial equities and reallocates the proceeds to minimize the impact of the exclusions on the index's overall risk profile. This reallocation strategy prioritizes investments in stocks with risk characteristics that closely align with those of the excluded equities, thereby preserving the portfolio's original risk-return dynamics to the greatest extent possible.

2.3 Financial Risk Metrics and Climate-Related Metrics

To evaluate the impact of exclusion filters on the risk profile of the selected indices, several financial and climate-related metrics are analyzed:

Tracking Error (TE)

The deviation of the screened indices from the original indices is assessed using the annualized Tracking Error between the two indices, providing a measure of how closely the screened indices replicate the risk-return profile of the initial indices. The tracking error is calculated using the sample covariance matrix normalized with the methodology proposed by Ledoit and Wolf (2003) as defined in Section 2.2.

$$TE_{annualised} = \sqrt{250}\sqrt{(w - w_{old})^T \Omega (w - w_{old})}$$

Factor intensity (FI)

The analysis examines changes in the risk factor profile of a portfolio through its factor intensity. Factor intensity (FI) measures the strength of an instrument's exposures to fundamental risk factors. It is calculated as the sum of the exposures to the six fundamental risk factors[3]:

$$Factor\ Intensity = \sum_{j=1}^{6} \beta_j$$

where j ∈ ["size","low volatility","profitability ","momentum ","value","investment"] and β_j represents the fundamental factor exposures. A portfolio with high factor intensity has a high aggregate exposure to fundamental risk factors.

2 - The covariance matrix is estimated using stocks' total returns calculated from daily stock prices over four years (September 2020 – August 2024). All prices are in US dollars. Price data source: S&P Capital IQ.
3 - Detailed definitions of each factor are provided in the appendix, Exhibit 9.

2. Data and Method

Effective number of sectors (ENS)

The effective number of sectors (ENS) is used to evaluate changes in the sectors concentration of the screened portfolio, reflecting the impact of exclusion on diversification. ENS is given as:

$$Effective\ Number\ of\ Sectors = \frac{1}{\sum_{S \in Sectors}(\sum_{i \in S} w_i)^2}$$

where w_i denotes the portfolio weight of company i belonging to the sector S in the portfolio.

Carbon Intensity (CI)

From a climate perspective, the carbon intensity (CI) of the screened portfolio is compared to that of the original portfolio. The CI quantifies a portfolio's exposure to carbon-intensive companies by accounting for both the portfolio weight of each company in the portfolio and its emissions[4]. To standardize emissions across companies of varying sizes, emissions are divided by the company revenue. The carbon intensity of the portfolio is then calculated as the weighted average of the carbon intensities of its constituents, where the weights correspond to the portfolio weight of each company in the portfolio. Mathematically, for a portfolio with n constituents, the CI is expressed as:

$$Carbon\ intensity = \sum_{i}^{n} \frac{Emissions_i}{Revenue_i} \times w_i$$

where $Emissions_i$ represents the emissions of company i, $Revenue$ its revenue, and w_i denotes the portfolio weight of company i in the portfolio. This metric provides a standardized and scalable measure of carbon intensity for portfolio-level comparisons.

4 - Direct and indirect emissions related to energy consumption (Scope 1 + Scope 2).

3. Results

3. Results

For each risk and climate metric, the impact of several exclusion filters is assessed on two cap-weighted indices representing the Developed Europe (EU) and United States (US) stock universes. The EU index comprises 424 stocks, of which 23 are not covered by the ESG exclusion datasets (accounting for 3% of portfolio weight). Similarly, the US index includes 500 stocks, with 20 lacking coverage (representing 1.4% of portfolio weight)[5-6]. For financial risk and climate-related metrics, the analysis is conducted in accordance with the four levels of aggregation outlined in subsection 2.1.

3.1 The Dominant Effect of Social and Governance Issues in Generating Tracking Error

The SDG screen leads to substantial exclusions in both the EU and US indices. For the EU index, applying the SDG screen excludes 64% of its portfolio weight. Similarly, for the US index, the SDG screen excludes 69% of its portfolio weight. Our analysis reveals that governance and social themes exert the most significant influence, as a substantial share of the excluded weights pertains to institutional relations, internal governance, and workforce considerations. Among these, anti-competition and human rights controversies emerge as the most impactful issues, with anti-competition controversies alone leading to the exclusion of up to 43% of stocks within the US universe.

From the perspective of Sustainable Development Goals (SDGs), SDG 16, which emphasizes peace, justice, and strong institutions, encompasses several of these issues and consequently excludes the highest share of weight in both universes[7] (Exhibit 2).

The analysis of the combination of different exclusion policies underscores their interdependence. For instance, at the theme level, excluding stocks with negative impacts on both environmental and social dimensions results in the exclusion of only 57% of the universe, despite these themes individually accounting for 20% and 50% of the weight, respectively (see Exhibit 13 and Exhibit 14 in appendix).

The weight excluded has a direct impact on the tracking error generated. The SDG screen results in substantial tracking error, reaching 3.2% for the U.S. index after optimization. The exclusion policies driving these tracking errors align with those that exclude the most weight. Governance and social issues contribute the most, with governance (G) dimensions alone accounting for 2.9% of tracking error[8] and social (S) dimensions accounting for 2.7% of tracking error (Exhibit 3).

5 - Indices composition as of June 2024.
6 - Exclusion data as of May 2024.
7 - The details of portfolio weight excluded by each exclusion set, for each level of analysis, is provided in Exhibit 12.
8 - See Exhibit 15 (appendix) for the tracking error generated by each exclusion set, and Exhibit 16 and Exhibit 17 for the tracking error generated by combinations of these exclusion sets.

3. Results

The relationship between the proportion of the portfolio weight excluded and the tracking error post-optimization is approximately linear across various exclusion sets. However, two observations emerge. First, the slope of this relationship is significantly lower when compared to estimates derived from a sample of diversified indices. For instance, in the context of the EU benchmark, a 10% increase in the exclusion weight results, on average, in a 0.3% increase in tracking error. This contrasts with a rate of approximately 0.8% when estimated on a large sample of indices from the same region (Porteu de la Morandière et al., 2025). This disparity may be attributed to the relatively larger number of constituent stocks in the benchmark indices analyzed in this study compared to other indices (Exhibit 4).

Exhibit 2: Top contributing exclusion sets by portfolio weight excluded

Level of analysis	Developed Europe		United States	
	Top contributing exclusion sets	Portfolio weight excluded	Top contributing exclusion sets	Portfolio weight excluded
Specific issues	Anti competition	31.0%	Anti competition	43.2%
	Corruption	27.8%	Human rights violations	42.3%
	Human rights violations	27.2%	Internal governance	39.1%
Sustainable Development Goals	16. Peace, justice and strong institutions	48.6%	16. Peace, justice and strong institutions	59.3%
	8. Decent work and economic growth	34.3%	8. Decent work and economic growth	52.5%
	7. Affordable and clean energy	22.4%	10. Reduced inequalities	32.8%
Subthemes	Institutional relations	41.3%	Workforce	48.1%
	Workforce	33.7%	Institutional relations	48.0%
	Corporate governance	25.1%	Corporate governance	39.9%
Themes	Governance	46.7%	Governance	54.1%
	Social	37.6%	Social	50.3%
	Environmental	32.1%	Environmental	19.6%
SDG screen	*64.3%*		*69.0%*	

Notes: This table outlines the portfolio weight excluded for two cap-weighted indices representing the Developed Europe and United States stock universes. The EU index comprises 424 stocks, of which 23 are not covered by the ESG exclusion datasets (accounting for 2.4% of portfolio weight). Similarly, the US index includes 500 stocks, with 20 lacking coverage (representing 1.4% of portfolio weight).

The second observation is specific to the U.S. benchmark. While the relationship between the proportion of portfolio weight excluded and tracking error remains linear, a notable discontinuity is observed between 20% and 30% of the benchmark index weight excluded. The jump corresponds to the inclusion of specific social and governance issues, such as anti-competitive practices, human rights violations, and internal governance concerns, in any combination of exclusion criteria. Several "Information Technology" companies representing the largest market capitalizations of the US market are implicated in these issues, resulting in a significant tracking error per unit of excluded weight, resulting in a vertical shift in the curve that represents the relationship between excluded weight and tracking error.

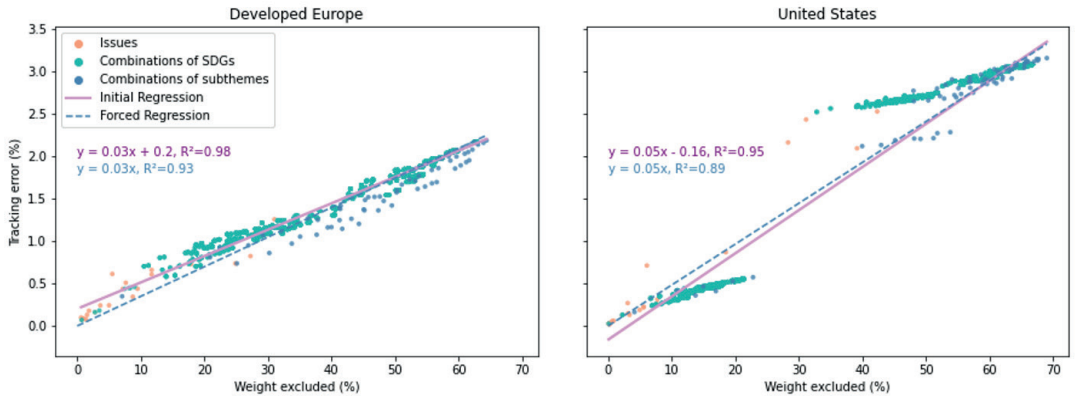
3. Results

Exhibit 3: Top contributing exclusion sets by tracking error generated

Level of analysis	Developed Europe		United States	
	Top contributing exclusion sets	Tracking error generated	Top contributing exclusion sets	Tracking error generated
Specific issues	Anti competition	1.3%	Anti competition	2.6%
	Corruption	1.1%	Human rights violations	2.5%
	Human rights violations	0.8%	Gas	2.5%
Sustainable Development Goals	16. Peace, justice and strong institutions	1.5%	16. Peace, justice and strong institutions	3.0%
	8. Decent work and economic growth	1.3%	8. Decent work and economic growth	2.8%
	3. Good health and well-being	1.0%	10. Reduced inequalities	2.5%
Subthemes	Institutional relations	1.4%	Institutional relations	2.8%
	Workforce	1.0%	Workforce	2.6%
	Climate	0.9%	Corporate governance	2.1%
Themes	G	1.5%	G	2.9%
	E	1.1%	S	2.7%
	S	1.1%	E	0.5%
SDG screen		*2.2%*		*3.2%*

Notes: For two cap-weighted indices representing the Developed Europe and United States stock universes this table presents the tracking error following the application of various exclusion sets.

Exhibit 4: Tracking error generated by excluding weight in different samples



Notes: This figure illustrates the relationship between the portfolio weight excluded and the tracking error generated across different samples built from the two cap-weighted benchmark indices representing the Developed Europe and United States stock universes. The Developed Europe benchmark index comprises 424 stocks, while the United States benchmark index includes 500 stocks. Various exclusion sets, including issue, sustainable development goal, and subtheme-level exclusion sets (and their combinations), are applied. For each subset, two regression lines are shown, one of which is constrained to pass through the origin. The figure highlights a significant and relatively linear relationship between the proportion of weight excluded and the tracking error generated.

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3.2 A Limited Impact on the Risk Factor Profile and Sector Concentration

When looking at the impact on the risk factor profile, we observe that the exclusion sets that reduce the factor intensity of the initial index the most still have a limited impact compared to the initial value. For the EU index, the issues with the highest impact (around 1% deviation) are environmental (oil, pollution and controversial chemicals), and when looking at themes, the environment is also the one generating the highest reduction (-2.4%). For the US index, the corporate governance subtheme has the highest impact, reducing the factor intensity by 4.2%, with the internal governance issue reducing the factor intensity by 4.6%. However, when considering the governance theme as a whole, this effect is partially offset by other issues, leading to a factor intensity increase of 3.1% (Exhibit 5).

When analyzing the impact on individual factors, Porteu de la Morandière et al. (2025) demonstrated that naive reallocation can increase exposure to the Fama and French (2015) "profitability" factor while slightly reducing exposure to the "investment" and "value" factors, but that optimized reallocation significantly mitigates these deviations. The analysis of different exclusion sets on the regional benchmark indices corroborates these findings (Exhibit 18 and Exhibit 19 in appendix). For both indices, no deviation exceeds 10%, even with the SDG screen that accounts for the maximum deviations: an increase in the size factor (+10% for both indices) and a decrease in the profitability factor (-10% for the US index). For the EU index, the other levels do not exhibit a significant effect on exposure to any of the traditional financial factors, with the maximum deviation observed for SDG 16, which increases the exposure to the size factor by 6%. The US index shows more significant deviations, particularly with social and governance issues, the broader Social (S) and Governance (G) themes, and SDGs 8 and 16, which lead to an increase in exposure to the size factor of up to 10% and a decrease in exposure to the profitability factor by up to 10% (for SDG 16).

Exhibit 5: Top contributing exclusion sets by factor intensity decrease

Level of analysis	Developed Europe Top contributing exclusion sets		United States Top contributing exclusion sets	
Specific issues	Oil	-1.8%	Internal governance	-4.6%
	Pollution	-1.3%	Energy efficiency	-0.5%
	Controversial chemicals	-0.9%	Biodiversity footprint	-0.4%
Sustainable Development Goals	3. Good health and well-being	-2.4%	14. Life below water	-0.4%
	9. Industry, innovation and infrastructure	-1.7%	15. Life on land	-0.4%
	13. Climate action	-1.5%	3. Good health and well-being	-0.2%
Subthemes	Climate	-1.7%	Corporate governance	-4.2%
	Biodiversity	-1.2%	Consumers	-0.2%
	Consumers	0.8%	Biodiversity	-0.2%
Themes	E	-2.4%	E	-0.1%
	S	3.1%	S	2.3%
	G	3.6%	G	3.1%
SDG screen		*3.2%*		*1.5%*

Notes: This table presents the reduction in factor intensity for two cap-weighted indices representing the Developed Europe and United States stock universes following the application of various exclusion sets. The initial factor intensity of the Developed Europe index is -5.6%, while that of the United States index is -17.8%.

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Exclusions, particularly those targeting issues specific to certain sectors such as environmental criteria, are expected to increase sector concentration, reflected by a reduction in the effective number of sectors (ENS). However, the analysis indicates that, when optimization is applied, the aggregate sector deviation is not substantial for any single exclusion set (Exhibit 6). This does not imply an absence of sectoral shifts. For instance, when applying the SDG screen as a whole, Porteu de la Morandière et al. (2025) demonstrate that, in the EU benchmark, the weight of the Non-Cyclical Consumer sector decreases from 12% to approximately 7%. Similarly, in the US benchmark, the Energy sector, which initially accounts for around 5% of the index, experiences a reduction of 2.5% under the SDG filter. Moreover, for the US benchmark, the exclusion of the largest market-capitalizations that belong to the "Information Technology" sector reduces sector concentration, resulting in an increase in ENS of 0.63 under the SDG filter.

Exhibit 6: Top contributing exclusion sets by concentration increase

Level of analysis	Developed Europe		United States	
	Top contributing exclusion sets	Effective number of sectors decrease	Top contributing exclusion sets	Effective number of sectors decrease
Specific issues	Pollution	-0.27	Pollution	-0.13
	Controversial chemicals	-0.20	Controversial chemicals	-0.08
	Oil	-0.15	Oil	-0.08
Sustainable Development Goals	3. Good health and well-being	-0.62	3. Good health and well-being	-0.25
	9. Industry, innovation and infrastructure	-0.32	6. Clean water and sanitation	-0.11
	13. Climate action	-0.32	12. Responsible consumption and production	-0.10
Subthemes	Biodiversity	-0.22	Biodiversity	-0.21
	Consumers	-0.06	Climate	-0.09
	Workforce	-0.02	Consumers	-0.07
Themes	E	-0.12	E	-0.27
	S	-0.11	S	0.14
	G	0.27	G	0.60
SDG screen		*– 0.35*		*0.63*

Notes: This table reports the decrease in the effective number of sectors for two cap-weighted indices representing the Developed Europe and United States stock universes after the application of various exclusion sets. A reduction in the effective number of sectors indicates increased sector concentration, which may amplify financial risk. The initial effective number of sectors for the Developed Europe index is 7.84, while for the United States index, it is 4.56.

3.3 The Mixed Effects of Exclusion on Carbon Emissions

While the SDG filter as a whole results in small emissions reductions for both benchmarks, the amplitude varies. Both indices have an initial carbon intensity of approximately 125 tCO2e/MUSD. For the EU benchmark, the reduction is minor at 6.7 tCO2e/MUSD, whereas for the US benchmark, the decrease is more significant at 30.1 tCO2e/MUSD.

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However, the impact is highly heterogeneous when examining the underlying themes and issues. Excluding the environmental theme and related SDGs (e.g., SDG 7 on affordable and clean energy and SDG 13 on climate action) generally leads to a decrease in carbon intensity. Conversely, social and governance criteria, such as labor rights violation and anti-competition, often exclude more low-emission companies than high-emission ones. When applied independently of environmental criteria, these exclusions can substantially increase carbon intensity, by up to 77 tCO2e/MUSD for the human rights violation issue[9] (US index) (Exhibit 7).

Exhibit 7: Top contributing exclusion sets by carbon intensity increase

Level of analysis	Developed Europe		United States	
	Top contributing exclusion sets	Carbon intensity increase (tCO2e/MUSD)	Top contributing exclusion sets	Carbon intensity increase (tCO2e/MUSD)
Specific issues	Corruption	+20.3	Human rights violation	+77.2
	Anti-competition	+19.0	Anti-competition	+69.0
	Labor rights violation	+14.4	Labor rights violation	+66.1
Sustainable Development Goals	16. Peace, justice and strong institutions	+24.8	16. Peace, justice and strong institutions	+121.4
	8. Decent work and economic growth	+19.1	8. Decent work and economic growth	+86.7
	12. Responsible consumption and production	+3.6	17. Partnership for the goals	+61.6
Subthemes	Institutional relations	+35.0	Institutional relations	+82.8
	Consumers	+3.0	Workforce	+77.7
	Workforce	-2.6	Corporate governance	+56.6
Themes	G	+24.6	G	+87.9
	S	5.5	S	+82.2
	E	-40.4	E	-40.2
SDG screen		*-6.7*		*-30.1*

Notes: This table presents the increase in the weighted average carbon intensity for two cap-weighted indices representing the Developed Europe and United States stock universes following the application of various exclusion sets. Carbon intensity is calculated as the ratio of the sum of direct emissions (Scope 1) and indirect emissions from energy consumption (Scope 2) to revenue, and the weighted average is computed using portfolio weights. The initial weighted carbon intensity of the Developed Europe index is 123.9 tCO_2e/MUSD, while that of the United States index is 125.9 tCO_2e/MUSD.

9 - Exhibit 20 in the appendix provides details on the increase in carbon intensity for each exclusion set, while Exhibit 21 and Exhibit 22 provide details on the increase in carbon intensity for combinations of these exclusion sets.

4. Conclusion

4. Conclusion

This study investigates the financial and extra-financial impacts of an ambitious exclusion strategy targeting all sustainable development goals on two benchmark indices representing the EU and US equity universes.

The analysis identifies social and governance themes, particularly anti-competitive practices and internal governance controversies – corresponding to sustainable development goals 8 (Decent Work and Economic Growth) and 16 (Peace, Justice, and Strong Institutions) – as the primary contributors to tracking error, due to the substantial weight excluded by these issues. Regarding the risk factor profile and sector concentration, no specific sustainable development goal or issue significantly impacts these dimensions, owing to the mitigating role of optimized reallocation. Lastly, the effect on carbon intensity is heterogeneous: while environmental exclusions tend to reduce emissions, social and governance exclusions can sometimes increase portfolio carbon intensity.

For asset owners and fiduciary managers subject to risk budgets, these findings highlight the need for detailed analyses to tailor exclusion strategies to both sustainability priorities and financial constraints. Different combinations of themes or SDGs can result in varied excluded weights, leading to diverse tracking errors. Moreover, the effects on extra-financial performance, such as carbon intensity, depend heavily on the specific exclusion sets applied.

Appendix

Appendix

Exhibit 8: Sustainable Development Goals

SDG	Short denomination	Complete denomination
1	No poverty	End poverty in all its forms everywhere
2	Zero hunger	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
3	Good health and well-being	Ensure healthy lives and promote well-being for all at all ages
4	Quality education	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
5	Gender equality	Achieve gender equality and empower all women and girls
6	Clean water and sanitation	Ensure availability and sustainable management of water and sanitation for all
7	Affordable and clean energy	Ensure access to affordable, reliable, sustainable and modern energy for all
8	Decent work and economic growth	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
9	Industry, innovation and infrastructure	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
10	Reduced inequalities	Reduce inequality within and among countries
11	Sustainable cities and communities	Make cities and human settlements inclusive, safe, resilient and sustainable
12	Responsible consumption and production	Ensure sustainable consumption and production pattern
13	Climate action	Take urgent action to combat climate change and its impacts
14	Life below water	Conserve and sustainably use the oceans, seas and marine resources for sustainable development
15	Life on land	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
16	Peace, justice and strong institutions	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
17	Partnership for the goals	Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

Appendix

Exhibit 9: Definition of exclusion sets by level of analysis

Level of analysis	Exclusion sets	Specific issues	
Specific issues (28)	Anti competition; Corruption; Human rights violations; Energy efficiency; Biodiversity footprint; Pollution; Water; Waste; Labor rights violation; Controversial chemicals; Discrimination; Oil; Coal power generation; Alcohol; Lobbying; Controversial weapons; Child and forced labor; Tobacco; Pesticides; Gambling; Adult entertainment; Cannabis; Gas; Unconventional fossil fuels; Civilian firearms; Internal governance; Predatory lending; Remuneration		
Sustainable development goals (17)	1. No poverty	Predatory lending	
	2. Zero hunger	Pesticides	
	3. Good health and well-being	Alcohol; Tobacco; Cannabis; Gambling; Coal power generation; Unconventional fossil fuels; Oil; Gas; Pesticides; Controversial chemicals; Pollution	
	4. Quality education	/	
	5. Gender equality	Adult entertainment	
	6. Clean water and sanitation	Pesticides; Controversial chemicals; Water	
	7. Affordable and clean energy	Coal power generation; Unconventional fossil fuels; Oil; Gas; Energy efficiency	
	8. Decent work and economic growth	Labor rights violation; Child and forced labor; Adult entertainment; Discrimination; Remuneration; Anti competition	
	9. Industry, innovation and infrastructure	Coal power generation; Unconventional fossil fuels; Oil; Gas	
	10. Reduced inequalities	Discrimination; Remuneration	
	11. Sustainable cities and communities	/	
	12. Responsible consumption and production	Pesticides; Controversial chemicals; Waste	
	13. Climate action	Coal power generation; Unconventional fossil fuels; Oil; Gas	
	14. Life below water	Biodiversity footprint	
	15. Life on land	Pesticides; Biodiversity footprint	
	16. Peace, justice and strong institutions	Labor rights violation; Child and forced labor; Controversial weapons; Civilian firearms; Internal governance; Anti competition; Corruption; Lobbying	
	17. Partnership for the goals	Lobbying	
Themes (3) / Subthemes (6)	Environment	Biodiversity	Biodiversity footprint; Pollution; Water; Waste; Controversial and chemicals; Pesticides
		Climate	Energy efficiency; Oil; Coal power generation; Gas; Unconventional fossil fuels
	Social	Workforce (*Social internal*)	Human rights violations; Discrimination; Child and forced labor; Labor rights violation
		Consumers (*Social external*)	Controversial weapons; Civilian firearms; Alcohol; Tobacco; Cannabis; Gambling; Adult entertainment
	Governance	Corporate governance (*Governance internal*)	Internal governance*, Remuneration
		Institutional relations (*Governance external*)	Anti competition; Corruption; Lobbying; Predatory lending

**The internal governance issue includes the topics of audit and internal control controversies, career management controversies and board of directors controversies.*

Appendix

Exhibit 10: ESG exclusion criteria underlying the sustainable development goals screen

Specific issue	Variable	Threshold*
Alcohol	Alcohol Production or Distribution Turnover Max	0.05
Controversial chemicals	Chemicals Subject of Controversy Production	TRUE
Controversial chemicals	Restricted Chemicals Production	TRUE
Pesticides	Pesticides Manufacturers or Distributors Turnover Max	0.1
Gambling	Gambling Operations or Products Turnover Max	0.05
Adult entertainment	Pornography and Adult Entertainment Services or Facilitating Access Turnover Max	0.03
Tobacco	Tobacco Industry Support Turnover Max	0.05*
Cannabis	Cannabis Industry Turnover Max	0.05
Predatory lending	Alternative Financial Services and Subprime Lending Turnover Max	0.05
Predatory lending	High-Interest-Rate Lending Turnover Max	0.05
Coal power generation	Thermal Coal Industry Turnover Max	0.01**
Coal power generation	Coal in Electricity Fuel Mix Max	0.01**
Oil	Oil Industry Maximum Turnover	0.1**
Gas	Gas Industry Maximum Turnover	0.5**
Oil, Unconventional fossil fuels	Tar Sands and Oil Shale Extraction or Services Turnover Max	0.05
Controversial weapons	Anti-Personnel Mines Manufacturer	TRUE
Controversial weapons	Biological Weapons Manufacturer	TRUE
Controversial weapons	Chemicals Weapons Manufacturer	TRUE
Controversial weapons	Depleted Uranium Weapons Manufacturer	TRUE
Controversial weapons	Incendiary Weapons Manufacturer	TRUE
Controversial weapons	Cluster Munitions Manufacturer	TRUE
Controversial weapons	Phosphorus Weapons Manufacturer	TRUE
Controversial weapons	Blinding Laser Weapons Manufacturer	TRUE
Controversial weapons	Non-Detectable Fragments Manufacturer	TRUE
Civilian firearms	Civilian Firearms Production or Sale Turnover	0.05
Human rights violation	Fundamental Human Rights Controversy	High severity
Labor right violation	Fundamental Labor Rights Controversy	High severity
Labor right violation	Social Standards in the Supply Chain Controversy	High severity
Discrimination	Discrimination Controversy	High severity
Child and forced labor	Child and Forced Labor Controversy	High severity
Biodiversity footprint	Environmental Standards in the Supply Chain Controversy	High severity
Biodiversity footprint	Transportation Controversy	High severity
Biodiversity footprint	Biodiversity Controversy	High severity
Water	Water Controversy	High severity
Energy efficiency	Energy Controversy	High severity
Pollution	Atmospheric Emissions Controversy	High severity
Pollution	Local Pollution Controversy	High severity
Waste	Waste Controversy	High severity
Corruption	Corruption Controversy	High severity
Anti-competition	Anti-Competition Controversy	High severity

Appendix

Lobbying	Lobbying Controversy	High severity
Remuneration	Remuneration Controversy	High severity
Remuneration, Internal governance	Executive remuneration Controversy	High severity
Internal governance	Board of Directors Controversy	High severity
Internal governance	Audit and Internal Controls Controversy	High severity
Internal governance	Career Management Controversy	High severity

Notes: Each exclusion criterion is defined as a pairing of a variable and its corresponding exclusion threshold. These thresholds can be expressed in various formats: as a percentage of revenue, a percentage of activity (measured through physical metrics), a binary indicator of involvement (True/False), or as a severity level in the context of controversies. For the latter, controversy severity is categorized into four ordered levels: Minor, Significant, High, and Critical. The data underpinning these criteria are sourced from Moody's and ISS.

Exhibit 11: Fundamental risk factors

Factor	Definition	Source
Momentum	High cumulative returns over the last 12 months (omitting the most recent month) versus low cumulative returns over the last 12 months (omitting the most recent month).	Ang et al. (2009)
Low Volatility	Low volatility versus high volatility over a 2-year period.	Frazzini-Pedersen (2013)
Value	High intangible-adjusted book-to-market ratio versus low intangible-adjusted book-to-market ratio.	Fama-French (2015)
Size	Low free-float adjusted market capitalization versus high free-float adjusted market capitalization.	Fama-French (2015)
Profitability	High past year gross profit/total assets versus low past year gross profit/total assets.	Fama-French (2015)
Investment	Low total asset growth versus high total asset growth over a 2-year period.	Fama-French (2015)

Appendix

Exhibit 12: Portfolio weight excluded by exclusion set

Screen	EU	US
SDG screen	64.3%	69.0%

SDG	EU	US
1	0.0%	0.0%
2	0.7%	0.1%
3	21.1%	12.9%
4	0.0%	0.0%
5	0.0%	0.0%
6	13.4%	7.5%
7	22.4%	10.8%
8	34.3%	52.5%
9	10.5%	6.7%
10	7.5%	32.8%
11	0.0%	0.0%
12	14.6%	8.3%
13	10.5%	6.7%
14	14.0%	6.9%
15	14.0%	7.0%
16	48.6%	59.3%
17	2.8%	2.2%

Subthemes	EU	US
Biodiversity	20.9%	13.7%
Climate	22.4%	10.8%
Workforce	33.7%	48.1%
Consumers	7.1%	4.1%
Corporate governance	25.1%	39.9%
Institutional relations	41.3%	48.0%

Themes	EU	US
E	32.1%	19.6%
S	37.6%	50.3%
G	46.7%	54.1%

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Issues	EU	US
Anti competition	31.0%	43.2%
Corruption	27.8%	18.5%
Human rights violations	27.2%	42.3%
Internal governance	24.9%	39.1%
Energy efficiency	17.9%	7.7%
Biodiversity footprint	14.0%	6.9%
Pollution	11.7%	7.6%
Water	11.7%	5.6%
Waste	9.5%	5.0%
Labor rights violation	8.7%	31.1%
Controversial chemicals	7.6%	5.6%
Discrimination	7.1%	28.3%
Oil	5.5%	3.1%
Coal power generation	5.0%	3.4%
Alcohol	3.6%	0.2%
Lobbying	2.8%	2.2%
Controversial weapons	1.8%	3.2%
Remuneration	1.5%	6.1%
Child and forced labour	1.4%	0.9%
Tobacco	1.0%	0.6%
Pesticides	0.7%	0.1%
Gambling	0.6%	0.2%
Adult entertainment	0.0%	0.0%
Cannabis	0.0%	0.0%
Gas	0.0%	0.3%
Unconventional fossil fuels	0.0%	0.0%
Civilian firearms	0.0%	0.0%
Predatory lending	0.0%	0.0%

Notes: This table presents the portfolio weight excluded for two cap-weighted indices representing the Developed Europe and United States stock universes following the application of various exclusion sets.

Appendix

Exhibit 13: Portfolio weight excluded by combinations of exclusion sets at the SDG level

Nb. of SDG	Combination with minimum weight excluded	Weight excluded	Combination with maximum weight excluded	Weight excluded
EU				
1	[2]	0.7%	[16]	48.6%
2	[2, 17]	3.5%	[3, 16]	59.0%
3	[2, 10, 17]	9.0%	[3, 7, 16]	62.4%
4	[2, 9, 13, 17]	13.7%	[3, 7, 8, 16]	62.8%
5	[2, 6, 9, 12, 13]	18.3%	[3, 7, 8, 14, 16]	62.9%
6	[2, 6, 9, 12, 13, 17]	19.6%	[2, 3, 7, 8, 14, 16]	62.9%
7	[2, 6, 9, 12, 13, 14, 15]	21.2%	[2, 3, 6, 7, 8, 14, 16]	62.9%
8	[2, 6, 9, 12, 13, 14, 15, 17]	22.3%	[2, 3, 6, 7, 8, 9, 14, 16]	62.9%
9	[2, 6, 9, 10, 12, 13, 14, 15, 17]	26.2%	[2, 3, 6, 7, 8, 9, 10, 14, 16]	62.9%
10	[2, 3, 6, 9, 10, 12, 13, 14, 15, 17]	32.5%	[2, 3, 6, 7, 8, 9, 10, 12, 14, 16]	62.9%
11	[2, 3, 6, 7, 9, 10, 12, 13, 14, 15, 17]	40.8%	[2, 3, 6, 7, 8, 9, 10, 12, 13, 14, 16]	62.9%
12	[2, 3, 6, 7, 8, 9, 10, 12, 13, 14, 15, 17]	56.0%	[2, 3, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16]	62.9%
13	[2, 3, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17]	62.9%	[2, 3, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17]	62.9%
US				
1	[2]	8.9%	[16]	59.3%
2	[2, 17]	2.3%	[3, 16]	64.8%
3	[2, 9, 13]	6.7%	[3, 8, 16]	65.7%
4	[2, 9, 13, 17]	8.1%	[3, 7, 8, 16]	66.5%
5	[2, 9, 13, 14, 15]	10.3%	[3, 6, 7, 8, 16]	66.7%
6	[2, 9, 13, 14, 15, 17]	11.7%	[3, 6, 7, 8, 12, 16]	66.7%
7	[2, 6, 9, 12, 13, 14, 15]	13.4%	[2, 3, 6, 7, 8, 12, 16]	66.7%
8	[2, 6, 9, 12, 13, 14, 15, 17]	14.8%	[2, 3, 6, 7, 8, 9, 12, 16]	66.7%
9	[2, 3, 6, 9, 12, 13, 14, 15, 17]	17.8%	[2, 3, 6, 7, 8, 9, 10, 12, 16]	66.7%
10	[2, 3, 6, 7, 9, 12, 13, 14, 15, 17]	21.3%	[2, 3, 6, 7, 8, 9, 10, 12, 13, 16]	66.7%
11	[2, 3, 6, 7, 9, 10, 12, 13, 14, 15, 17]	51.8%	[2, 3, 6, 7, 8, 9, 10, 12, 13, 14, 16]	66.7%
12	[2, 3, 6, 7, 8, 9, 10, 12, 13, 14, 15, 17]	61.7%	[2, 3, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16]	66.7%
13	[2, 3, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17]	66.7%	[2, 3, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17]	66.7%

Notes: This table presents the portfolio weight excluded for two cap-weighted indices representing the Developed Europe and United States stock universes following the application of various combinations of exclusion sets at the Sustainable Development Goal (SDG) level.

Appendix

Exhibit 14: Portfolio weight excluded by combinations of exclusion sets at the subtheme and theme levels
a) Subtheme level of analysis

Nb. of subthemes	Combination with minimum weight excluded	Weight excluded	Combination with maximum weight excluded	Weight excluded
EU				
1	[consumers]	7.1%	[institutional relations]	41.3%
2	[biodiversity, consumers]	26.9%	[workforce, institutional relations]	53.5%
3	[biodiversity, climate, consumers]	37.8%	[biodiversity, workforce, institutional relations]	59.4%
4	[biodiversity, climate, consumers, corporate governance]	45.8%	[biodiversity, climate, workforce, institutional relations]	62.1%
5	[biodiversity, climate, workforce, consumers, corporate governance]	53.2%	[biodiversity, climate, workforce, consumers, institutional relations]	63.9%
6	[biodiversity, climate, workforce, consumers, corporate governance, institutional relations]	64.3%	[biodiversity, climate, workforce, consumers, corporate governance, institutional relations]	64.3%
US				
1	[consumers]	4.1%	[workforce]	48.1%
2	[climate, consumers]	14.9%	[workforce, institutional relations]	60.7%
3	[biodiversity, climate, consumers]	22.8%	[climate, workforce, institutional relations]	64.0%
4	[biodiversity, climate, consumers, corporate governance]	53.8%	[biodiversity, climate, workforce, institutional relations]	66.1%
5	[biodiversity, climate, workforce, consumers, corporate governance]	63.5%	[biodiversity, climate, workforce, corporate governance, institutional relations]	67.7%
6	[biodiversity, climate, workforce, consumers, corporate governance, institutional relations]	69.0%	[biodiversity, climate, workforce, consumers, corporate governance, institutional relations]	69.0%

b) Theme level of analysis

Nb. of themes	Combination with minimum weight excluded	Weight excluded	Combination with maximum weight excluded	Weight excluded
EU				
1	[E]	32.1%	[G]	46.7%
2	[E, S]	48.2%	[E, G]	58.5%
3	[E, S, G]	64.3%	[E, S, G]	64.3%
US				
1	[E]	19.6%	[G]	54.1%
2	[E, S]	57.4%	[S, G]	64.2%
3	[E, S, G]	69.0%	[E, S, G]	69.0%

Notes: This table presents the portfolio weight excluded for two cap-weighted indices representing the Developed Europe and United States stock universes following the application of various combinations of exclusion sets at the subtheme and theme level.

Appendix

Exhibit 15: Tracking error generated by exclusion set

	EU	US
SDG	**2.2%**	**3.2%**

SDG	EU	US
1	-	-
2	0.1%	0.0%
3	**1.0%**	0.4%
4	-	-
5	-	-
6	0.7%	0.3%
7	0.9%	0.4%
8	**1.3%**	**2.8%**
9	0.7%	0.3%
10	0.4%	**2.5%**
11	-	-
12	0.7%	0.3%
13	0.7%	0.3%
14	0.6%	0.2%
15	0.6%	0.2%
16	**1.5%**	**3.0%**
17	0.2%	0.1%

Subthemes	EU	US
Biodiversity	0.8%	0.4%
Climate	0.9%	0.4%
Workforce	**1.0%**	**2.6%**
Consumers	0.3%	0.2%
Corporate governance	0.7%	**2.1%**
Institutional relations	**1.4%**	**2.8%**

Themes	EU	US
E	**1.1%**	0.5%
S	**1.1%**	**2.7%**
G	**1.5%**	**2.9%**

Issues	EU	US
Anti competition	**1.3%**	**2.6%**
Corruption	**1.1%**	0.9%
Human rights violations	0.8%	**2.5%**
Internal governance	0.7%	**2.1%**
Energy efficiency	0.7%	0.3%
Biodiversity footprint	0.6%	0.2%
Pollution	0.7%	0.3%
Water	0.6%	0.2%
Waste	0.4%	0.2%
Labor rights violation	0.3%	**2.4%**
Controversial chemicals	0.5%	0.2%
Discrimination	0.4%	**2.2%**
Oil	0.6%	0.3%
Coal power generation	0.2%	0.1%
Alcohol	0.2%	0.0%
Lobbying	0.2%	0.1%
Controversial weapons	0.2%	0.1%
Remuneration	0.1%	0.7%
Child and forced labor	0.1%	0.1%
Tobacco	0.1%	0.1%
Pesticides	0.1%	0.0%
Gambling	0.1%	0.0%
Adult entertainment	-	-
Cannabis	-	-
Gas	-	**2.5%**
Unconventional fossil fuels	-	-
Civilian firearms	-	-
Predatory lending	-	-

Notes: For two cap-weighted indices representing the Developed Europe and United States stock universes this table presents the tracking error (expressed in %) following the application of various exclusion sets. Tracking errors greater than 1% are emphasized in bold.

Appendix

Exhibit 16: Tracking error generated by combinations of exclusion sets at the SDG level

Nb. of SDG	Combination with minimum tracking error (TE)	TE	Weight excluded	TE/weight	Combination with maximum tracking error (TE)	TE	Weight excluded	TE/weight	Median TE
EU									
1	[2]	0.07	0.69	0.10	[16]	1.54	48.56	0.03	0.68
2	[2, 17]	0.18	3.46	0.05	[3, 16]	2.06	58.98	0.03	0.94
3	[2, 10, 17]	0.46	9.00	0.05	[3, 7, 16]	2.16	62.43	0.03	1.12
4	[2, 14, 15, 17]	0.59	15.36	0.04	[3, 7, 8, 16]	2.16	62.78	0.03	1.54
5	[2, 10, 14, 15, 17]	0.71	19.37	0.04	[3, 7, 8, 14, 16]	2.16	62.88	0.03	1.75
6	[2, 6, 12, 14, 15, 17]	0.81	20.48	0.04	[2, 3, 7, 8, 14, 16]	2.16	62.88	0.03	1.83
7	[2, 6, 10, 12, 14, 15, 17]	0.92	24.40	0.04	[2, 3, 6, 7, 8, 14, 16]	2.16	62.88	0.03	1.94
8	[2, 6, 9, 12, 13, 14, 15, 17]	1.02	22.30	0.05	[2, 3, 6, 7, 8, 9, 14, 16]	2.16	62.88	0.03	2.03
9	[2, 6, 9, 10, 12, 13, 14, 15, 17]	1.11	26.23	0.04	[2, 3, 6, 7, 8, 9, 10, 14, 16]	2.16	62.88	0.03	2.06
10	[2, 3, 6, 9, 10, 12, 13, 14, 15, 17]	1.24	32.48	0.04	[2, 3, 6, 7, 8, 9, 10, 12, 14, 16]	2.16	62.88	0.03	2.06
11	[2, 3, 6, 7, 9, 10, 12, 13, 14, 15, 17]	1.38	40.84	0.03	[2, 3, 6, 7, 8, 9, 10, 12, 13, 14, 16]	2.16	62.88	0.03	2.16
12	[2, 3, 6, 7, 8, 9, 10, 12, 13, 14, 15, 17]	1.97	56.03	0.04	[2, 3, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16]	2.16	62.88	0.03	2.16
13	[2, 3, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17]	2.16	62.88	0.03	[2, 3, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17]	2.16	62.88	0.03	2.16
US									
1	[2]	0.03	0.09	0.30	[16]	2.98	59.29	0.05	0.32
2	[2, 17]	0.13	2.29	0.06	[7, 16]	3.05	62.77	0.05	0.45
3	[2, 14, 15]	0.24	6.96	0.03	[7, 8, 16]	3.07	63.97	0.05	2.62
4	[2, 14, 15, 17]	0.27	8.53	0.03	[3, 7, 8, 16]	3.08	66.47	0.05	2.88
5	[2, 6, 12, 14, 15]	0.31	11.10	0.03	[3, 7, 8, 12, 16]	3.08	66.50	0.05	2.91
6	[2, 6, 12, 14, 15, 17]	0.34	12.63	0.03	[2, 3, 7, 8, 12, 16]	3.08	66.50	0.05	2.95
7	[2, 6, 9, 12, 13, 14, 15]	0.40	13.44	0.03	[2, 3, 7, 8, 9, 12, 16]	3.08	66.50	0.05	3.04
8	[2, 6, 9, 12, 13, 14, 15, 17]	0.42	14.81	0.03	[2, 3, 7, 8, 9, 10, 12, 16]	3.08	66.50	0.05	3.06
9	[2, 3, 6, 9, 12, 13, 14, 15, 17]	0.48	17.83	0.03	[3, 6, 7, 9, 10, 13, 14, 16, 17]	3.08	66.66	0.05	3.06
10	[2, 3, 6, 7, 9, 12, 13, 14, 15, 17]	0.55	21.32	0.03	[3, 6, 7, 8, 10, 12, 14, 15, 16, 17]	3.08	66.70	0.05	3.07
11	[2, 3, 6, 7, 9, 10, 12, 13, 14, 15, 17]	2.74	51.77	0.05	[2, 3, 7, 8, 9, 10, 12, 13, 14, 15, 16]	3.08	66.50	0.05	3.08
12	[2, 3, 6, 7, 8, 9, 10, 12, 13, 14, 15, 17]	2.97	61.70	0.05	[2, 3, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17]	3.08	66.50	0.05	3.08
13	[2, 3, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17]	3.08	66.70	0.05	[2, 3, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17]	3.08	66.70	0.05	3.08

Notes: This table presents the tracking error (TE) generated, for two cap-weighted indices representing the Developed Europe and United States stock universes, following the application of various combinations of exclusion sets at the Sustainable Development Goal (SDG) level. The ratio tracking error divided by portfolio weight excluded (TE/weight) normalize the tracking error to highlight the combination with the highest relative contribution.

Appendix

Exhibit 17: Tracking error generated by combinations of exclusion sets at the subtheme and theme levels

a) Subtheme level of analysis

Nb. of subthemes	Combination with minimum TE	TE	Weight excluded	TE / weight	Combination with maximum TE	TE	Weight excluded	TE / weight	Median TE
EU									
1	[consumers]	0.3%	7.1%	0.05	[institutional relations]	1.4%	41.3%	0.03	0.9%
2	[consumers, corporate governance]	0.9%	30.2%	0.03	[climate, institutional relations]	1.9%	53.2%	0.03	1.2%
3	[biodiversity, consumers, corporate governance]	1.2%	39.4%	0.03	[biodiversity, climate, institutional relations]	2.0%	57.0%	0.03	1.6%
4	[biodiversity, workforce, consumers, corporate governance]	1.4%	49.5%	0.03	[biodiversity, climate, consumers, institutional relations]	2.1%	60.5%	0.03	1.9%
5	[biodiversity, climate, workforce, consumers, corporate governance]	1.7%	53.2%	0.03	[biodiversity, climate, workforce, consumers, institutional relations]	2.2%	63.9%	0.03	2.1%
6	[biodiversity, climate, workforce, consumers, corporate governance, institutional relations]	2.2%	64.3%	0.03	[biodiversity, climate, workforce, consumers, corporate governance, institutional relations]	2.2%	64.3%	0.03	2.2%
US									
1	[consumers]	0.2%	4.1%	0.04	[institutional relations]	2.8%	48.0%	0.06	1.3%
2	[biodiversity, consumers]	0.4%	16.9%	0.02	[workforce, institutional relations]	3.0%	60.7%	0.05	2.7%
3	[biodiversity, climate, consumers]	0.6%	22.8%	0.03	[climate, workforce, institutional relations]	3.1%	64.0%	0.05	2.9%
4	[biodiversity, climate, consumers, corporate governance]	2.3%	53.8%	0.04	[climate, workforce, corporate governance, institutional relations]	3.1%	65.7%	0.05	3.0%
5	[biodiversity, climate, workforce, consumers, corporate governance]	2.9%	63.5%	0.05	[climate, workforce, consumers, corporate governance, institutional relations]	3.1%	67.4%	0.05	3.1%
6	[biodiversity, climate, workforce, consumers, corporate governance, institutional relations]	3.2%	69.0%	0.05	[biodiversity, climate, workforce, consumers, corporate governance, institutional relations]	3.2%	69.0%	0.05	0.03

b) Theme level of analysis

Nb. of themes	Combination with minimum TE	TE	Weight excluded	TE / weight	Combination with maximum TE	TE	Weight excluded	TE / weight	Median TE
EU									
1	[S]	1.2%	37.6%	0.03	[S]	1.6%	46.7%	0.03	1.2%
2	[E, S]	1.6%	48.2%	0.03	[E, S]	2.2%	58.5%	0.04	1.8%
3	[E, S, G]	2.3%	64.3%	0.04	[E, S, G]	2.3%	64.3%	0.04	2.3%
US									
1	[E]	0.6%	19.6%	0.03	[E]	3.1%	54.1%	0.06	2.7%
2	[E, S]	2.8%	57.4%	0.05	[E, S]	3.2%	64.2%	0.05	3.2%
3	[E, S, G]	3.3%	69.0%	0.05	[E, S, G]	3.3%	69.0%	0.05	3.3%

Notes: This table presents the tracking error generated, for two cap-weighted indices representing the Developed Europe and United States stock universes, following the application of various combinations of exclusion sets at the subtheme and theme level.

Appendix

Exhibit 18: Factor exposure deviation generated by exclusion sets at the SDG, subtheme, and theme levels

	EU								US							
	Benchmark	Size	Value	Profitability	Investment	Momentum	Volatility	Tracking error	Benchmark	Size	Value	Profitability	Investment	Momentum	Volatility	Tracking error
Initial exposure	**103.2%**	**-14.4%**	**8.4%**	**-9.1%**	**17.7%**	**-4.6%**	**-3.5%**		**104.8%**	**-14.4%**	**-7.6%**	**11.1%**	**-8.9%**	**1.1%**	**0.9%**	
Level of analysis: Screen																
SDG screen	-1.8%	10.3%	-0.7%	-2.4%	-2.4%	-1.7%	0.1%	2.2%	-2.2%	10.4%	1.8%	-9.6%	0.9%	-1.7%	-0.3%	3.2%
Level of analysis: SDG																
2	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%
3	-0.6%	1.9%	-1.3%	-1.8%	-1.3%	-0.2%	-0.4%	1.0%	-0.1%	0.7%	-0.2%	-0.3%	-0.5%	0.0%	0.1%	0.4%
6	-0.6%	1.5%	-0.6%	-0.9%	-1.2%	-0.1%	-0.1%	0.7%	0.0%	0.4%	0.0%	-0.2%	-0.2%	0.1%	0.2%	0.3%
7	-0.5%	1.6%	-1.3%	0.1%	-1.1%	-0.4%	-0.5%	0.9%	-0.1%	0.4%	-0.4%	-0.1%	-0.5%	0.2%	0.2%	0.4%
8	-0.4%	4.7%	1.0%	-1.3%	0.8%	-0.9%	0.4%	1.3%	-0.9%	8.9%	1.8%	-8.9%	1.6%	-1.2%	0.2%	2.8%
9	-0.7%	1.4%	-1.0%	-1.0%	-1.0%	-0.1%	-0.4%	0.7%	0.0%	0.5%	-0.1%	-0.2%	-0.3%	0.1%	0.1%	0.3%
10	0.1%	1.0%	0.3%	0.0%	-0.1%	-0.1%	0.3%	0.4%	-0.6%	6.7%	1.9%	-7.8%	1.9%	-1.0%	0.3%	2.5%
12	-0.5%	1.7%	-0.5%	-1.2%	-0.9%	-0.1%	-0.1%	0.7%	0.1%	0.4%	0.1%	-0.1%	-0.1%	0.1%	0.1%	0.3%
13	-0.7%	1.4%	-1.0%	-1.0%	-1.0%	-0.1%	-0.4%	0.7%	0.0%	0.5%	-0.1%	-0.2%	-0.3%	0.1%	0.1%	0.3%
14	-0.6%	1.5%	-0.5%	0.1%	-1.2%	0.1%	0.2%	0.6%	-0.2%	0.3%	-0.1%	-0.2%	-0.3%	0.0%	-0.1%	0.2%
15	-0.6%	1.5%	-0.5%	0.1%	-1.2%	0.1%	0.2%	0.6%	-0.2%	0.3%	-0.1%	-0.2%	-0.3%	0.0%	-0.1%	0.2%
16	-1.2%	5.5%	0.3%	-1.0%	-0.4%	-1.0%	0.3%	1.5%	-1.1%	10.1%	1.9%	-10.2%	1.4%	-1.3%	0.2%	3.0%
17	0.1%	-0.1%	0.0%	0.0%	-0.1%	-0.1%	0.0%	0.2%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	-0.1%	0.1%
Level of analysis: Subtheme																
Biodiversity	-0.4%	2.0%	-0.8%	-1.0%	-1.3%	-0.1%	0.0%	0.8%	-0.2%	0.6%	-0.1%	-0.4%	-0.5%	0.0%	0.1%	0.4%
Climate	-0.5%	1.6%	-1.3%	0.1%	-1.1%	-0.4%	-0.5%	0.9%	-0.1%	0.4%	-0.4%	-0.1%	-0.5%	0.2%	0.2%	0.4%
Workforce	-0.7%	3.5%	0.0%	-0.5%	-0.5%	-0.5%	0.3%	1.0%	-0.9%	6.9%	1.8%	-7.0%	1.8%	-1.2%	-0.1%	2.6%
Consumers	-0.1%	0.7%	0.0%	-0.1%	-0.1%	0.1%	0.2%	0.3%	-0.1%	0.0%	-0.1%	-0.1%	-0.1%	0.1%	0.0%	0.2%
Corporate governance	-0.7%	1.6%	-0.7%	1.2%	-1.1%	0.0%	0.3%	0.7%	-1.7%	5.0%	0.2%	-6.3%	-1.6%	-1.0%	-0.5%	2.1%
Institutional relations	-0.8%	4.2%	0.7%	-0.5%	0.2%	-0.9%	0.4%	1.4%	-0.6%	9.2%	1.8%	-9.3%	1.6%	-1.1%	0.3%	2.8%
Level of analysis: Theme																
E	-0.7%	1.8%	-1.3%	-0.5%	-1.5%	-0.5%	-0.4%	1.1%	-0.2%	0.8%	-0.4%	-0.3%	-0.8%	0.2%	0.4%	0.5%
S	-0.8%	4.2%	0.0%	-0.2%	-1.0%	-0.4%	0.5%	1.1%	-1.1%	7.1%	1.8%	-7.1%	1.7%	-1.2%	0.0%	2.7%
G	-1.3%	5.3%	0.1%	-0.5%	-0.5%	-1.0%	0.3%	1.5%	-0.9%	9.7%	2.1%	-8.9%	2.1%	-1.6%	-0.3%	2.9%

Notes: This table presents the factor exposure deviations, for two cap-weighted indices representing the Developed Europe and United States stock universes, following the application of various sets of exclusion at the SDG, subtheme, and theme levels.

Appendix

Exhibit 19: Factor exposure deviation generated by exclusion sets at the issue levels

	EU								US							
	Benchmark	Size	Value	Profitability	Investment	Momentum	Volatility	Tracking error	Benchmark	Size	Value	Profitability	Investment	Momentum	Volatility	Tracking error
Initial exposure	**103.2%**	**-14.4%**	**8.4%**	**-9.1%**	**17.7%**	**-4.6%**	**-3.5%**		**104.8%**	**-14.4%**	**-7.6%**	**11.1%**	**-8.9%**	**1.1%**	**0.9%**	
Level of analysis: Issue																
Anti competition	-0.4%	4.4%	0.9%	-1.0%	0.7%	-0.9%	0.4%	1.3%	-0.5%	7.8%	1.5%	-8.4%	1.2%	-1.1%	0.1%	2.6%
Corruption	-0.2%	1.9%	0.0%	-0.3%	0.6%	-0.6%	0.0%	1.1%	0.0%	1.5%	-0.2%	-0.4%	-0.3%	0.1%	0.3%	0.9%
Human rights violations	-0.4%	2.6%	-0.3%	-0.1%	-0.5%	-0.3%	0.2%	0.8%	-1.0%	6.6%	1.6%	-6.3%	1.8%	-1.0%	-0.2%	2.5%
Internal governance	-0.7%	1.6%	-0.7%	1.2%	-1.1%	0.0%	0.3%	0.7%	-1.7%	4.8%	0.2%	-6.1%	-1.7%	-1.1%	-0.7%	2.1%
Energy efficiency	-0.6%	1.3%	-1.2%	0.9%	-1.5%	0.0%	-0.1%	0.7%	-0.2%	0.0%	-0.3%	0.1%	-0.3%	0.2%	-0.1%	0.3%
Biodiversity footprint	-0.6%	1.5%	-0.5%	0.1%	-1.2%	0.1%	0.2%	0.6%	-0.2%	0.3%	-0.1%	-0.2%	-0.3%	0.0%	-0.1%	0.2%
Pollution	-0.4%	1.5%	-0.9%	-0.6%	-1.1%	-0.1%	-0.1%	0.7%	-0.2%	0.4%	0.0%	-0.1%	-0.2%	0.0%	-0.1%	0.3%
Water	-0.7%	1.7%	-0.7%	-0.5%	-1.3%	0.1%	0.2%	0.6%	0.0%	0.3%	0.0%	-0.1%	-0.2%	0.1%	0.1%	0.2%
Waste	0.0%	0.8%	0.0%	-0.4%	-0.5%	0.0%	0.2%	0.4%	0.0%	0.3%	0.0%	-0.1%	-0.1%	0.0%	0.0%	0.2%
Labor rights violation	-0.2%	0.2%	0.0%	-0.3%	-0.3%	0.1%	0.2%	0.3%	-0.9%	5.9%	1.5%	-7.8%	1.3%	-0.9%	0.0%	2.4%
Controversial and chemicals	-0.5%	1.1%	-0.8%	-0.1%	-1.1%	0.1%	0.0%	0.5%	0.1%	0.3%	0.0%	-0.1%	-0.1%	0.1%	0.1%	0.2%
Discrimination	0.1%	1.0%	0.3%	0.0%	-0.1%	-0.1%	0.3%	0.4%	-0.4%	5.2%	2.0%	-6.5%	1.4%	-1.4%	-0.5%	2.2%
Oil	-0.7%	1.5%	-1.1%	-0.5%	-1.4%	0.0%	-0.3%	0.6%	0.2%	0.8%	0.0%	-0.3%	-0.2%	0.0%	0.2%	0.3%
Coal power generation	0.1%	0.1%	0.1%	-0.3%	0.3%	-0.1%	-0.1%	0.2%	-0.1%	0.0%	-0.1%	0.0%	0.0%	0.0%	-0.1%	0.1%
Alcohol	-0.1%	0.5%	0.0%	-0.2%	-0.1%	0.0%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Lobbying	0.1%	-0.1%	0.0%	0.0%	-0.1%	-0.1%	0.0%	0.2%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	-0.1%	0.1%
Controversial weapons	0.0%	0.2%	0.0%	0.0%	0.0%	0.1%	0.1%	0.2%	-0.2%	0.0%	-0.1%	-0.1%	-0.1%	0.1%	0.1%	0.1%
Remuneration	0.0%	-0.1%	0.0%	0.0%	-0.1%	0.0%	0.0%	0.1%	-0.3%	0.0%	-0.1%	0.3%	0.4%	0.1%	0.1%	0.7%
Child and forced labor	0.0%	0.2%	0.0%	-0.1%	0.1%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
Tobacco	0.0%	0.0%	0.0%	0.1%	-0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	-0.1%	0.0%	0.0%	0.0%	0.1%
Pesticides	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%
Gambling	0.0%	-0.1%	0.1%	0.0%	0.1%	-0.1%	-0.1%	0.1%	0.0%	0.0%	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%
Gas	-	-	-	-	-	-	-	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Notes: This table presents the factor exposure deviations, for two cap-weighted indices representing the Developed Europe and United States stock universes, following the application of various sets of exclusion at the issue level.

Appendix

Exhibit 20: Carbon intensity increase by exclusion set

	EU	US
SDG	-6.7	-30.1
SDG	EU	US
1	-	-
2	3.2	3.6
3	-47.8	-38.6
4	-	-
5	-	-
6	-9.7	1.3
7	-26.5	-53.5
8	19.1	86.7
9	-25.0	-51.0
10	-1.3	61.6
11	-	-
12	3.6	5.8
13	-25.0	-51.0
14	1.6	4.0
15	1.6	6.7
16	24.8	121.4
17	-3.7	5.8

Subthemes	EU	US
Biodiversity	-17.3	17.4
Climate	-26.5	-53.5
Workforce	-2.6	77.7
Consumers	3.0	16.6
Corporate governance	-5.6	56.6
Institutional relations	35.0	82.8
Themes	EU	US
E	-40.4	-40.2
S	5.5	82.2
G	24.6	87.9

Issues	EU	US
Anti competition	19.0	69.0
Corruption	20.3	27.6
Human rights violations	-10.1	77.2
Internal governance	-5.5	62.2
Energy efficiency	-5.1	-4.9
Biodiversity footprint	1.6	4.0
Pollution	-2.3	-0.4
Water	3.0	-6.0
Waste	1.7	4.8
Labor rights violation	14.4	66.1
Controversial chemicals	-17.3	7.0
Discrimination	-1.4	31.2
Oil	-14.2	6.4
Coal power generation	-18.9	-53.8
Alcohol	-5.5	1.4
Lobbying	-3.7	5.8
Controversial weapons	-0.3	13.1
Remuneration	-2.9	17.2
Child and forced labor	-8.3	0.3
Tobacco	2.7	3.4
Pesticides	3.2	3.6
Gambling	5.5	2.9
Adult entertainment	-	-
Cannabis	-	-
Gas	-	3.0
Unconventional fossil fuels	-	-
Civilian firearms	-	-
Predatory lending	-	-

Notes: This table presents the increase in the weighted average carbon intensity for two cap-weighted indices representing the Developed Europe and United States stock universes following the application of various exclusion sets. Carbon intensity is calculated as the ratio of the sum of direct emissions (Scope 1) and indirect emissions from energy consumption (Scope 2) to revenue, and the weighted average is computed using portfolio weights and is expressed in tCO_2e/MUSD. The initial weighted carbon intensity of the Developed Europe index is 123.9 tCO_2e/MUSD, while that of the United States index is 125.9 tCO_2e/MUSD.

Appendix

Exhibit 21: Carbon intensity increase by combinations of exclusion sets at the SDG level

Nb. of SDG	Combination with minimum increase in carbon intensity (CI)	Increase in CI	Weight excluded	CI / weight	Combination with minimum increase in carbon intensity (CI)	Increase in CI	Weight excluded	CI / weight
EU								
1	[3]	-47.8	21.1%	-226.8	[16]	24.8	48.6%	51.2
2	[3, 8]	-48.6	49.7%	-97.7	[7, 16]	29.5	55.9%	52.8
3	[3, 7, 12]	-53.0	36.2%	-146.3	[7, 14, 16]	36.9	56.9%	64.8
4	[3, 6, 7, 17]	-53.7	36.7%	-146.5	[7, 8, 14, 16]	37.5	57.4%	65.4
5	[2, 3, 6, 7, 17]	-53.7	36.7%	-146.5	[7, 8, 13, 14, 16]	37.6	57.4%	65.5
6	[2, 3, 6, 7, 9, 17]	-53.7	36.7%	-146.5	[2, 7, 8, 9, 14, 16]	37.5	57.4%	65.4
7	[2, 3, 6, 7, 9, 13, 17]	-53.7	36.7%	-146.5	[2, 7, 8, 9, 10, 14, 16]	37.5	57.4%	65.4
8	[2, 3, 6, 7, 9, 12, 13, 17]	-53.5	36.7%	-145.7	[2, 7, 8, 9, 10, 13, 14, 16]	37.5	57.4%	65.4
9	[2, 3, 7, 9, 12, 13, 14, 15, 17]	-50.8	36.8%	-138.0	[2, 7, 8, 9, 10, 13, 14, 15, 16]	37.5	57.4%	65.4
10	[2, 3, 6, 7, 9, 12, 13, 14, 15, 17]	-50.8	36.9%	-137.6	[2, 7, 8, 9, 10, 13, 14, 15, 16, 17]	37.5	57.4%	65.4
11	[2, 3, 6, 7, 9, 10, 12, 13, 14, 15, 17]	-44.3	40.8%	-108.5	[2, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17]	6.4	59.1%	10.8
12	[2, 3, 6, 7, 8, 9, 10, 12, 13, 14, 15, 17]	-30.7	56.0%	-54.9	[2, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17]	-4.4	59.2%	-7.4
13	[2, 3, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17]	-6.9	62.9%	-11.0	[2, 3, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17]	-6.9	62.9%	-11.0
US								
1	[7]	-53.5	10.8%	-494.8	[16]	121.4	59.3%	204.7
2	[7, 14]	-53.7	14.0%	-384.2	[16, 17]	121.4	59.3%	204.7
3	[7, 9, 14]	-53.7	14.0%	-384.2	[2, 16, 17]	121.4	59.4%	204.4
4	[7, 10, 12, 17]	-54.4	47.5%	-114.6	[8, 10, 14, 16]	117.1	61.1%	191.5
5	[2, 7, 10, 12, 17]	-54.4	47.5%	-114.6	[8, 10, 14, 16, 17]	117.1	61.1%	191.5
6	[2, 7, 9, 10, 12, 17]	-54.4	47.5%	-114.6	[2, 8, 10, 14, 15, 16]	116.8	61.2%	190.7
7	[2, 7, 9, 10, 12, 13, 17]	-54.4	47.5%	-114.6	[2, 8, 10, 14, 15, 16, 17]	116.8	61.2%	190.7
8	[2, 6, 7, 9, 10, 12, 13, 17]	-53.3	48.0%	-110.9	[2, 8, 10, 12, 14, 15, 16, 17]	115.3	62.9%	183.4
9	[2, 7, 9, 10, 12, 13, 14, 15, 17]	-51.3	48.9%	-105.0	[2, 6, 8, 10, 12, 14, 15, 16, 17]	78.0	63.3%	123.2
10	[2, 6, 7, 9, 10, 12, 13, 14, 15, 17]	-51.3	49.1%	-104.6	[3, 6, 7, 8, 10, 12, 14, 15, 16, 17]	-27.8	66.7%	-41.6
11	[2, 3, 6, 7, 9, 10, 12, 13, 14, 15, 17]	-46.4	51.8%	-89.7	[2, 3, 7, 8, 9, 10, 12, 13, 14, 15, 16]	-27.8	66.5%	-41.8
12	[2, 3, 6, 7, 8, 9, 10, 12, 13, 14, 15, 17]	-35.0	61.7%	-56.7	[2, 3, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17]	-27.8	66.5%	-41.8
13	[2, 3, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17]	-27.9	66.7%	-41.9	[2, 3, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17]	-27.9	66.7%	-41.9

Notes: This table presents the increase in the weighted average carbon intensity for two cap-weighted indices representing the Developed Europe and United States stock universes following the application of various combinations of exclusion sets at the SDG level. Carbon intensity (CI) is calculated as the ratio of the sum of direct emissions (Scope 1) and indirect emissions from energy consumption (Scope 2) to revenue, and the weighted average is computed using portfolio weights and is expressed in tCO_2e/MUSD. The initial weighted carbon intensity of the Developed Europe index is 123.9 tCO_2e/MUSD, while that of the United States index is 125.9 tCO_2e/MUSD.

Appendix

Exhibit 22: Carbon intensity increase by combinations of exclusion sets at the subtheme and theme levels
a) Subtheme level of analysis

Nb. of subthemes	Combination with minimum increase in carbon intensity (CI)	CI increase	Weight excluded	CI / weight	Combination with minimum increase in carbon intensity (CI)	CI increase	Weight excluded	CI / weight
EU								
1	[climate]	-26.5	22.4%	-118.1	[institutional relations]	35.0	41.3%	84.9
2	[biodiversity, climate]	-40.4	32.1%	-125.9	[consumers, institutional relations]	36.6	45.2%	80.9
3	[biodiversity, climate, consumers]	-48.8	37.8%	-129.0	[climate, workforce, institutional relations]	30.7	58.7%	52.3
4	[biodiversity, climate, workforce, consumers]	-37.8	48.2%	-78.5	[climate, workforce, corporate governance, institutional relations]	34.8	59.6%	58.4
5	[biodiversity, climate, workforce, consumers, corporate governance]	-16.4	53.2%	-30.9	[climate, workforce, consumers, corporate governance, institutional relations]	39.7	61.5%	64.5
6	[biodiversity, climate, workforce, consumers, corporate governance, institutional relations]	-6.7	64.3%	-10.4	[biodiversity, climate, workforce, consumers, corporate governance, institutional relations]	-6.7	64.3%	-10.4
US								
1	[climate]	-53.5	10.8%	-494.8	[institutional relations]	82.8	48.0%	172.5
2	[climate, consumers]	-47.1	14.9%	-315.3	[consumers, institutional relations]	105.0	51.7%	203.0
3	[biodiversity, climate, institutional relations]	-47.4	59.3%	-79.9	[workforce, consumers, institutional relations]	114.9	62.6%	183.7
4	[biodiversity, climate, workforce, corporate governance]	-41.0	62.0%	-66.2	[workforce, consumers, corporate governance, institutional relations]	114.7	64.2%	178.8
5	[biodiversity, climate, workforce, consumers, corporate governance]	-36.1	63.5%	-56.9	[biodiversity, workforce, consumers, corporate governance, institutional relations]	73.3	67.0%	109.5
6	[biodiversity, climate, workforce, consumers, corporate governance, institutional relations]	-30.1	69.0%	-43.6	[biodiversity, climate, workforce, consumers, corporate governance, institutional relations]	-30.1	69.0%	-43.6

b) Theme level of analysis

Nb. of themes	Combination with minimum increase in carbon intensity (CI)	CI increase	Weight excluded	CI / weight	Combination with minimum increase in carbon intensity (CI)	CI increase	Weight excluded	CI / weight
EU								
1	[E]	-50.0	32.1%	-156.0	[G]	30.7	46.7%	65.7
2	[E, S]	-42.8	48.2%	-88.9	[S, G]	25.0	56.5%	44.2
3	[E, S, G]	-4.6	64.3%	-7.2	[E, S, G]	-4.6	64.3%	-7.2
US								
1	[E]	-44.7	19.6%	-228.4	[G]	46.7	54.1%	86.3
2	[E, S]	-37.8	57.4%	-65.8	[S, G]	102.1	64.2%	159.2
3	[E, S, G]	-23.9	69.0%	-34.7	[E, S, G]	-23.9	69.0%	-34.7

Notes: This table presents the increase in the weighted average carbon intensity for two cap-weighted indices representing the Developed Europe and United States stock universes following the application of various combinations of exclusion sets at the SDG level. Carbon intensity (CI) is calculated as the ratio of the sum of direct emissions (Scope 1) and indirect emissions from energy consumption (Scope 2) to revenue, and the weighted average is computed using portfolio weights and is expressed in tCO_2e/MUSD. The initial weighted carbon intensity of the Developed Europe index is 123.9 tCO_2e/MUSD, while that of the United States index is 125.9 tCO_2e/MUSD.

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