Drivers of exchange sustainability development:

Evidence from a decade of surveys [*]

Kaitao Lin[†]   Ying Liu[‡]

January 9, 2025

*Do not cite or quote

Drivers of exchange sustainability development: Evidence from a decade of surveys

Abstract

This paper provides an analysis of the drivers influencing exchanges' focus on Environmental, Social, and Governance (ESG) efforts, along with the motivations behind their sustainability initiatives, and the development of ESG-related financial products. By contrasting data from ten years of the World Federation of Exchanges (WFE)'s annual Sustainability Surveys against various environmental, economic, and cultural factors, we test which of these factors correlate with ESG initiatives across 66 security exchanges from 54 jurisdictions. The findings show that ESG advancements are shaped by a complex interplay of governance quality, environmental conditions, economic infrastructure, and cultural dimensions, providing important guidance for tailoring ESG strategies to the unique contexts of each jurisdiction.

1   Introduction

In recent decades, Environmental, Social, and Governance (ESG) has gained significant prominence in the global financial landscape, influencing decision-making processes across various sectors. Numerous studies have examined ESG practices among corporations (Bancel, Glavas, and Karolyi, 2023), institutional investors (Krueger, Sautner, and Starks, 2020; Edmans, Gosling, and Jenter, 2024), and retail investors (Giglio et al., 2023), yet little attention has been given to exchanges. As key players in the capital markets, exchanges have increasingly integrated ESG principles, shaping both their internal policies and those of their listed companies. This study is the first one to address this gap by investigating the ESG engagement of exchanges on a global scale.

This paper aims to understand whether there are economic, institutional, social, and cultural factors driving the levels and the types of engagement with ESG that exchanges across jurisdictions have demonstrated in the last decade. The results provide insights into the interplay between exchanges' ESG strategies and their jurisdiction's unique economic, social, and institutional context. These insights provide valuable guidance for policymakers, regulators, and exchanges seeking to promote ESG development. Adapting ESG strategies to the specific environmental, economic, and cultural contexts of each jurisdiction would be crucial for fostering the growth of sustainable and responsible financial practices.

The analysis focuses on the key aspects of ESG engagement by exchanges: the percentage of their total ESG effort that exchanges allocate to each individual ESG component (E, S, or G); the underlying motivations driving their adoption of ESG initiatives; the offering of ESG-related products; and the inclusion of the exchange's own stock in an ESG index. We obtain these data from a decade of Sustainability Surveys (2015–2024) conducted by the World Federation of Exchanges (WFE) among its members and affiliates. Using panel regression models with multiple fixed effects, the study examines the influences of macroeconomic conditions, cultural norms, and social development on exchanges' ESG practices.

Our analysis considers how country-level characteristics—such as environmental performance, institutional quality, and cultural dimensions—affect exchanges' ESG engagement and initiatives.

First, we investigate the factors influencing exchanges' focus on environmental, social, and governance efforts. For environmental efforts (e.g., reducing energy and using renewable energy sources, encouraging recycling and reducing the amount of waste destined for landfill.), the findings suggest that exchanges in regions with higher literacy rates, on average, place significantly less emphasis on environmental initiatives, potentially because educated populations already expect strong environmental standards. Long-term orientation culture, a culture in which individuals prioritize a future-oriented perspective over a short-term point of view, has a significant and positive influence, indicating that future-oriented societies prioritize environmental sustainability. For social efforts, power distance (the extent to which the less powerful members of society accept an unequal distribution of power) and masculinity culture (traditionally masculine values are prioritized over feminine values) negatively affects social concerns, while uncertainty avoidance (low tolerance to uncertainty) positively influences a focus on social issues, highlighting a desire for social protections in risk-averse societies. Regarding governance efforts, literacy rate positively impacts governance focus, in contrast with environmental efforts, reflecting a higher public demand for well-designed policies and structures in more educated regions. Interestingly and intuitively, the results also show that governance effort is negatively associated with the jurisdiction's perceived corruption level, signaling the effectiveness of governance in combating corruption.

Second, we examine the diverse motivations driving exchanges' ESG advancements, such as sustainability concerns, regulatory requirements, reputation, and competition. In the recent American Finance Association (AFA) presidential address, Starks (2023) highlights the role of countries' characteristics in the motivation for ESG investing. In this paper, we find that the jurisdictions' environmental performance shows a significant

negative relationship with competitive concerns, suggesting that exchanges in countries with stronger environmental performance may face less pressure to engage in ESG actions driven by competition. Exchanges' market capitalization negatively influences reputational motivations, indicating that larger markets may already have established reputations, reducing additional pressure for ESG engagement. Moreover, cultural dimensions play a prominent role, with long-term orientation and indulgence (a measure of the extent to which people express their desires and impulses in a society) positively affecting motivations across different categories, indicating that exchanges in societies valuing future orientation and personal enjoyment and self-expression are more likely to pursue ESG initiatives. Conversely, uncertainty avoidance and power distance negatively impact competition motivations, suggesting that societies with a low tolerance for uncertainty may view ESG advancements as risky and unpredictable, leading to hesitance in adopting innovative or competitive ESG strategies. Similarly, in more authoritarian societies characterized by high power distance, traditional market structures and hierarchical decision-making processes may favor stability and conformity over the adoption of progressive ESG initiatives.

Lastly, we study the factors influencing the development of ESG-related financial products across exchanges. Our results show that jurisdictions with larger forest areas are significantly more likely to develop sustainability-related products, such as ESG ETFs, suggesting a strong connection between natural resources and environmental finance. Also, the exchange's market capitalization positively influences the development of various ESG offerings, indicating that more developed financial markets are better equipped to support sustainable investment initiatives. Additionally, cultural dimensions such as individualism (a societal tendency where people only look after themselves and their immediate family) and long-term orientation are key drivers. Societies that emphasize personal responsibility and future planning are more engaged in creating sustainability-related financial products. Conversely, high uncertainty avoidance discourages ESG-related innovation, particularly for ESG ratings and indices, indicating that risk-averse societies may be less likely to invest

3

in certain sustainability efforts. We also find that the larger publicly-list exchanges' stock and those in more sustainable economies are more like to be included in a designated ESG index.

Overall, the findings from this study highlight the intricate interplay of environmental, economic, and cultural factors in shaping exchanges' focus on ESG efforts. The quality of governance in a country, its environmental performance, the characteristics of its population, including cultural aspects, significantly influence the adoption of ESG initiatives and the development of sustainability-related financial products.

Related literature

Our paper relates to the extensive literature studying the motivation behind firms' sustainability practices,[1] including (1) altruism and social concerns (e.g., Bénabou and Tirole, 2006; Brown, Helland, and Smith, 2006; Baron, 2010; Bénabou and Tirole, 2010); (2) regulatory pressure (e.g., Innes and Sam, 2008; Lanoie et al., 2011); (3) reputation and social pressure (e.g., Brown, Helland, and Smith, 2006; Fisman, Heal, and Nair, 2007; Baron, Harjoto, and Jo, 2011; Cahan et al., 2015); and (4) business competition (e.g., Bagnoli and Watts, 2003; Shleifer, 2004; Fisman, Heal, and Nair, 2007; Fernández-Kranz and Santaló, 2010). Our paper delves into the role of different jurisdictions' characteristics in driving these sustainability motivations.

Related papers have also analyzed the impact of different countries' economic condition and cultural norms on sustainable investment. Indeed, Cai, Pan, and Statman (2016) find that variation in sustainability performance across countries is associated more strongly with country factors than with firm characteristics. In a study of cross-country variations in environmental performance, Esty and Porter (2005) demonstrate that these differences are linked to the quality of a country's environmental regulatory regime and economic factors. Hoepner, Majoch, and Zhou (2021) show that home-country cultural norms affect institutions' decision to sign on to the United Nations' Principles of Responsible Investment

---

[1]Crifo and Forget (2015) provide a comprehensive literature review on the drivers behind firms' corporate social responsibility (CSR) practices.

(PRI). Our paper links these factors to the exchanges' actions in sustainable finance and find consistent evidence that geographic, economic, and cultural factors are linked to the exchanges' sustainability initiatives.

In term of methodology, survey-based ESG studies have explored the perspectives of different financial professionals and investors on integrating ESG factors into their decision-making processes. Bancel, Glavas, and Karolyi (2023) survey financial executives and find that most integrate ESG factors into corporate valuations, though challenges like inconsistent ESG ratings lead to adjustments in discount rates rather than cash flows. Edmans, Gosling, and Jenter (2024) focus on institutional investors, particularly portfolio managers, and find that most integrate environmental and social (ES) performance into stock selection, voting, and engagement. McCahery, Pudschedl, and Steindl (2022) survey institutional investors, primarily from private equity and venture capital firms, and show that ESG integration is driven by perceived correlations with financial performance or client demand. Krueger, Sautner, and Starks (2020) investigate institutional investors' views on climate risk, discovering that they increasingly recognize the financial impacts of climate risks, particularly regulatory risks, and adjust their portfolios accordingly. Giglio et al. (2023) survey retail investors and analyze their ESG beliefs, finding motivations ranging from ethical concerns to financial performance expectations.

The subsequent sections of the paper are structured as follows. Section 2 provides information about the survey and outlines the data sample used in our analysis. Section 3 presents and discusses the empirical results obtained from our analysis. Finally, Section 4 serves as the conclusion, summarizing the key findings and implications of our study.

2 Data

Our data sample comprises two categories: exchange-level data and jurisdiction-level data. For the exchange-level data, we utilize the annual sustainability survey conducted by the

World Federation of Exchanges, collected from its members and affiliates between 2015 and 2024, covering data for the years 2014 to 2023.[2]

The sustainability survey was designed to capture the progress and achievements of the exchange industry in its engagement with ESG issues as well as the challenges it faces in achieving its ESG goals. The questionnaire asks exchanges about their engagement in diverse sustainability initiatives, transparency and reporting, and sustainability products. The questions are updated annually to reflect the evolving sustainability landscape.[3] The number of responses received each year also fluctuates. To enhance the robustness of the analysis, we require that, to be included in the analysis, each exchange member partic-ipates in the survey at least four times over the past ten years. Ultimately, we obtained data from 66 exchanges, representing 54 jurisdictions. Table A1 in the Appendix lists the exchanges covered in the sample. Table A1 also reports the income group and region for each jurisdiction, based on the World Bank country classification.[4] The last column of table A1 documents the number of times each exchange participated in the annual sustainability survey over the past ten years.

Table 1 provides an overview of the distribution of exchanges across income groups and regions, following the World Bank's classification criteria. When considering the income group distribution, it is shown that 48% of exchanges in our sample are concentrated in high-income economies, with a total of 32 exchanges. The regional distribution highlights that the East Asia & Pacific region contains the largest number of exchanges in our sample, with 20 in total (30%). Latin America & the Caribbean, North America, and South Asia are the regions with the fewest exchanges in our sample.

Table 1. Number of exchanges across income group and regions

This table presents the number of exchanges for each income group and each region, respectively. Classifications of income groups and regions follow the World Bank criteria.

	Classification	Exchange count
	High	32
Income group	Upper middle	21
	Lower middle	13
	East Asia & Pacific	20
	Europe & Central Asia	11
	Middle East & North Africa	11
Region	Sub-Saharan Africa	8
	Latin America & Caribbean	6
	North America	6
	South Asia	4

2.1 Dependent variables

The survey collected information about how the exchange distributes its sustainability efforts between the between E, S, and G; the motivations behind exchanges implementing ESG practices; and the sustainability products introduced by the exchanges. The dependent variables in our analysis are the responses provided by exchanges in the annual Sustainability Survey. We selected key variables with the highest response rates as our dependent variables for analysis. Panel A of Table 2 reports the summary statistics of the dependent variables.

For the first section, *ESG Efforts*, the survey requires the respondents to provide the percentage of their total ESG efforts that are focused on Environmental (E), Social (S) and Governance (G), respectively.[5] Each measure ranges from 0 and 1, with 1 representing 100% allocation. Panel A of Table 2 reveals that among the three attributes, exchanges allocate the most effort to Governance, with an average of 39%. In comparison, the average allocation for Environmental efforts is 30%, while Social efforts are slightly higher at 31%.

For the second section, *Motivation*, the survey asks the exchanges to select the factors (multiple choices allowed) that motivate their involvement in sustainability, including (1)

---

[5]This question has only been included since the 2021 WFE Sustainability Survey.

Sustainability concerns, (2) *Regulatory requirements*, (3) *Reputation / public relations*, and (4) *Competitive concerns*. We represent these binary choices with a one (when the factor is selected) or a zero (when the factor is not selected). Panel A of table 2 shows that Sustainability concerns are the most significant motivator, with a mean of 0.83, indicating that 83% of the respondents recognized this factor as a driving force. Reputation and public relations appear to be the second most important factors, with 76% of exchanges selecting it as a motivator. In contrast, Regulatory requirement and Competitive concerns are less significant motivators, both with a mean of 0.26. In other words, only a small portion of respondents perceive regulatory mandates or competitive pressures as significant motivators.

Respondents to the surveys also had to indicate whether they were offering sustainability-related products (e.g., green bonds, social bonds), sustainability rankings or ratings, ESG ETFs, sustainable indices, or ESG index futures. Depending on whether the answer was positive or negative we assign one or zero. On average, 57% of exchanges offer sustainability-related products, while approximately one-third (33%) provide ESG rankings or ratings, as well as ESG exchange-traded funds (ETFs). Around 18% of exchanges offer ESG index futures and 15% offer sustainability indices.

Finally, respondents also had to indicate whether their exchange has been included in sustainability or ESG indices. Being a component of a sustainability index reflects a further level of scrutiny and is often seen as validation of the exchange's ESG engagement. On average, 30% of the exchanges are included in an ESG index.

2.2   Independent variables

To understand the drivers behind ESG advancements across different exchanges, we collected ten years of data at the jurisdictional level, integrating various environmental, social, economic, and cultural dimensions from multiple established data sources. These four dimensions align with global sustainability frameworks, such as the United Nations

Table 2. Summary Statistics

This table presents the summary statistics for the dependent and independent variables used in the analysis. Panel A provides descriptive statistics for the dependent variables, including environmental, social, and governance efforts, motivations for ESG adoption (sustainability concerns, regulatory requirements, reputation/public relations, and competitive concerns), and the availability of ESG-related financial products (sustainability-related products, ESG rankings/ratings, sustainability indices, ESG exchange-traded funds (ETFs), ESG index futures, and exchange inclusion in ESG indices). Panel B reports summary statistics for the independent variables, such as the Environmental Performance Index (EPI), forest area, average temperature, CO_2 emissions, GDP growth, market capitalization, population size, literacy rate, and cultural dimensions (power distance, individualism, masculinity, uncertainty avoidance, long-term orientation, and indulgence). The table provides mean, standard deviation, minimum, median, and maximum values, along with the number of observations for each variable.

Panel A: Dependent Variables

		Mean	SD	Min	Median	Max	No.
ESG Efforts	Environmental	0.30	0.15	0.05	0.30	1.00	167
	Social	0.31	0.09	0.00	0.30	0.69	167
	Governance	0.39	0.14	0.00	0.40	0.80	167
Motivation	Sustainability concerns	0.83	0.37	0.00	1.00	1.00	436
	Regulatory requirements	0.26	0.44	0.00	0.00	1.00	434
	Reputation / public relations	0.76	0.43	0.00	1.00	1.00	436
	Competitive concerns	0.26	0.44	0.00	0.00	1.00	436
Products	Sustainability-related products	0.57	0.50	0.00	1.00	1.00	491
	ESG rankings or ratings	0.33	0.47	0.00	0.00	1.00	434
	Sustainability indices	0.15	0.36	0.00	0.00	1.00	434
	ESG exchange traded funds (ETFs)	0.33	0.47	0.00	0.00	1.00	487
	ESG index futures	0.18	0.39	0.00	0.00	1.00	434
Index Inclusion	Exchange included in ESG index	0.30	0.46	0.00	0.00	1.00	433

Panel B: Independent Variables

	Mean	SD	Min	Median	Max	No.
EPI	0.59	0.16	0.19	0.58	0.89	487
Forest Area	0.26	0.17	0.00	0.24	0.68	66
Average Temperature	18.05	8.94	-3.71	20.95	29.42	64
log(Average Precipitation)	5.77	2.21	0.00	6.48	8.10	57
log(CO_2 emissions)	12.52	2.25	7.33	12.39	16.21	487
GDP Growth	0.03	0.04	-0.15	0.03	0.13	491
log(Market cap)	26.69	2.51	19.21	26.72	31.51	491
log(Population)	17.61	2.20	11.06	17.73	21.08	491
Literacy Rate	0.93	0.09	0.62	0.95	1.00	65
Corrupt	0.56	0.26	0.09	0.58	1.00	485
Power Distance	0.60	0.25	0.00	0.67	1.00	61
Individualism	0.38	0.25	0.00	0.30	0.91	61
Masculinity	0.50	0.18	0.00	0.52	0.95	61
Uncertainty Avoidance	0.56	0.26	0.00	0.55	1.00	61
Long Term Orientation	0.45	0.29	0.00	0.42	1.00	60
Indulgence	0.41	0.26	0.00	0.43	0.97	59

Sustainable Development Goals (SDGs), which highlight their critical role in achieving sustainable development. Panel B of Table 2 provides a summary of the variables.

To evaluate each jurisdiction's environmental performance over the past decade, we employ the Environmental Performance Index (EPI), a measure developed by the Yale Center for Environmental Law & Policy.[6] The EPI ranks countries based on their proximity to specific environmental policy targets, providing a snapshot of sustainability performance at a national level (Hsu et al., 2016; Block et al., 2024). It also serves as a reliable benchmark to evaluate and compare the environmental dimension of ESG performance across countries (Gratcheva, Emery, and Wang, 2020). For our study, we extract the EPI scores from the past ten years to assess trends in environmental performance. Since the EPI scores are released once every two years, with data available only for even-numbered years, we fill the values for the odd-numbered years by carrying forward the scores from the previous year. This approach ensures that we have a consistent annual dataset to analyze environmental performance across jurisdictions while accounting for the EPI's release schedule. We scale the EPI ranks by dividing it by 100, so that the value ranges from 0 to 1. A higher EPI value indicates better environmental performance. The average EPI score in our dataset is 0.59, with a standard deviation of 0.16, ranging from a minimum of 0.19 to a maximum of 0.89.

For the analysis of geographical characteristics, we gather data on CO_2 emissions (metric tons per capita), forest coverage (proportion of land area), climate variables (e.g., average temperature (°C) and precipitation (mm per year)), and socio-economic factors (e.g., total population, adult literacy rates, and GDP growth). These data are sourced from the World Bank Open Data database.[7] Such variables are crucial as environmental outcomes are not only shaped by policy but also by underlying geographical and socio-economic contexts. For example, the mean forest area in our sample is 26%, with a wide range from 0% to 68%, suggesting that some jurisdictions have extensive forest coverage, which can serve

---

[6]For more information, see https://epi.yale.edu/. Also see Wolf et al. (2022) for a discussion of the EPI.
[7]For more information, see https://data.worldbank.org/

as significant carbon sinks, influencing their overall sustainability performance (Pan et al., 2011). The average temperature of 18.05°C across jurisdictions (with a standard deviation of 8.94°C) indicates varying climates, which can influence policy needs and environmental challenges. The precipitation (log-transformed, with mean 5.77, SD 2.21) and CO_2 emissions (log-transformed, with mean 12.52, SD 2.25) further highlight the diversity in natural and human-made environmental pressures faced by different regions.

In addition, from the World Federation of Exchanges Statistics Portal, we collect data on the total market capitalization of equity markets to assess the financial market dimension of each jurisdiction's ESG infrastructure.[8] To capture institutional quality, we included data from Transparency International's Corruption Perceptions Index, which provides a measure of perceived public sector corruption.[9] A corrupt environment could reduce governance effectiveness and negatively impacting ESG performance. For instance, Zhang and chow So (2024) found that corruption exposure negatively affects all three dimensions of ESG performance in multinational firms. To quantify corruption, we scale the index by dividing it by 100 so that the value ranges from 0 to 1 and then take 1 minus the corruption index as our measure of corruption level ($Corrupt = 1 - CorruptIndex/100$). In other words, a corruption value of 1 indicates a highly corrupt public sector, and a value of 0 reflects a very clean public sector.

Lastly, to account for cultural influences on ESG performance, we include Hofstede's Cultural Dimensions in our dataset, using values collected from the Culture Factor Group.[10] Hofstede's framework has been widely applied in cross-cultural studies to understand how cultural values shape business practices and policy preferences (Hofstede, 2011). The six dimensions—*Power Distance*, *Individualism*, *Masculinity*, *Uncertainty Avoidance*, *Long-Term Orientation*, and *Indulgence*—capture how societal norms and attitudes may affect ESG outcomes. We obtain the latest available values of such scores, countries' scores on the

---

[8]For more information, see https://www.world-exchanges.org/

[9]https://www.transparency.org/en/

[10]See https://www.theculturefactor.com/

11

Hofstede dimensions relative to the scores of other countries do not change very much over time (Beugelsdijk, Maseland, and Van Hoorn, 2015).[11]

Regarding the individual dimensions, Power Distance measures the extent to which the less powerful members of society accept an unequal distribution of power. In societies with high power distance, individuals are more likely to accept hierarchical structures and unequal power distribution as normal. The mean Power Distance score of 0.60 suggests that, on average, many societies in our sample accept hierarchical structures, which may influence how top-down environmental policies are implemented. Individualism refers to a societal tendency where people only look after themselves and their immediate family. Masculinity measures the degree to which traditionally masculine values are prioritized over feminine values in a society. Uncertainty Avoidance measures the extent to which people feel threatened by uncertainty and ambiguity and try to avoid such situation. In a society with high uncertainty avoidance, individuals typically seek stability and clarity, prioritizing predictability over risk. Long Term Orientation reflects the degree to which individuals prioritize future-oriented or pragmatic perspective rather than a normative or short-term point of view. Indulgence measures the extent to which people express their desires and impulses in a society. In cultures with high indulgence, personal enjoyment and self-expression are highly valued. These six cultural dimensions are scaled by dividing their values by 100, ensuring that they range from 0 to 1.

Table 3 provides summary statistics by income group, showing both dependent variables (Panel A) and independent variables (Panel B) across high, upper-middle, and lower-middle income economies. In terms of ESG efforts, the summary statistics show relatively similar levels of focus across the three income groups. In Panel A, governance appears to be a slightly higher priority, particularly in upper-middle and lower-middle income economies (0.41 and 0.43 respectively), compared to high-income economies (0.35). En-

---

[11]The Hofstede's Cultural Dimensions have been frequently used in explaining ESG practices. For example, see Roy and Mukherjee (2022); Helfaya, Morris, and Aboud (2023); Shin, Moon, and Kang (2023); Wasiuzzaman, Ibrahim, and Kawi (2023).

vironmental and social efforts are relatively balanced across the three groups, with slight variation in environmental efforts. Looking at the motivations for ESG advancements, sustainability concerns are notably stronger in upper-middle (0.89) and lower-middle income economies (0.92) compared to high-income economies (0.76). This suggests that environmental sustainability is a more pressing issue in less wealthy jurisdictions, likely due to greater vulnerability to environmental risks. Competitive concerns, however, are higher in high-income economies (0.30), reflecting the importance of maintaining market competitiveness in more developed markets. Reputation/public relations motivations are relatively balanced across the groups, with a slight peak in upper-middle income economies (0.80). When it comes to ESG-related products, upper-middle-income economies lead in offering sustainability-related products (0.64), as well as rankings/ratings (0.43) and sustainability indices (0.27). In contrast, lower-middle-income economies lag behind in the development of ESG products, especially in terms of ESG exchange-traded funds (ETFs) (0.14) and index futures (0.08). They are also less frequently included in ESG indices(0.08). This observation goes in line with Esty and Porter (2005), who show that national environmental performance varies across income levels.

As shown in Panel B, high-income economies have higher Environmental Performance Index (EPI) scores (0.69) compared to upper-middle (0.52) and lower-middle-income economies (0.45). The average temperature is notably higher in lower-middle-income economies (23.27^{o}C), which could contribute to increased environmental vulnerabilities and the strong sustainability concerns reflected in Panel A. CO_2 emissions are also relatively lower in lower-middle-income economies (11.68) compared to their upper- and high-income counterparts, which may reflect differences in industrial activity and energy consumption. Economic factors such as GDP growth and market capitalization show disparities, with lower-middle-income countries having the highest GDP growth but significantly lower market capitalization. The differences in literacy rates are particularly striking, with high-income countries reporting near-universal literacy (0.97) compared

Table 3. Summary Statistics by income group

This table presents summary statistics for both dependent and independent variables across three income groups: high-income, upper-middle-income, and lower-middle-income economies. Panel A reports the mean values of ESG efforts, motivations for ESG advancements, and the availability of ESG-related financial products. Panel B provides summary statistics for the independent variables, including environmental metrics, climate factors , economic indicators, and cultural dimensions.

Panel A: Dependent Variables

		High	Upper middle	Lower middle
ESG Efforts	Environmental	0.33	0.28	0.26
	Social	0.31	0.32	0.32
	Governance	0.35	0.41	0.43
Motivation	Sustainability concerns	0.76	0.89	0.92
	Required by regulator/law	0.25	0.28	0.26
	Reputation / public relations	0.74	0.80	0.73
	Competitive concerns	0.30	0.25	0.19
Products	Offer sustainability-related products	0.56	0.64	0.45
	ESG rankings or ratings	0.33	0.43	0.12
	Sustainability indices	0.10	0.27	0.06
	ESG exchange traded funds (ETFs)	0.37	0.37	0.14
	ESG index futures	0.23	0.18	0.08
Index Inclusion	Exchange included in ESG index	0.32	0.40	0.08

Panel B: Independent Variables

	High	Upper middle	Lower middle
EPI	0.69	0.52	0.45
Forest Area	0.23	0.31	0.24
Average Temperature	17.35	15.83	23.27
log(Average Precipitation)	5.93	6.06	4.95
log(CO_2 emissions)	12.43	13.05	11.68
GDP Growth	0.02	0.03	0.04
log(Market cap)	27.26	26.71	25.06
log(Population)	16.95	18.12	18.52
Literacy Rate	0.97	0.95	0.79
Corruption	0.46	0.64	0.71
Power Distance	0.51	0.67	0.71
Individualism	0.51	0.24	0.29
Masculinity	0.52	0.50	0.46
Uncertainty Avoidance	0.63	0.53	0.45
Long Term Orientation	0.48	0.50	0.30
Indulgence	0.49	0.39	0.31

to lower-middle-income countries (0.79), reflecting broader education gaps. Cultural dimensions, such as power distance, individualism, and uncertainty avoidance, also differ significantly. Lower-middle-income countries have the highest power distance (0.71) and lowest individualism (0.29), suggesting more hierarchical and collectivist societies.

3 Empirical results

With the variables described above, we estimate the following panel regression model to analyze the drivers of ESG advancements across exchanges:

$$Q_{i,t} = X'_{i,t}\beta + \alpha_t + \alpha_{region} + \alpha_{income} + \varepsilon_{i,t} \tag{1}$$

where $Q_{i,t}$ represents the dependent variable for exchange i in year t, capturing its response to a specific survey question related to ESG practices or motivations. The vector $X_{i,t}$ consists of the jurisdiction-year level covariates described in Section 2, including environmental, social, economic, and cultural factors. We incorporate several fixed effects to control for unobserved heterogeneity, including year fixed effects (α_t), region fixed effects (α_{region}), and income group fixed effects (α_{income}). To address potential issues of serial correlation and heteroscedasticity, we cluster the standard errors by year, which adjusts for possible correlations in the residuals across observations within the same time period.

3.1 Exchanges' focus on environmental, social, and governance

The regression results in Table 4 report the factors driving exchanges' focus on environmental, social, and governance efforts. As described in Section 2.1, the E, S, and G effort variables represent the weight that the exchanges put in each of the three aspects for sustainability. Thus, the three variables sum to one, and an increase in one effort will decrease the other effort(s).

Table 4. Environmental, Social, and Governance Efforts

This table presents the regression results analyzing the factors influencing exchanges' focus on Environmental (E), Social (S), and Governance (G) initiatives. The independent variables include environmental factors such as the Environmental Performance Index (EPI), CO_2 emissions, forest area, and climate indicators, along with economic and cultural factors such as market capitalization, population size, GDP growth, literacy rates, and Hofstede's cultural dimensions. The regressions control for year, region, and income group fixed effects, and standard errors are clustered by year. Coefficients are reported with standard errors in parentheses.

	Dependent variable:		
	Environmental effort	Social effort	Governance effort
	(1)	(2)	(3)
EPI	−0.160	−0.046	0.184
	(0.264)	(0.134)	(0.179)
Forest area	0.009	−0.038	0.014
	(0.065)	(0.052)	(0.053)
Average temperature	0.00001	0.003	−0.003
	(0.002)	(0.002)	(0.002)
log(Average Precipitation)	0.002	−0.002	0.002
	(0.004)	(0.002)	(0.004)
log(CO_2 emissions)	−0.039	0.026	0.003
	(0.035)	(0.030)	(0.023)
GDP growth	0.009	0.161	−0.104
	(0.586)	(0.272)	(0.502)
log(Market cap)	0.005	0.012	−0.012
	(0.007)	(0.010)	(0.022)
log(Population)	−0.008	−0.028	0.039
	(0.039)	(0.017)	(0.039)
Literacy rate	−0.467***	−0.008	0.457**
	(0.150)	(0.107)	(0.224)
Corrupt	0.054	0.033	−0.066**
	(0.047)	(0.023)	(0.032)
Power Distance	0.001	−0.002***	0.001
	(0.001)	(0.0003)	(0.001)
Individualism	0.161**	−0.043	−0.104*
	(0.069)	(0.065)	(0.059)
Masculinity	0.149	−0.079*	−0.102
	(0.101)	(0.040)	(0.084)
Uncertainty Avoidance	−0.053	0.196***	−0.121*
	(0.080)	(0.029)	(0.071)
Long Term Orientation	0.134**	0.021	−0.146***
	(0.067)	(0.022)	(0.049)
Indulgence	−0.034	−0.007	0.013
	(0.106)	(0.029)	(0.115)
Year FEs	Yes	Yes	Yes
Region FEs	Yes	Yes	Yes
Income Group FEs	Yes	Yes	Yes
Observations	165	165	165
R^2	0.862	0.933	0.919
Adjusted R^2	0.833	0.919	0.902
Note:			*p<0.1; **p<0.05; ***p<0.01

Firstly, the estimated coefficient of literacy rate is negative and statistically significant for the exchanges' environmental effort, suggesting that higher literacy rates are associated with less emphasis on environmental initiatives. This could indicate that more educated populations may already expect strong environmental standards, reducing the need for exchanges to focus further on these efforts. This result aligns with Esty and Porter (2005), who document that information seems to have a limited impact on environmental performance. Whereas, the estimated coefficient of literacy rate is positive and statistically significant for the governance effort, indicating that more educated populations demand stronger governance mechanisms.

Moreover, the result shows that corruption has a negative and significant relationship with governance effort, while the estimated coefficients for the environmental and social effort are positive but statistically insignificant. This result highlights the importance of governance mechanisms are important in combating corruption.

On the cultural dimension, power distance and masculinity are negatively associated with social efforts, meaning that exchanges in hierarchical and more competitive societies may be less likely to emphasize social concerns. Regarding individualism and long term orientation, the results show a positive impact on the exchanges' environmental effort and a negative impact on the governance effort. Exchanges in societies that value individual responsibility and are future-oriented are more likely to prioritize environmental sustainability, while reducing the need for less formal governance structures. Lastly, uncertainty avoidance has a strong positive influence on social efforts and a marginally significant negative impact on governance efforts, suggesting that exchanges in societies that prefer structured approaches and avoid risks tend to focus more on social issues such as labor standards and equality.

Overall, the results indicate that exchanges' focus on environmental, social, and governance efforts is influenced by a diverse set of environmental, economic, and cultural factors. Cultural dimensions such as uncertainty avoidance and long-term orientation also

17

shape the emphasis on social and governance efforts, while economic factors such as literacy rates reveal contrasting impacts on governance and environmental priorities. These findings highlight the complexity of ESG efforts and the importance of considering both external environmental factors and internal cultural dynamics when examining how exchanges prioritize ESG issues.

3.2 Motivations behind exchanges' ESG advancements

The regression results in Table 5 highlight various motivations behind exchanges' ESG advancements, such as sustainability concerns, regulatory requirements, reputation management, and competitive pressures. For sustainability concerns (Column 1), long-term orientation and indulgence have a positive and significant impact, indicating that future-oriented societies and those that allow more personal freedom are more likely to engage in ESG initiatives driven by sustainability. This finding is supported by Bénabou and Tirole (2010), who document that firms' corporate social responsibility actions could be driven by social interests, including adopting long-term perspectives. Additionally, uncertainty avoidance negatively affects sustainability concerns, suggesting that risk-averse societies are less focused on sustainability efforts.

For regulatory requirements (Column 2), long-term orientation and indulgence again show significant positive effects, implying that societies with a long-term outlook and higher indulgence are more likely to have regulatory frameworks supporting ESG initiatives. Population size also plays a role, with larger populations showing a slight positive impact on regulatory motivations.

Reputation and public relations (Column 3) are another significant motivator behind ESG advancements.[12] Individualism, indulgence, and long-term orientation positively influence exchanges' ESG efforts driven by reputational concerns, suggesting that societies

---

[12]Cahan et al. (2015) show that social media pressure has significant impact on corporate social responsibilities (CSRs).

Table 5. Motivation

This table presents the results of four panel regressions examining the various motivations driving exchanges' ESG advancements. The dependent variables include dummy variables indicating: (1) Sustainability concerns, (2) Regulatory requirements, (3) Reputation/public relations, and (4) Competitive concerns. Independent variables include the Environmental Performance Index (EPI) for 2014, 10-year percentage change in EPI, forest area, average temperature, CO_2 emissions, GDP growth, market capitalization, population, adult literacy rate, and several cultural dimensions based on Hofstede's model. The regressions control for year, region, and income group fixed effects, and standard errors are clustered by year. Coefficients are reported with standard errors in parentheses.

| | *Dependent variable:* | | | |
| | Sustainability concerns | Regulatory requirements | Reputation | Competition |
	(1)	(2)	(3)	(4)
EPI	−0.313	−0.098	−0.024	−0.540*
	(0.199)	(0.228)	(0.293)	(0.325)
Forest area	−0.069	−0.015	0.120	0.650***
	(0.104)	(0.129)	(0.125)	(0.177)
Average temperature	0.002	0.005	0.007***	0.011***
	(0.002)	(0.004)	(0.002)	(0.003)
log(Average Precipitation)	−0.007	0.0004	−0.010	0.008
	(0.005)	(0.004)	(0.010)	(0.005)
log(CO_2 emissions)	−0.012	−0.027	0.047	−0.028
	(0.021)	(0.046)	(0.036)	(0.022)
GDP growth	−0.658	−0.500	−2.360**	−0.968
	(0.754)	(0.740)	(0.983)	(0.721)
log(Market cap)	0.028	−0.005	−0.069**	−0.021
	(0.020)	(0.042)	(0.028)	(0.022)
log(Population)	−0.030*	0.047*	0.009	0.017
	(0.018)	(0.026)	(0.018)	(0.016)
Literacy rate	−0.258	−0.212	0.567*	0.995**
	(0.312)	(0.317)	(0.295)	(0.425)
Corrupt	−0.012	0.046	0.127	0.248**
	(0.106)	(0.139)	(0.090)	(0.103)
Power Distance	0.001	0.001	0.004***	−0.003**
	(0.001)	(0.002)	(0.001)	(0.001)
Individualism	0.028	−0.086	0.284***	0.005
	(0.185)	(0.214)	(0.109)	(0.231)
Masculinity	−0.222	−0.232	0.027	0.637**
	(0.224)	(0.239)	(0.143)	(0.273)
Uncertainty Avoidance	−0.198*	−0.020	−0.213	−0.331***
	(0.114)	(0.174)	(0.162)	(0.057)
Long Term Orientation	0.289***	0.385***	0.294***	0.418***
	(0.092)	(0.144)	(0.092)	(0.138)
Indulgence	0.341***	0.416**	0.249***	0.248**
	(0.102)	(0.168)	(0.095)	(0.111)
Year FEs	Yes	Yes	Yes	Yes
Region FEs	Yes	Yes	Yes	Yes
Income Group FEs	Yes	Yes	Yes	Yes
Observations	429	427	429	429
R^2	0.867	0.545	0.798	0.383
Adjusted R^2	0.856	0.507	0.781	0.332

Note: *p<0.1; **p<0.05; ***p<0.01

with a focus on personal accountability, personal freedom, and a long-term outlook are more concerned with maintaining a positive public image through ESG advancements. Literacy rates also show a positive relationship with reputation motivations, indicating that more educated populations drive ESG practices for reputational reasons.

Finally, competitive concerns (Column 4) have a marginal significant relation with ESG advancements as evident by the negative coefficient of EPI. This negative relationship suggests that competition motivated ESG efforts could negatively impact the jurisdictions' environmental performance. Moreover, competitive concerns are significantly influenced by forest area and masculinity, suggesting that exchanges in jurisdictions with larger forest areas and more competitive, masculine cultures adopt ESG initiatives as part of their market strategies. Uncertainty avoidance negatively impacts competitive motivations, indicating that risk-averse societies may be less inclined to adopt ESG practices for competitive reasons.

Overall, the results indicate that exchanges are driven by a combination of environmental performance, regulatory pressures, reputational concerns, and competitive dynamics in their pursuit of ESG advancements. The significance of cultural factors, such as long-term orientation, masculinity, and power distance, further underscores the need to understand the social and institutional contexts that shape ESG motivations. These findings provide important insights for policymakers and regulators aiming to foster ESG development across exchanges by tailoring strategies to the specific motivations and concerns present in different jurisdictions.

3.3   Offering of ESG-related products and index inclusion

The regression estimation results for the ESG-related products are reported in Table 6. The Environmental Performance Index shows a positive and significant relationship with the inclusion of an exchange's own stock in an ESG index (Column 6), indicating that better environmental performance is linked to greater inclusion in sustainability indices.

Table 6. Products and index inclusion

This table presents the results of six panel regressions examining the determinants of various sustainability-related financial products and inclusion in ESG index across exchanges. The dependent variables include: (1) the offering of sustainability-related products, (2) the offering of ESG rankings or ratings, (3) the offering of sustainability indices, (4) the offering of ESG exchange-traded funds (ETFs), (5) the offering of ESG index futures, and (6) inclusion in an ESG index. Independent variables include the Environmental Performance Index (EPI) for 2014, 10-year percentage change in EPI, forest area, average temperature, CO_2 emissions, GDP growth, market capitalization, population, adult literacy rate, and several cultural dimensions based on Hofstede's model. The regressions control for year, region, and income group fixed effects, and standard errors are clustered by year. Coefficients are reported with standard errors in parentheses.

	Dependent variable:					
	ESG products	ESG rating	ESG indices	ESG ETFs	ESG ind. fut.	ESG ind. inclu.
	(1)	(2)	(3)	(4)	(5)	(6)
EPI	−0.107	0.065	−0.378	−0.090	−0.125	0.589**
	(0.403)	(0.225)	(0.287)	(0.255)	(0.357)	(0.259)
Forest area	0.534***	0.178	0.182	0.542***	0.148	1.138***
	(0.204)	(0.199)	(0.162)	(0.116)	(0.121)	(0.139)
Average temperature	0.006*	−0.003	0.004***	0.006**	0.003	0.016***
	(0.003)	(0.003)	(0.001)	(0.002)	(0.003)	(0.003)
log(Average Precipitation)	0.020**	0.029***	0.015*	0.007	0.013	0.030***
	(0.008)	(0.011)	(0.008)	(0.012)	(0.008)	(0.009)
log(CO_2 emissions)	−0.021	−0.061	−0.044**	−0.088***	0.030	0.143***
	(0.025)	(0.053)	(0.019)	(0.032)	(0.023)	(0.023)
GDP growth	−0.655	−0.887	−0.650	−0.213	0.656	−0.597
	(0.848)	(0.833)	(0.733)	(0.825)	(0.799)	(0.982)
log(Market cap)	0.072**	0.089***	0.009	0.067***	0.059***	−0.060***
	(0.030)	(0.032)	(0.018)	(0.023)	(0.022)	(0.008)
log(Population)	−0.042***	−0.033	0.066***	0.038	−0.052***	−0.060***
	(0.016)	(0.045)	(0.021)	(0.023)	(0.018)	(0.018)
Literacy rate	−2.087***	−1.243**	0.265	−0.618	0.040	−0.033
	(0.671)	(0.481)	(0.401)	(0.445)	(0.272)	(0.430)
Corrupt	0.042	−0.029	0.041	−0.132*	0.013	0.107
	(0.115)	(0.071)	(0.107)	(0.078)	(0.067)	(0.080)
Power Distance	−0.001	0.001**	0.002	−0.001	−0.002***	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Individualism	0.484***	0.352***	0.410**	0.525***	0.134	0.732***
	(0.183)	(0.089)	(0.186)	(0.168)	(0.149)	(0.179)
Masculinity	−0.225	−0.283	−0.114	−0.019	−0.052	0.350**
	(0.144)	(0.205)	(0.073)	(0.244)	(0.207)	(0.175)
Uncertainty Avoidance	0.071	−0.447***	−0.274*	−0.109	0.085**	−0.878***
	(0.167)	(0.131)	(0.141)	(0.083)	(0.038)	(0.094)
Long Term Orientation	0.323***	0.453***	−0.128	0.412***	0.269***	0.088
	(0.093)	(0.130)	(0.167)	(0.091)	(0.062)	(0.117)
Indulgence	−0.027	0.069	0.229***	−0.276**	−0.106	−0.019
	(0.112)	(0.076)	(0.070)	(0.127)	(0.082)	(0.102)
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Region FEs	Yes	Yes	Yes	Yes	Yes	Yes
Income Group FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	469	427	427	465	427	426
R^2	0.774	0.582	0.381	0.602	0.538	0.572
Adjusted R^2	0.756	0.546	0.329	0.571	0.500	0.536

Note: $^*p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

Geographical characteristics also play a significant role in the development of ESG financial products. Forest area is positively associated with the availability of sustainability-related products, ESG ETFs, and inclusion in ESG indices, suggesting that jurisdictions with larger forested areas may have a greater focus on environmental stewardship, which in turn encourages the creation of ESG products. Similarly, climate-related variables, such as average temperature and precipitation, show significant positive associations with the development of sustainability-related products, ESG rankings, and inclusion in ESG indices. This implies that jurisdictions experiencing more pronounced climate variability may prioritize the creation of financial products that address environmental risks and sustainability concerns.

In terms of emissions, CO_2 emissions are negatively associated with the development of ESG ETFs and sustainability indices, indicating that higher emissions may inhibit the development of certain sustainability-related products. However, in contrast, inclusion in ESG indices appears positively correlated with CO_2 emissions, suggesting that exchanges in jurisdictions with higher emissions may face pressure to be included in these indices to address investor demand for greater environmental accountability. This reflects a nuanced relationship between environmental performance and the creation of ESG-related financial products.

Economic factors such as market capitalization show a strong positive influence across multiple ESG product offerings. Larger financial markets appear more capable of supporting the development of these products, possibly due to better infrastructure, regulatory frameworks, and greater investor demand for sustainability-oriented investments.

Cultural dimensions based on Hofstede's model reveal complex but important relationships with ESG product development. Higher individualism consistently shows a positive relationship with the development of various ESG products and rankings, indicating that societies where personal responsibility and accountability are emphasized tend to be more engaged in creating sustainability-related financial products. Similarly, so-

cieties with higher long-term orientation are positively associated with the development of sustainability-related products, including ESG rating, ETFs, and futures, reflecting a future-oriented approach that values sustainability. Conversely, uncertainty avoidance is negatively associated with offering ESG rankings, offering ESG indices, and inclusion in ESG indices, implying that societies that are more risk-averse may be less likely to innovate in the ESG space.

These results underscore the multifaceted nature of ESG product development. Environmental, geographical, economic, and cultural factors all play critical roles in shaping how jurisdictions engage with sustainability-related financial markets. Policy-makers and regulators can leverage these findings to tailor strategies that promote the growth of ESG-related financial products, taking into account the unique characteristics of each jurisdiction. For example, jurisdictions with improving environmental performance or large financial markets may be better positioned to develop and expand their offerings of sustainability-related products, while cultural factors such as individualism and long-term orientation can further enhance ESG innovation.

4   Conclusion

This study examines the drivers behind exchanges' focus on ESG efforts, as well as the underlying motivations, and the development of ESG-related financial products. Through analyzing the results collected from ten years of the WFE sustainability survey and integrating environmental performance metrics, geographical characteristics, economic indicators, and cultural dimensions, this study sheds light on the complex factors shaping ESG initiatives across exchanges globally. The findings show that exchanges' ESG advancements are shaped by a complex interplay of such factors.

Our results offer valuable implications for exchanges, policymakers, and regulators aiming to advance ESG practices globally. For exchanges, the findings emphasize the need

to align their ESG initiatives with the socio-economic and cultural realities of their jurisdictions. For example, exchanges in risk-averse societies may focus on gradually introducing ESG innovations to build trust and mitigate perceived risks. Similarly, exchanges in jurisdictions with strong environmental performance can employ their competitive positioning to drive the development of new sustainability products.

Policymakers and regulators can apply these insights to tailor targeted interventions that enhance ESG adoption in the capital market. For instance, governance reforms and public education campaigns could foster greater demand for sustainable financial practices in underdeveloped markets. The findings also provide guidance for international organizations and investors seeking to evaluate the ESG performance of exchanges, offering a framework to consider the contextual drivers behind sustainability initiatives. Overall, this paper highlights the importance of adapting ESG strategies to local contexts.

References

Bagnoli, M., and S. G. Watts. 2003. Selling to socially responsible consumers: Competition and the private provision of public goods. *Journal of Economics & Management Strategy* 12:419–45.

Bancel, F., D. Glavas, and G. A. Karolyi. 2023. Do ESG Factors Influence Firm Valuation? Evidence from the Field. Working Paper, Available at SSRN: https://ssrn.com/abstract=4365196 or http://dx.doi.org/10.2139/ssrn.4365196.

Baron, D. P. 2010. Morally motivated self-regulation. *American Economic Review* 100:1299–329.

Baron, D. P., M. A. Harjoto, and H. Jo. 2011. The economics and politics of corporate social performance. *Business and Politics* 13:1–46.

Bénabou, R., and J. Tirole. 2006. Incentives and prosocial behavior. *American Economic Review* 96:1652–78.

———. 2010. Individual and corporate social responsibility. *Economica* 77:1–19.

Beugelsdijk, S., R. Maseland, and A. Van Hoorn. 2015. Are scores on h ofstede's dimensions of national culture stable over time? A cohort analysis. *Global Strategy Journal* 5:223–40.

Block, S., J. W. Emerson, D. C. Esty, A. de Sherbinin, Z. A. Wendling, and et al. 2024. The 2024 environmental performance index report. *epi.yale.edu* .

Brown, W. O., E. Helland, and J. K. Smith. 2006. Corporate philanthropic practices. *Journal of Corporate Finance* 12:855–77.

Cahan, S. F., C. Chen, L. Chen, and N. H. Nguyen. 2015. Corporate social responsibility and media coverage. *Journal of Banking & Finance* 59:409–22.

Cai, Y., C. H. Pan, and M. Statman. 2016. Why do countries matter so much in corporate social performance? *Journal of Corporate Finance* 41:591–609.

Crifo, P., and V. D. Forget. 2015. The economics of corporate social responsibility: A firm-level perspective survey. *Journal of Economic Surveys* 29:112–30.

Edmans, A., T. Gosling, and D. Jenter. 2024. Sustainable investing: Evidence from the field. Working Paper, FEB-RN Research Paper No. 18/2024.

Esty, D. C., and M. E. Porter. 2005. National environmental performance: An empirical analysis of policy results and determinants. *Environment and Development Economics* 10:391–434.

Fernández-Kranz, D., and J. Santaló. 2010. When necessity becomes a virtue: The effect of product market competition on corporate social responsibility. *Journal of Economics & Management Strategy* 19:453–87.

Fisman, R., G. Heal, and V. B. Nair. 2007. A model of corporate philanthropy. Working Paper, Working Paper. Columbia University.

Giglio, S., M. Maggiori, J. Stroebel, Z. Tan, S. Utkus, and X. Xu. 2023. Four Facts About ESG Beliefs and Investor Portfolios. NBER Working Papers 31114, National Bureau of Economic Research, Inc.

Gratcheva, E. M., T. Emery, and D. Wang. 2020. Demystifying sovereign esg. EFI Insight-Finance. Washington, DC: World Bank.

Helfaya, A., R. Morris, and A. Aboud. 2023. Investigating the factors that determine the ESG disclosure practices in Europe. *Sustainability* 15:5508–.

Hoepner, A. G., A. A. Majoch, and X. Y. Zhou. 2021. Does an asset owner's institutional setting influence its decision to sign the principles for responsible investment? *Journal of Business Ethics* 168:389–414.

Hofstede, G. 2011. Dimensionalizing cultures: The Hofstede model in context. *Online Readings in Psychology and Culture* 2:8–.

Hsu, A., D. Esty, M. Levy, A. de Sherbinin, and et al. 2016. The 2016 environmental performance index report. *https://doi.org/10.13140/RG.2.2.19868.90249* .

Innes, R., and A. G. Sam. 2008. Voluntary pollution reductions and the enforcement of environmental law: An empirical study of the 33/50 program. *The Journal of Law and Economics* 51:271–96.

Krueger, P., Z. Sautner, and L. T. Starks. 2020. The Importance of Climate Risks for Institutional Investors. *The Review of Financial Studies* 33:1067–111. ISSN 0893-9454. doi:10.1093/rfs/hhz137.

Lanoie, P., J. Laurent-Lucchetti, N. Johnstone, and S. Ambec. 2011. Environmental policy, innovation and performance: New insights on the Porter hypothesis. *Journal of Economics & Management Strategy* 20:803–42.

McCahery, J. A., P. C. Pudschedl, and M. Steindl. 2022. Institutional investors, alternative asset managers, and ESG preferences. *ECGI Working Paper Series in Law* .

Pan, Y., R. A. Birdsey, J. Fang, R. Houghton, P. E. Kauppi, W. A. Kurz, O. L. Phillips, A. Shvidenko, S. L. Lewis, J. G. Canadell, et al. 2011. A large and persistent carbon sink in the world's forests. *Science* 333:988–93.

Roy, A., and P. Mukherjee. 2022. Does national culture influence corporate ESG disclosures? Evidence from cross-country study. *Vision* 09722629221074914.

Shin, J., J. J. Moon, and J. Kang. 2023. Where does ESG pay? The role of national culture in moderating the relationship between ESG performance and financial performance. *International Business Review* 32:102071–.

Shleifer, A. 2004. Does competition destroy ethical behavior? *American Economic Review* 94:414–8.

Starks, L. T. 2023. Presidential address: Sustainable finance and ESG issues—value versus values. *The Journal of Finance* 78:1837–72.

Wasiuzzaman, S., S. A. Ibrahim, and F. Kawi. 2023. Environmental, social and governance (ESG) disclosure and firm performance: Does national culture matter? *Meditari Accountancy Research* 31:1239–65.

Wolf, M. J., J. W. Emerson, D. C. Esty, A. d. Sherbinin, and Z. A. Wendling. 2022. 2022 Environmental Performance Index (EPI) results. Working Paper, New Haven, CT: Yale Center for Environmental Law & Policy.

Zhang, J. F., and J. Y. chow So. 2024. The effect of corruption exposure on the esg performance of multinational firms. *Pacific-Basin Finance Journal* 86:102433–. ISSN 0927-538X. doi:https://doi.org/10.1016/j.pacfin.2024.102433.

Appendix

A   The List of Exchanges

Table A1. The List of Exchanges
This table lists the names of exchanges, along with their corresponding jurisdiction, income group, region, and participation count in the annual sustainability survey. Only exchanges that have participated in the WFE's annual sustainability survey at least four times over the past ten years are included. The exchanges are listed in alphabetical order by name.

Exchange	Jurisdiction	Income Group	Region	Survey Count
Abu Dhabi Securities Exchange	United Arab Emirates	High	Middle East & North Africa	6
Amman Stock Exchange	Jordan	Lower middle	Middle East & North Africa	10
Athens Stock Exchange	Greece	High	Europe & Central Asia	9
Australian Securities Exchange	Australia	High	East Asia & Pacific	8
B3 - Brasil Bolsa Balcão	Brazil	Upper middle	Latin America & Caribbean	9
BME Spanish Exchanges	Spain	High	Europe & Central Asia	7
BSE India	India	Lower middle	South Asia	5
Bahrain Bourse	Bahrain	High	Middle East & North Africa	6
Baku Stock Exchange	Azerbaijan	Upper middle	East Asia & Pacific	4
Bermuda Stock Exchange	Bermuda	High	North America	4
Bolsa Mexicana de Valores	Mexico	Upper middle	Latin America & Caribbean	8
Bolsa de Comercio de Buenos Aires	Argentina	Upper middle	Latin America & Caribbean	9
Bolsa de Comercio de Santiago	Chile	High	Latin America & Caribbean	7

Table A1. The List of Exchanges (Continued)

Exchange	Jurisdiction	Income Group	Region	Survey Count
Bolsa de Valores de Colombia	Colombia	Upper middle	Latin America & Caribbean	9
Bolsa de Valores de Lima	Peru	Upper middle	Latin America & Caribbean	5
Borsa Istanbul	Turkey	Upper middle	Europe & Central Asia	10
Botswana Stock Exchange	Botswana	Upper middle	Sub-Saharan Africa	6
Boursa Kuwait	Kuwait	High	Middle East & North Africa	6
Bursa Malaysia	Malaysia	Upper middle	East Asia & Pacific	10
CME	United States of America	High	North America	6
Cboe Global Markets	United States of America	High	North America	10
China Financial Futures Exchange	China	Upper middle	East Asia & Pacific	5
Colombo Stock Exchange	Sri Lanka	Lower middle	South Asia	7
Cyprus Stock Exchange	Cyprus	High	Europe & Central Asia	6
Dar es Salaam Stock Exchange PLC	Tanzania	Lower middle	Sub-Saharan Africa	5
Deutsche Börse AG	Germany	High	Europe & Central Asia	8
Dhaka Stock Exchange Ltd	Bangladesh	Lower middle	South Asia	5
Dubai Financial Market	United Arab Emirates	High	Middle East & North Africa	8
FMDQ	Nigeria	Lower middle	Sub-Saharan Africa	4
Ghana Stock Exchange	Ghana	Lower middle	Sub-Saharan Africa	4
Hochiminh Stock Exchange	Vietnam	Lower middle	East Asia & Pacific	6
Hong Kong Exchanges and Clearing	Hong Kong, China	Upper middle	East Asia & Pacific	10
Indonesia Stock Exchange	Indonesia	Upper middle	East Asia & Pacific	9

Table A1. The List of Exchanges (Continued)

Exchange	Jurisdiction	Income Group	Region	Survey Count
Intercontinental Exchange, Inc.	United States of America	High	North America	4
Japan Exchange Group, Inc.	Japan	High	East Asia & Pacific	10
Johannesburg Stock Exchange	South Africa	Upper middle	Sub-Saharan Africa	10
Kazakhstan Stock Exchange	Kazakhstan	Upper middle	Europe & Central Asia	9
Korea Exchange	South Korea	High	East Asia & Pacific	9
London Stock Exchange Group	United Kingdom	High	Europe & Central Asia	4
Luxembourg Stock Exchange	Luxembourg	High	Europe & Central Asia	10
Malta Stock Exchange	Malta	High	Middle East & North Africa	8
Moscow Exchange	Russia	Upper middle	Europe & Central Asia	6
Muscat Securities Market	Oman	High	Middle East & North Africa	4
NZX Limited	New Zealand	High	East Asia & Pacific	7
Nairobi Securities Exchange	Kenya	Lower middle	Sub-Saharan Africa	4
Nasdaq	United States of America	High	North America	9
National Stock Exchange of India Limited	India	Lower middle	South Asia	10
Nigerian Exchange	Nigeria	Lower middle	Sub-Saharan Africa	8
Oslo Børs ASA	Norway	High	Europe & Central Asia	5
Qatar Stock Exchange	Qatar	High	Middle East & North Africa	9
SIX Swiss Exchange	Switzerland	High	Europe & Central Asia	10
Saudi Exchange	Saudi Arabia	High	Middle East & North Africa	7
Shanghai Futures Exchange	China	Upper middle	East Asia & Pacific	7

Table A1. The List of Exchanges (Continued)

Exchange	Jurisdiction	Income Group	Region	Survey Count
Shanghai Stock Exchange	China	Upper middle	East Asia & Pacific	8
Shenzhen Stock Exchange	China	Upper middle	East Asia & Pacific	9
Singapore Exchange	Singapore	High	East Asia & Pacific	9
Stock Exchange of Mauritius	Mauritius	Upper middle	Sub-Saharan Africa	10
Stock Exchange of Thailand	Thailand	Upper middle	East Asia & Pacific	10
TMX Group Limited	Canada	High	North America	9
Taipei Exchange	Taiwan	High	East Asia & Pacific	8
Taiwan Futures Exchange	Taiwan	High	East Asia & Pacific	9
Taiwan Stock Exchange Corp.	Taiwan	High	East Asia & Pacific	8
Tel-Aviv Stock Exchange	Israel	High	Middle East & North Africa	10
The Egyptian Exchange	Egypt	Lower middle	Middle East & North Africa	10
The Philippine Stock Exchange, Inc.	Philippines	Lower middle	East Asia & Pacific	6
Zhengzhou Commodity Exchange	China	Upper middle	East Asia & Pacific	4