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Greenwashing in environmental, social and governance disclosures

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‘Declarations of interest: none.’

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Greenwashing in environmental, social and governance disclosures

Abstract

The environmental, social, and governance (ESG) data provided in firms' sustainability reports is often unaudited. If ESG information disclosed by firms is not reliable, a firm's greenwashing behavior can be a barrier to integrating ESG factors into investment decisions. In this paper, we study mechanisms to lessen firms' greenwashing behavior in ESG dimensions holistically. Firstly, we identify "greenwashers" as firms which seem very transparent and reveal large quantities of ESG data but perform poorly in ESG aspects. By creating peer-relative greenwashing scores for a cross-country dataset comprised by 1925 large-cap firms, we measure the extent to which large-cap firms engage in greenwashing. We find evidence that greenwashing behavior in ESG dimensions can be deterred by scrutiny from (a) independent directors, (b) institutional investors, (c) influential public interests via a less corrupted country system, and (d) being cross-listed. Our results suggest that the two firm-level governance factors are most effective at attenuating firms' misleading disclosure relating to ESG dimensions.

Keywords: Greenwashing, ESG disclosure, ESG performance, sustainability, stakeholder engagement, corporate governance.

JEL: G3, G15.

1. Introduction

In the last decade, there has been a growing call for investors to incorporate environmental, social, and governance (hereafter ESG) factors into their investment process. However, incorporating ESG variables into the asset selection process is made more difficult for investors when companies “greenwash,” i.e. when firms make misleading ESG disclosures. This concern motivates us to explore the mechanisms that could deter firms from engaging in ESG greenwashing. Moreover, the prior ESG disclosure and greenwashing literature focus only on gauging best practice for each dimension of ESG separately. While the greenwashing literature discusses the presence of symbolic strategies adopted by firms, very few studies have empirically explored the circumstances under which companies are engaged in greenwashing (King and Lenox, 2000; Bromley and Powell, 2012; McDonnell and King, 2013; Del Bosco and Misani, 2016; Marquis et al., 2016; Van Halderen et al., 2016). Our study aims to fill this research gap by studying the quantity and quality of firms’ disclosure in the three dimensions of ESG holistically. By creating a peer-relative greenwashing score, we can measure the magnitude of a firms’ greenwashing behavior in ESG issues. Covering an international sample of large-cap companies across 47 countries and territories, our empirical results suggest that governance and ownership factors play an important role in dissuading ESG greenwashing. We find that firms exposed to greater scrutiny, i.e. effective supervision under institutional investors, are less likely to engage in ESG greenwashing.

More pension scheme trustees, regulators, institutional investors, and sovereign funds have started considering environmental, social and governance (ESG) factors holistically for investment decisions (European Commission, 2016; The Pension Policy Institute, 2018). The United Nations (2006) launched its voluntary set of Principles for Responsible Investment which prioritizes ESG factors into investment practice. These six United Nations-supported principles of responsible investing provide the very first general guideline for incorporating ESG factors holistically into the asset selection process. The Pension Policy Institute (2018) in the UK proposes that pension funds who do not incorporate ESG factors into their investment strategies are more likely to deliver poor long-term returns because of the future economic consequences of increased regulations. Institutional investors have started using ESG data disclosed by firms to evaluate their investment risks and opportunities. For

example, the €1.17 trillion Japan's Government Pension Investment Fund (GPIF), the biggest pool of retirement savings in the world, has begun allocating capital to ESG indices, such as the FTSE Blossom Japan Index. Presenting at 2018 FTSE Russell conference, Mr. Mizuno (2018), GPIF's chief investment officer, suggests that the fund which currently holds 1% of global equity market capitalization, must aim for creating a sustainable capital market rather than trying to beat it. Another illustration of how investors can place pressure and incentivize firms to put ESG factors into management practice is Norges Bank Investment Management (NBIM), the world's largest sovereign wealth fund. The three key investment criteria recently set by NBIM cover three areas: water, children's rights and climate change (Serafeim and Grewal, 2017). With regard to the sustainable and responsible investment practice, EY (2014) argues that corporate social responsibility information can provide institutional investors with additional information about their portfolio firms' future benefits and risks (EY, 2014). For instance, disclosure on employee accidents can help investors gauge the potential adverse impact on productivity per worker and shareholder profit.

However, the existing challenges on firms' disclosure on ESG data are manifold: unaudited ESG data, no global governing body, various behavioural issues at firm level, and no specific regulatory guidelines to ensure the accuracy of reported ESG data (PRI, 2015; Khan et al., 2017; PRI 2017; State Street Global Advisors, 2017; Schrodgers, 2017; Fride, 2019). We believe that these impediments in ESG disclosure and practice may give companies latitude to engage in ESG greenwashing. In addition to the very first general guidelines of the responsible investment approach provided by the United Nations to incorporate ESG factors holistically into the asset selection process, the Sustainability Accounting Standards Board (SASB) and the Global Reporting Initiative (GRI) also develop and propagate sustainability accounting standards. However, for each country, stakeholder parties still need mandatory and voluntary ESG disclosure instruments to follow the general ESG disclosure guidelines proposed by the United Nations, SASB, and GRI. One good example of voluntary disclosure instruments is the EU's "Non-Financial Reporting Directive," although the major drawback of this voluntary disclosure instrument is that the EU directive lacks a consistent standard for firms to follow in reporting their ESG information. Other recent voluntary instruments in the arena of impact investing are the development of Impact Reporting and Investment Standards (IRIS), a system for assessing the social and environmental impact of companies, and Global Impact Investment Rating

System (GIIRS), a fund impact ratings framework. With regards to mandatory disclosure instruments which transfer the new disclosure rules into national law, a recent example is the requirement for UK pension fund trustees to produce a Statement of Investment Principles on how they take account of ESG considerations from October 2019 (the UK Law Commission, 2014 and 2017; the Department for Work and Pensions DWP, 2018). In practice, firms are allowed to disclose favourite data or even opt-out entirely because not all ESG disclosure instruments are mandatory. The quality and content of ESG reports vary considerably (Prakash and Potoski, 2012; Siew, 2015; Büyüközkan and Karabulut, 2018). It is also difficult for relevant stakeholder parties to directly evaluate firms' transparency, performance, and corporate accountability in ESG aspects. The stakeholder parties rely heavily on corporations' signals, which do not always convey their real performance in ESG dimensions accurately (Bromley and Powell, 2012; Marquis et al., 2016; Van Halderen et al., 2016). The reliance on firms' self-reported ESG data can also give rise to firms' greenwashing behavior.

In this study, we define "greenwashers" as companies which seem very transparent and publish large quantities of ESG data but perform poorly in ESG aspects. We view the three dimensions of ESG holistically and define greenwashing as deceptive disclosure in all three dimensions of ESG. Presumably, firms which adopt greenwashing as their corporate strategy attempt to obscure their less impressive overall ESG performance by disclosing large quantities of ESG data to mislead their stakeholders. We create peer-relative ESG greenwashing scores for all our sample firms by comparing their relative position for the Bloomberg ESG disclosure score (a measure of the quantity of disclosure) with that for the Asset4 ESG score (a measure of ESG performance). When a firm has a much better relative position than its peers in its ESG disclosure score than in its ESG performance score, this firm's greenwashing score will be positive, implying that this firm is obscuring its poor ESG performance by simply revealing large quantities of ESG data. In the prior literature, scholars (Tamimi and Sebastianelli, 2017; Yu et al., 2018) employ the Bloomberg ESG disclosure score to measure firms' ESG transparency, while the Asset4 ESG performance score is often adopted to represent firms' real performance in ESG dimensions ((Ioannou and Serafeim, 2012; Cheng et al., 2014; Hartmann and Uhlenbruck, 2015; Rees and Rodionova, 2015; Del Bosco and Misani, 2016). In this study, we aim to generate a peer-relative greenwashing score for our sample firms by combining these two indicators.

Lastly, we study the common characteristics of greenwashing firms and then suggest ways to attenuate firms' greenwashing behavior. We develop our hypotheses on common characteristics of greenwashing firms based on the prior greenwashing literature, in particular, whether increased scrutiny can have a direct effect on greenwashing. Our empirical findings show that pressure on preventing such ESG greenwashing behavior can be enhanced by the following four mechanisms: (a) more independent directors, (b) more institutional investors, (c) more-influential public interests via a less corrupted country system, and (d) cross-listed status, the first two being the most efficient actors for attenuating greenwashing. For example, our result shows that residents in a less corrupted country can scrutinize firms' greenwashing behavior better since they can speak up about greenwashing. Overall, our empirical findings support the view that firms exposed to greater scrutiny are less likely to be involved in greenwashing. Our results have significant implications for ESG policymakers and investors by showing how firm- and country-level factors can dissuade greenwashing behavior.

The rest of this paper is organized as follows. We provide a brief overview of the prior literature on various types of greenwashing and develop our hypotheses on the common features of firms engaged in greenwashing. Next, we describe the calculation of the relative greenwashing score, as well as our data collection and estimation methodology. In the final section, we conclude, discussing the possible policy implications, limitations of this study, and providing suggestions for future research.

2. Literature review and hypothesis development

2.1 Prior literature on greenwashing

In this section, we provide a brief review of how scholars from various research fields define greenwashing and its impact.

Recent research argues that environmental, social and governance factors are essential to firm valuation and risk management (Lyon et al., 2013; Marquis et al., 2016; Huang et al., 2018; Yu et al., 2018). In particular, there are several prior studies focusing on voluntary disclosure of corporate social responsibility issues. For instance, Lu et al. (2017) show that standalone corporate social responsibility (CSR) reports can enhance monitoring over firm managers and thus induce them to make better investment decisions, resulting in more efficient use of cash holdings. By investigating the first-time standalone CSR reports issued by U.S. firms, Dhaliwal et al. (2011) provide empirical evidence indicating that companies with better peer-relative CSR performance can access equity capital more cheaply after they initiate voluntary disclosure of CSR issues. Ghoul et al. (2018) find for manufacturing firms across 30 countries that corporate environmental responsibility can reduce firms' risk exposure and consequently lower their cost of equity capital.

Although the literature shows that environmental, social and governance factors can have an impact on firm valuation, greenwashing is a threat to accurate ESG information. As suggested by Bowen and Aragon-Correa (2014) and Du (2014), greenwashing is a deliberate information disclosure decision initiated by firms that may be beneficial to firms but costly to society. From the perspective of corporate sustainability disclosure, Herbohn, Walker, & Loo (2014) find that, in a sample of energy and mining companies, corporate sustainability performance is positively related to sustainability disclosure. Pascual et al. (2017) study whether corporate environmental actions can help firms get social acceptance. Investigating US-listed firms in polluting industries from 1997 to 2001, they find that intense scrutiny from nongovernmental organizations is detrimental to a firm in achieving social acceptance if its environmental performance deteriorates. In the field of environmental disclosure, some previous studies (Bromley and Powell, 2012; Kirk and Vincent, 2014; Marquis et al., 2016) document that organizations often set out symbolic compliance rather than actual. For instance, some researchers (Berliner and Prakash, 2015; Shvarts et al., 2018) observe that the members of the UN Global Compact (UNGC) are sometimes inclined to downplay their commitments without improving their environmental practice although they enjoy the reputation of being green as being part of UNGC. Marquis et al. (2016) also propose that

firms with better environmental performance might greenwash less since they have less to hide.

We identify three types of greenwashing discussed in the literature. The first type of greenwashing is manipulating disclosure to boost company valuation. By doing so, companies overstate their real environmental performance, which is so-called a “greenwashing” strategy” (Lyon and Maxwell, 2011; Lyon and Montgomery, 2013; Marquis et al., 2016). Firms adopting “greenwashing” as their corporate strategy try to obscure their poor environmental performance by disclosing large quantities of environmental data to mislead their stakeholders. For example, Radu and Francoeur (2017) document that a firm’s environmental performance is positively associated with its environmental disclosure. On the other hand, studying U.S. electric utility firms’ data, Kim and Lyon (2015) suggest that firms may choose to have communications that understate their environmental achievements, which is so-called a “brownwashing” strategy and also in line with previous research proposing that green credentials or social responsibility programs are detrimental to share prices (Ullmann, 1985; Khanna and Damon, 1999; Fisher-Vanden and Thorburn, 2011).

The second type of greenwashing is selective disclosure to mislead investors. Some researchers (Lyon and Maxwell, 2011; Lyon et al. 2013; Marquis et al. 2016) define greenwashing as firms selectively reporting positive environmental information but hiding negative information. In other circumstances, Kirk and Vincent (2014) document how companies disclose private information to a selected group of investors only. Consequently, these firms are able to create a false impression to mislead the public about their actual environmental performance. However, Marquis et al. (2016) state that corporations are less likely to undertake selective disclosure where they are more exposed to global norms and scrutiny.

Finally, the third type of greenwashing simply focuses on product-level greenwashing rather than firm-level greenwashing (Delmas and Burbano, 2011; Majid and Russell, 2015; Testa et al., 2015; Cho and Baskin, 2018). For example, Testa et al. (2015) investigate whether the use of eco-labels can influence Italian consumers’ purchasing decisions. Delmas

and Burbano (2011) show that firms can overstate the environmental benefits of a product to increase sales. Majid and Russell (2015) find that second-hand cars of pure green brands such as Toyota Prius lose value more slowly than their counterparts with green brand extensions.

In this paper, we aim to extend the theory of greenwashing by examining firms' greenwashing behavior in the three dimensions of ESG holistically. This is the main difference between our approach and the various definitions of greenwashing in the literature since previous studies only focus on assessing the greenwashing issue for each dimension of environmental, social, or governance separately. In this study, we "re-define" greenwashing as firms obscuring their less impressive overall ESG performance by revealing large quantities of ESG data to manage relevant stakeholders' impression. We focus on ESG data disclosure at the firm-level.

2.2 Hypothesis development on common characteristics of ESG greenwashers

We aim to gain a better understanding of the factors which can mitigate greenwashing behavior. The prior literature on environmental greenwashing and empirical evidence support that closer scrutiny by external stakeholders can alleviate the extent of environmental greenwashing (Kim and Lyon, 2011; Lyon and Montgomery, 2013; Delmas and Burbano, 2011; Kim and Lyon, 2015). For example, Kim and Lyon (2011) find that companies are less likely to be involved in environmental greenwashing when they were headquartered in a location with a greater density of environmental NGO members. Lyon and Montgomery (2013) also argue that such environmental greenwashing behavior can be deterred by external scrutiny from environmental activists.

Based on this literature, we focus on whether increased scrutiny can have a direct effect on firms' greenwashing behavior. In this paper, we hypothesize that companies are less likely to engage in ESG greenwashing because of their exposure to pressure arising from a variety of stakeholders.

Firm-level governance factors

At firm level, we focus on whether increased scrutiny from independent directors, institutional investors, or board size has a direct effect on firms' greenwashing behavior. The CSR literature suggests that CSR disclosure can be seen as firms trying to meet the extra information demand from non-shareholder stakeholders and shareholders (Dhaliwal et al., 2011; Kim et al., 2012; Dhaliwal et al., 2012; Lu et al., 2017). For instance, Dhaliwal et al. (2012) show that a corporate social responsibility report can exert a positive impact on analysts' forecast accuracy. Researchers (Dahya and McConnell, 2007; Lee et al., 2008; Bebchuk and Weisbach, 2010; Liu et al., 2015; Ferrell et al., 2016) also document that effective governance mechanisms, including independent board directors and an institutional investor base, may reduce the agency costs linked to the division of ownership and control. Dalla Via and Perego (2018) suggest that firms with stronger corporate governance systems have higher levels of conflict minerals disclosure as mandated by the Dodd-Frank Act. Consistent with the view from prior CSR literature (Dhaliwal et al., 2011; Dhaliwal et al., 2012), the rationale of our first hypothesis is that the environmental, social, and governance (ESG) data disclosed in firms' sustainability reports can provide additional information beyond conventional annual reports, which is beneficial for decision making for all relevant stakeholders. Consequently, we argue that ESG data as a whole can reduce relevant parties' information asymmetry and thus reduce firm managers' opportunities to engage in greenwashing by enhanced monitoring and increased scrutiny from all relevant stakeholders. Prior studies examine whether increased scrutiny can reduce firms' greenwashing behaviour in environmental, social, or governance issues separately. For example, Cuadrado-Ballesteros et al. (2015) document that a higher percentage of independent directors exerts a positive influence on the level of corporate social responsibility (CSR) information disclosure. Abrahamson and Park (1994) show that firms are more likely to disclose adverse financial information if they are thoroughly monitored by their investors and boards. Furthermore, Marquis et al. (2016) document that greater scrutiny and global norms can discourage environmentally damaging firms from selective disclosure. Adams and Mehran (2012) provide evidence that increases in board size is likely to add value when the complexity of bank holding companies increases. Studying Canadian firms, Ben-amar and McIlkenny (2015) show that a firm's board effectiveness is positively related to its carbon disclosure quality. However, we also observe some conflict findings against the positive impact on

environmental disclosure from increased scrutiny. For example, Kim and Lyon (2015) and Lyon et al. (2013) argue that shareholders are likely to place pressure on the companies they invest in to avoid disclosing more environmental information since these environmental practices could raise a firm's costs and consequently have a negative impact on its share price.

Given the evidence from the literature that increased scrutiny can have a direct effect on firms' greenwashing behavior, we propose to include three corporate ownership and governance variables in our model, as stated in Hypothesis 1.

Hypothesis 1: (a) An increased share of institutional owners reduces firms' ESG greenwashing behavior (b) An increased share of independent directors reduces firms' ESG greenwashing behavior (c) A greater board size reduces firms' ESG greenwashing behavior, since a larger board size can increase a board's capability for monitoring.

Country factors

In this section, we argue that more scrutiny and pressure from the public can also lead to more reliable corporate disclosure in ESG issues. Prior studies suggest that firms' greenwashing is also influenced by the extent to which their headquarter's country scrutinizes corporate behavior. Scholars (Vormedal and Rund, 2009; Marquis et al., 2016) document how the institutional environment can impact on corporate decisions and the relevant empirical evidence supports this notion. For instance, some previous studies (Marquis and Qian, 2014; Marquis et al., 2016) find that companies publish their environmental and CSR reports more frequently when they are headquartered in countries with a greater density of environmental NGO members or when they are monitored by regulating authorities. Delmas and Toffel (2004) also show that firms adopt different types of environmental strategy in order to respond to institutional pressures. Given the evidence from previous studies, we examine whether the absence of corruption and the absence of political rights affect firms' greenwashing behavior. We focus on whether these two country-level factors can increase a

company's exposure to scrutiny and consequently influence its greenwashing behavior. Prior literature (Cooper et al., 2010; Cuervo-Cazurra, 2006) reports that inhabitants in a society with weaker political rights are less likely to express their concerns through the media or NGOs freely, and corruption influences the cost of improving firm's transparency through activities such as bribery. Ioannou and Serafeim (2012) document that Japanese firms are under less pressure to enhance corporate social responsibility because corruption is less prevalent in Germany than Japan. Accordingly, this leads to our Hypothesis 2. We expect that firms will be dissuaded from greenwashing in countries with less corruption and more political rights. The rationale for this relationship is that more scrutiny and pressure from the public can lead to more reliable corporate disclosure of ESG issues.

Hypothesis 2: (a) Firms will engage in less ESG greenwashing behavior in countries where corruption is low. (b) Firms will engage in more ESG greenwashing behavior in countries with an absence of political rights.

Cross-listing

We also study whether cross-listed firms are scrutinized more closely when their shares are listed on external stock exchanges. Cross-listing means that a company has its shares listed on at least one international stock exchange in addition to its home country. Such cross-listed companies must adhere to their home country securities regulations and the listing requirements of the host countries in which they are cross-listed. Consequently, cross-listed firms may have less incentive to greenwash in ESG issues and try to avoid irritating external stakeholders. We predict that the state of cross-listing can dissuade firms from engaging in ESG greenwashing because international exposure tends to increase scrutiny on the firm and consequently influence its responsiveness to its foreign regulators and overseas investors.

Our assumption leads to Hypothesis 3. We predict that heightened transparency standards are more likely to discourage cross-listed firms from greenwashing behavior.

Hypothesis 3: Cross-listed firms are less likely to engage in ESG greenwashing.

3. Research design

Having surveyed the various types of greenwashing and developed the hypotheses used in our investigation, we now describe our research design. Firstly, we create the peer-relative greenwashing score, which measures the extent to which a firm engages in ESG greenwashing. Then, we develop a model for examining the common characteristics of firms that exhibit greenwashing behavior.

3.1 Peer-relative greenwashing score

Earlier in the paper, we define “greenwashers” as firms which seek to create a very transparent public image by revealing large quantities of ESG data but perform poorly in ESG aspects. To align with our definition of greenwashing in this study, we estimate a firm’s peer-relative greenwashing score using equation 1. This peer-relative greenwashing score can be used to quantify the magnitude of a firm’s greenwashing behavior in ESG issues.

A firm’s peer-relative greenwashing score = (a normalized measure representing a firm’s relative position to its peers in the distribution of the Bloomberg ESG disclosure score) - (a normalized measure representing a firm’s relative position to its peers in the distribution of our modified Asset4 ESG performance score)

Eq (1)

To measure a firm’s ESG disclosure, we use the Bloomberg ESG disclosure score by following the previous studies (Tamimi and Sebastianelli, 2017; Yu et al. 2018). The Bloomberg ESG disclosure score reflects the quantity of ESG data this firm discloses to the public but does not gauge its ESG performance. All ESG information disclosed by a firm is counted irrespective of whether it is favorable or negative. The Bloomberg disclosure score is a proprietary calculation. More than 900 key disclosure indicators (e.g., direct CO2

emissions, total energy consumptions, total water use, hazardous waste, percentages of minorities in workforce, workforce accidents, board meeting attendance, and political donations) are structured into separate disclosure score for each dimension, and then combine as the total Bloomberg ESG disclosure score for each firm. Starting at 0.1 for firms that disclose a minimum amount of ESG data, the score can reach 100 for those that disclose information on every ESG data point gathered by Bloomberg. The higher the Bloomberg ESG disclosure score, the more non-financial information is disclosed. More detailed information on the Bloomberg disclosure score matrix is provided in Appendix Table A-1.

To represent firms' performance on ESG dimensions, we employ the three pillar scores from Asset4 on the environmental, social, and governance dimensions. Scholars adopt the Asset4 ESG performance scores as an indicator of a firm's performance on environmental, social and governance dimensions (Ioannou and Serafeim, 2012; Cheng et al., 2014; Hartmann and Uhlenbruck, 2015; Rees and Rodionova, 2015; Del Bosco and Misani, 2016). Thomson Reuters supplies the Asset4 performance scores based on the relative performance of a company on the aspects of E, S, and G, compared with the Asset4 universe. As stated by Thomson Reuters (2019), the key metrics cover all aspects of ESG, from emission reduction to employment quality (see Appendix Table A-1). The ESG performance scores range between 0 and 100 where higher values represent better performance. However, in order to have a meaningful comparison between the disclosure score and performance scores, we re-weight the performance scores using the weighting scheme for the disclosure scores. By doing so, the weights of the three components of E, S, and G are consistent for our measures of ESG disclosure and ESG performance.

We convert both scores into ratios by dividing by 100, so the maximum value for both indicators is one. Then we normalize both scores to the same scale by subtracting the mean and dividing by the standard deviation. A company's peer-relative greenwashing score is the difference between its normalized ESG disclosure and its normalized ESG transparency score. If a firm discloses no indicators for either or both types of scores, we treat this situation as missing data for the relative greenwashing score.

We can identify three basic circumstances of a firm's ESG disclosure using equation (1). Firms can either (a) disclose large quantities of ESG data such that it overstates its achievements in ESG issues, (b) disclose its ESG information fully, so the disclosed information is the same as the reflection of its actual performance in ESG issues, or (c) disclose less ESG information or remain silent so it understates its achievements in ESG issues. For example, when a firm has a much better relative position than its peers in its ESG disclosure score than in its ESG performance score, this company's greenwashing score will be positive, implying that the company is greenwashing. It may be hiding its poor performance in its ESG issues by simply revealing large quantities of ESG data. Oppositely, firms with negative greenwashing scores choose to understate their environmental achievements, which may in line with prior research suggesting that green credentials and social responsibility programs are harmful to share prices (Ullmann, 1985; Khanna and Damon, 1999; Fisher-Vanden and Thorburn, 2011).

3.2 Model

We summarise our theoretical model below. The dependent variable in equation (2) is our peer-relative greenwashing score, which quantifies the magnitude of a firm's ESG greenwashing. Employing the panel dataset, we examine the common features of firms' greenwashing behavior across sample firms from all countries.

$$\begin{aligned}
 \text{peer - relative greenwashing score}_{jkt} &= b_0 + b_1 * (\text{firm - level governance factors})_{jt} + b_2 \\
 &* (\text{country factors})_{jt} + b_3 * (\text{cross - listing})_{jt} + b_4 \\
 &* (\text{R\&D intensity})_{jt} + b_5 \\
 &* (\text{industry - adjusted operating firm performance indicator})_{jt} + b_6 \\
 &* \log(\text{firm asset size})_{jt} + b_7 * (\text{liquidity})_{jt} + b_8 \\
 &* (\text{industry - adjusted leverage})_{jt} + b_9 \\
 &* (\text{share of insider ownership})_{jt} + b_{10} \\
 &* \log(\text{GDP per capita based on PPP})_{jt} + \varepsilon_{jkt}
 \end{aligned}$$

Eq (2)

Where:

*peer – relative greenwashing score*_{jkt}: A peer-relative greenwashing score for company j of country k in year t, which measures the magnitude of a firms' greenwashing behavior in ESG dimensions.

A vector of firm-level governance factors, including (a) share of institutional owners (b) share of independent directors, and (c) log (board size)

A vector of country factors, including (a) the lack of corruption, and (b) the absence of political rights.

Cross-listing: The status of cross-listing equals one if a firm has its shares listed on at least one external stock exchanges, and zero otherwise.

A vector of control variables, including:

- (a) Operating firm performance indicators: We adopt return on asset (ROA), and the average return on asset for the last three years (ROA3Y), and the average return on asset for the last five years (ROA5Y).
- (b) Log (asset firm size): Firm size is measured by the book value of assets.
- (c) Liquidity: We employ the quick ratio and the current ratio.
- (d) Leverage: We measure a firm's leverage as the debt/total asset ratio.
- (e) R&D intensity: We define R&D intensity as the sum of R&D costs divided by sales for the prior three years.
- (f) Log (GDP per capita): The value of GDP per capita converted to U.S. dollar at purchasing power parity (PPP) exchange rates. As a robustness check, we also re-estimate this equation by replacing Log (GDP per capita) with the Human Development Index. The Human Development Index, attempting to capture overall national well-being, is published by the United Nations.

We also include a set of control variables to reflect important dimensions of the firm- and country-level factors that may affect firms' greenwashing behavior. For instance, Delmas & Burbano (2011) document that firm characteristics such as profitability and size may also influence environmental greenwashing behavior. Prior literature (Himmelberg et al., 1999; Lee et al. 2008) suggests that R&D intensity is positively related to agency cost, we thus employ the variable of R&D intensity to measure a firm's agency and monitoring cost. We control for firm size since large firms typically have a cheaper cost of capital for environmental investments because of better access to capital markets (Innes and Sam, 2008; Herbohn et al., 2014). We also include GDP per capita, converted to U.S. dollar at PPP exchange rates, to capture the impact from a country's economic development. Some scholars

(De Soto, 1989; Husted, 2005) document that economic development is an important force for environmental sustainability. For example, Gnyawali (1996) finds that people in advanced economies are better informed and therefore demand environmentally and socially responsible conduct from companies. However, others have different views. Previous studies (Chapple and Moon, 2005; Ioannou and Serafeim, 2012) show that the stage of economic development cannot account fully for the cross-country variation in corporate social performance.

4. Data Sources and Results

4.1 Data Sources

Sample

To test our hypotheses, we select our sample firms from the MSCI All Country World Index, which accounts for around 85% of the market capitalization of the worldwide equity opportunity set. We exclude firms headquartered in tax havens such as Jersey and Bermuda because their inclusion may confound the impact of country factors. This results in an international dataset which comprises 1925 large-cap companies headquartered in 47 countries and territories over the period 2012-2016. We drop financial firms from our study because financial and banking regulations may influence firms' ESG disclosure and their greenwashing behavior.

We obtain other country data from a variety of sources. The GDP per capita in U.S. dollar at PPP exchange rates is collected from the International Monetary Fund's World Economic Outlook Database. We adopt this measure to compare the state of economic development across countries. We also use the annual "absence of corruption index" from Transparency International, which ranges from zero for highly corrupt countries to 100 for highly clean countries. For example, Denmark (90.8) is the "cleanest" country, while

corruption is high in Russia (28.2) and followed by India (37.6). Transparency International (2017) reports that many countries in Asia Pacific, including India, fail to stop corruption and 900 million people pay bribes. Conversely, the high score for Denmark reflects surveys of citizens' and companies' experience with low rates of reported bribery. We employ the indicator for the "lack of political rights" from the World Report of Freedom House for the sample period of 2012-2016. For "lack of political rights," each country is rated on a scale from 1 to 7, where a low number indicates a high level of political rights. We collect data on firm-level characteristics and control variables from Bloomberg and Datastream. We find that approximately 1450 companies had their shares cross-listed in at least one of the sample years.

We report descriptive statistics for all variables in Table 1, along with the correlations between each of them. Most correlations are relatively low. To avoid the multicollinearity problem, highly correlated variables are not used simultaneously in equation (2).

[Insert Table 1]

4.2 Empirical results

We report and interpret our empirical results concerning the common characteristics of large-cap corporations' greenwashing behavior.

4.2.1 Peer-relative greenwashing score

Appendix Table A-2 provides our sample distribution across countries and territories. Then in Figure 1, we explore the relation between ESG performance scores and ESG disclosure scores by countries. We group our sample firms by country and present their ESG performance scores on the vertical axis and ESG disclosure scores on the horizontal axis. We

find ESG performance scores are positively associated with ESG disclosure scores. Our observation is consistent with the empirical finding of Herbohn et al. (2014) showing a positive performance-disclosure relation in the dimension of corporate social responsibility (CSR).

[Insert Table A-2]

[Insert Figure 1]

We also suggest that companies in the countries below the regression line may be more likely to engage in greenwashing along ESG dimensions. For instance, Japan and South Korea have better ESG disclosure score than other sample countries, but both suffer from an inferior ESG performance score, especially in the governance dimension. According to the Asset4 database, Japan receives an average governance performance score of 11 out of the maximum value as 100, followed by South Korea (13), while the average “governance” performance score for all our sample firms is 51. As stated by Thomson Reuters (2019), the corporate governance score provided by Asset4 reflects “a firm’s systems and processes, which ensure that its executives and board members work in the best interests of its long-term shareholders.”

Furthermore, we present a boxplot of ESG disclosure score and ESG performance score for the 1925 sample firms in Figure 2. This figure shows the distributions of our ESG disclosure scores and ESG performance score. The average of the ESG performance score is 58 (median = 60), while the average of ESG disclosure score is 33 (median = 33). As shown in Figure 2, we can see that the distributions of ESG disclosure score and ESG performance scores vary significantly. Therefore, we have to normalize both types of scores before we use equation (1) to calculate peer-relative greenwashing scores for our sample firms.

[Insert Figure 2]

That is, we compute:

$$\text{A normalized measure of Bloomberg ESG disclosure score} = \frac{(D_{jkt} - \bar{D})}{\sigma_D}$$

Eq (3)

$$\text{A normalized measure of the re-weighted Asset 4 ESG performance score} = \frac{(P_{jkt} - \bar{P})}{\sigma_P}$$

Eq (4)

where: Our measures are normalized by the standard deviations of ESG disclosure scores (σ_D) and ESG performance scores (σ_P). \bar{D} represents the average value of ESG disclosure scores, and \bar{P} indicates the average value of ESG performance scores.

Finally, we show the distribution of peer-relative greenwashing scores in Figure 3. Although many large-cap firms overstate their achievements in ESG dimensions (greenwashing strategy), some firms understate their achievements (brownwashing strategy). The mean of the peer-relative greenwashing score of our sample firms is 0.04, and the median is 0.059.

[Insert Figure 3]

Table 2 reports peer-relative greenwashing scores of firms in the ten Global Industry Classification Standard (GICS) sectors, excluding the financial sector. We find that companies in the Materials have the highest peer-relative greenwashing score of 0.1522, followed by Energy (0.1477), and Utilities (0.1202). Our finding implies that the sample firms in the Materials sector are more likely to engage in ESG greenwashing. As we can see from Table 2, peer-relative greenwashing scores are highly industry-dependent. Therefore, we use an industry-adjusted measure of greenwashing score as our dependent variable in our

regression of Eq (1). The greenwashing score for a company is industry-adjusted by subtracting the average greenwashing score of the sector that the company belongs to.

[Insert Table 2]

4.2.2 Results on greenwashers' common characteristics

We now turn to examine the common characteristics of companies that engage in greenwashing.

Firm-level governance factors

Table 3 shows results using the estimation method of panel EGLS period weight and the White diagonal as our coefficient covariance method, which is robust to heteroskedasticity (Reed and Ye, 2011).

[Insert Table 3]

Our findings suggest that increased institutional ownership and a higher share of independent directors can reduce firms' greenwashing behavior. Both factors, "percentage of institutional ownership" and "percentage of independent directors," are consistently significant at the 1% level (refer to Model (1) to Model (8) in Table 3). For example, based on Model (7) shown in Table 4, a 1% increase in the share of independent directors leads to 0.85% less greenwashing along ESG dimensions. Moreover, the effect of 1% increase in institutional ownership reduces greenwashing by 0.36%. However, we find that a greater board size has no significant impact on firms' greenwashing behavior. The insignificant impact of board size on firm's greenwashing behaviour could be due to the benefits of having more directors outweighed by the increased costs of a larger board. Prior literature on board

size (Jensen, 1993; Yermack, 1996; Guest, 2009; Adams and Mehran, 2012) suggests that a larger board size can increase a board's ability to monitor managerial behaviour, but a larger board is also likely to suffer from free-riding, coordination problem among group decision makers, and slower decision making. For example, Jensen (1993) shows that boards beyond eight members are less likely to function effectively, while we observe that the average board number in our study is between ten to eleven.

Our empirical evidence shows that increased scrutiny from independent directors and institutional investors have a direct effect on firms' greenwashing behavior. The findings match our prior expectation that firms are less likely to engage in ESG greenwashing when relevant stakeholders exert greater scrutiny over the relationship between a company's ESG performance and its ESG transparency. Our regression results also offer support for the view that some of these governance mechanisms are potential substitutes for each other (Dahya and McConnell, 2007; Bebchuk and Weisback, 2010; Liu et al., 2015; Palmberg, 2015). In our case, oversight from independent directors and institutional investors can complement each other to deter large-cap firms from engaging in ESG greenwashing.

To provide further support for our hypotheses, we also perform a set of robustness checks for equation (2) using various operational firm performance indicators. We use an alternative measure of firm performance by replacing ROA (return on asset) with three-year average return on asset (ROA3Y) and five-year average return on asset (ROA5Y). We also employ the quick ratio to replace the current ratio as a measure of a firm's liquidity. The regression results are shown in Table 4 and Table 5, which are consistent with those presented in Table 3. Both firm-level factors, independent directors, and institutional investors, still matter, whereas the size of the board does not reduce a firms' greenwashing behavior. These supplementary regression results give us additional confidence that we capture the hypothesized effects robustly.

[Insert Table 4]

[Insert Table 5]

Country factors

We find support for part (a) of Hypothesis 2, which posits that the absence of corruption is likely to reduce firms' greenwashing behavior. Consistent with our argument, the coefficients for the absence of corruption are statistically significant and negative in all model specifications in Tables 3, 4, and 5. Controlling for per-capita GDP, we show that companies in countries with less corruption are less likely to engage in greenwashing behavior. More specifically, based on Model (7) in Table 5, a 1% increase in the factor of the absence of corruption (this means a country will become less corrupted) leads to 0.60% less greenwashing. Our result suggests that, in a less-corrupted country, inhabitants can scrutinize firms' greenwashing behavior more and speak up about this issue. Therefore, we suggest that a less corrupted system can provide more opportunities for relevant stakeholder parties to lessen the extent of greenwashing.

Surprisingly, the coefficients of "lack of political rights" are negative and consistently statistically significant at the 1% level. Refer to all model specifications shown in Tables 3, 4, and 5. This finding contradicts the notion that substantial political rights empower people to discourage firms' greenwashing behavior. This empirical finding might be explained by the following mechanisms. People in a society with a stronger political rights are given more opportunities to express their concerns through the media, influential environmental organizations, and NGOs. Meanwhile, large-cap firms also have more political rights to selectively disclose their favorable environmental credentials, improving the opinion of stakeholders through activities such as (a) lobbying efforts to the government, (b) seeking the legitimacy of corporate green branding, or (c) to averting mandatory regulations by developing voluntary self-regulation (Delmas & Montes-Sancho, 2010). Our findings are in line with previous studies (Bansal & Kistruck, 2006; Van Halderen et al., 2016), which show that organizations can obtain financial rewards and legitimacy by taking symbolic actions without implementing the practices.

Our results suggest that economic development, as measured by per-capita GDP, plays an ambiguous role in firms' greenwashing behavior in ESG dimensions. See all model specifications shown in Tables 3, 4, and 5. Our finding matches prior studies (Chapple and

Moon, 2005; Ioannou and Serafeim, 2012) which suggest that economic development cannot fully explain the variation in cross-country corporate social performance. As a robustness check, we replace Log (GDP per capita) with the Human Development Index in Equation (2). The Human Development Index, provided by the United Nations (2019), is a combined measurement of educational attainment, GDP per capita, and life expectancy. By adopting the Human Development Index, we control for overall national well-being holistically. We display all our regressions relevant to the Human Development Index in Appendix Tables A-3, A-4, and A-5. We confirm that the main results shown in Tables 3-6 are robust to the inclusion of these additional regressors. Interestingly, we find that higher national well-being can reduce firms' greenwashing behavior.

Cross-listing

Our findings support Hypothesis 3. In most circumstances, cross-listed firms must meet stricter disclosure requirements, which tend to lessen information asymmetry between the principal and the agent. Consequently, cross-listed firms have less incentive to engage in greenwashing. The empirical result meets our prediction as the cross-listing coefficient is negative and significant at the 1% level across all our model specifications. See Model (3) to Model (8) shown in Tables 3, 4, and 5. Our findings support the notion that cross-listed firms are more likely to be dissuaded from greenwashing and more willing to portray a full and proper picture of their real performance in ESG issues. This occurs through stricter international disclosure requirements in the host country and scrutiny from foreign investors.

4.2.3 Relative importance of company characteristics, cross-listing, and country factors

Focusing on the relative importance among these factors, we show our regression results in Table 6. Our findings indicate that a firm's firm-level factors exert a more significant influence on firms' greenwashing behavior, followed by country-level factors, and finally cross-listing.

[Insert Table 6]

For instance, we examine firm characteristics only in Model (1) of Table 6. On the other hand, we include only country factors while excluding all firm features in Models (2) and (3) of Table 6. Comparing Model (1) and Model (2), we find that firm characteristics account for 17.54% of the total variation of the relative greenwashing score, 3.16 times as much as country factors. We obtain a similar result for cross-listing. Comparing Model (1) and Model (7), our results show that company characteristics account of the total variation in the greenwashing relative score 4.13 times as much as cross-listing. We also find that the influence from the country-level factors on greenwashing relative score is only slightly higher than the impact from cross-listing (see Model 4 vs. Model 5). Finally, we include all firm characteristics, country-level factors, and cross-listing status from Models (8) to (12) in Table 6. Together they account for 20.47% of the total variation in the dependent variable in Model (12).

5. Conclusion

We investigate large-cap firms' greenwashing behavior in ESG issues. Viewing these three dimensions of environmental, social and governance as a whole and incorporating these ESG factors into the asset selection process distinguishes the responsible investing from the ethical investment approach. The key characteristic of the responsible investing is that investors do not have to exclude companies and can still go for maximization of their return as long as they consider their risks posed by environmental, social and governance factors. Therefore, to understand greenwashing is increasingly important, given rising demands for companies to perform better in ESG dimensions and provide more reliable ESG data to supplement their financial reports. The current challenges of ESG data disclosure are that sustainability reports are unaudited ESG, there is lack of standardization in disclosure rules of ESG data and no global governing body to ensure the accuracy of reported ESG information. We emphasize the importance of aligning a firm's ESG transparency (symbolic) and its ESG performance (action) since greenwashing can be a barrier for investors to integrate ESG data into their

investment strategy. In this study, we aim to identify some ways to lessen firms' greenwashing behavior. We make the following contributions. Firstly, the prior literature concentrates on greenwashing behavior for each environmental, social and governance dimension. In this study, we extend the theory of greenwashing to incorporate the three dimensions of ESG holistically. Secondly, we create peer-relative greenwashing scores for our sample firms by comparing a company's relative position in the distribution of the Bloomberg ESG disclosure scores and our modified Asset4 ESG performance scores. By doing so, we identify the large-cap firms that are engaged in greenwashing and quantify the degree to which a company is considered to engage in greenwashing. Finally, our model unpacks whether firm-level features, country-level characteristics, and cross-listing status can dissuade firms from engaging in greenwashing. We test our hypotheses by employing a global dataset comprised of 1925 companies. The variation across countries helps us to specify the impacts of cross-listing, country features, and firm characteristic on greenwashing behavior. We find that companies engage less in ESG greenwashing when relevant stakeholders exert greater scrutiny over the link between ESG transparency and ESG performance. Our results suggest that pressure on preventing such ESG greenwashing behavior can be enhanced by the following four factors: (a) more independent directors (b) more institutional investors (c) more influential public interests through a less corrupted country system, and (d) the state of cross-listing. In particular, two firm-level governance factors are the most two effective factors to attenuate firms' greenwashing behavior. Our results provide empirical support for stewardship, an effective and responsible active ownership, since firms exposed to greater scrutiny are less likely to be involved in greenwashing.

Overall, we contribute to research on sustainability in capital markets, ESG data disclosure, and responsible investments. Our hypotheses and empirical findings in this study foster a better understanding of the varied factors that impact large-cap firms' greenwashing behavior. Understanding how firm- and country-level factors can dissuade greenwashing behavior has important implications for all stakeholders. Based on our findings, we propose to focus on stewardship and encourage large-cap firms across countries to have more independent directors and institutional investors on the board. This study has limitations that are left for future research to address. We only examine large-cap firms, since smaller firms often struggle to integrate these ESG factors into their operations because of insufficient

resources. Therefore, firms with smaller size may need even more support from the regulators and governments. However, whether smaller firms are inclined to engage in ESG greenwashing is still of interest to the public in the future.

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Table**Table 1** Summary statistics and variable correlations

Variable	Mean	SD	Obs	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1)	0.0390	0.7882	7295	1.00															
(2)	41879.86	16220.04	9625	-0.22*	1.00														
(3)	0.6902	0.1389	9225	-0.15*	0.75*	1.00													
(4)	0.2524	0.2316	9625	0.01	-0.41*	-0.59*	1.00												
(5)	0.2687	0.1845	9330	-0.03*	-0.01	-0.05*	0.01	1.00											
(6)	0.0600	0.0775	9331	-0.05*	0.01	-0.04*	0.02	-0.26*	1.00										
(7)	23010.97	46215.61	9389	0.01	0.03*	-0.02	0.02	0.08*	-0.11*	1.00									
(8)	0.0299	0.0868	9232	0.05*	-0.04*	-0.10*	0.08*	0.00	0.05*	-0.05*	1.00								
(9)	0.6174	0.2932	9232	-0.31*	0.29*	0.11*	-0.04*	0.04*	0.09*	-0.04*	-0.24*	1.00							
(10)	0.0123	0.0210	9012	0.03*	0.05*	0.04*	-0.04*	-0.28*	0.15*	-0.10*	0.01	0.05*	1.00						
(11)	0.0187	0.0290	9109	0.00	0.06*	0.05*	-0.04*	-0.29*	0.15*	-0.12*	0.01	0.08*	0.91*	1.00					
(12)	0.1543	0.2359	8877	-0.06*	0.06*	0.01	0.04*	0.01	0.49*	-0.05*	0.03*	0.11*	-0.03*	-0.03*	1.00				
(13)	0.1528	0.2158	8543	-0.07*	0.05*	0.03*	0.06*	0.02	0.45*	-0.04*	0.03*	0.11*	-0.03*	-0.03*	0.91*	1.00			
(14)	10.5427	3.0929	7990	0.04*	0.01	0.01	0.02*	0.15*	-0.12*	0.24*	-0.07*	-0.04*	-0.12*	-0.11*	-0.02	-0.02	1.00		
(15)	0.5790	0.2707	7528	-0.38*	0.44*	0.27*	-0.21*	0.10*	0.04*	0.08*	-0.09*	0.49*	-0.05*	-0.03*	0.08*	0.09*	-0.10*	1.00	
(16)	0.0471	1.4300	8755	-0.03*	0.12*	0.10*	-0.12*	-0.20*	0.01	-0.02*	-0.03*	0.11*	0.28*	0.23*	-0.07*	-0.08*	-0.10*	0.11*	1.00

*indicates 10% statistical significance level or better.

Greenwashing in environmental, social and governance disclosures

Source: Authors' calculations. This table shows the descriptive statistics of all variables used in this study. Note. (1) Relative greenwashing score, (2) GDP per capita converted to U.S. dollar at purchasing power parity exchange rates, (3) The lack of Corruption, (4) Absence of Political Rights, (5) Leverage ratio, (6) ROA (return on asset), (7) Asset firm size, (8) Insider ownership, (9) Institutional holdings, (10) Quick ratio, (11) Current ratio, (12) ROA3Y, (13) ROA5Y, (14) Board size, (15) Independent board members, (16) R&D Intensity.

Table 2 Peer-relative greenwashing scores of ten GICS sectors

GICS sector	Percentage of all firms	Peer-relative greenwashing scores
Consumer discretionary	17.71%	0.0506 (0.7772)
Consumer staple	9.92%	-0.0455 (0.8417)
Energy	6.65%	0.1477 (0.6944)
Healthcare	8.05%	0.0755 (0.6962)
Industrials	18.29%	-0.0363 (0.8189)
Information technology	11.38%	0.0333 (0.8214)
Materials	10.13%	0.1522 (0.8210)
Real estate	7.43%	0.0508

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		(0.7335)
Telecommunication services	4.26%	-0.1271
		(0.6848)
Utilities	6.18%	0.1202
		(0.8114)
<i>Total (1925 firms)</i>	100%	

Source: Authors' calculations. A higher value of the relative greenwashing score indicates more pronounced greenwashing behaviour. Our sample period is from 2012 to 2016.

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Table 3 Regression results for Greenwashing [ROA used as an operating firm performance indicator]

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)
						hdi		hdi
Dependent variable	peer-relative greenwashing score	peer-relative greenwashing score	peer-relative greenwashing score	peer-relative greenwashing score	peer-relative greenwashing score	peer-relative greenwashing score	peer-relative greenwashing score	peer-relative greenwashing score
	(Industry-adjusted)	(Industry-adjusted)	(Industry-adjusted)	(Industry-adjusted)	(Industry-adjusted)	(Industry-adjusted)	(Industry-adjusted)	(Industry-adjusted)
Constant	1.7245*** (0.3749)	1.7305*** (0.3749)	1.1218*** (0.3687)	1.7859*** (0.2477)	1.7439*** (0.3712)	0.8303*** (0.1736)	1.7385*** (0.3712)	0.8785*** (0.1731)
Share of institutional owners	-0.4202*** (0.0386)	-0.4238*** (0.0385)	-0.3885*** (0.0397)	-0.3269*** (0.0385)	-0.3702*** (0.0394)	-0.3168*** (0.0388)	-0.3659*** (0.0394)	-0.3121*** (0.0388)
Share of independent directors	-0.8721*** (0.0406)	-0.8665*** (0.0406)	-0.8267*** (0.0405)	-0.8647*** (0.0400)	-0.8532*** (0.0404)	-0.7881*** (0.0398)	-0.8581*** (0.0404)	-0.7940*** (0.0398)
Log (Board size)	-0.0373 (0.0380)	-0.0338 (0.0380)	-0.0119 (0.0384)	0.0197 (0.0366)	-0.0161 (0.0383)	-0.0266 (0.0384)	-0.0190 (0.0382)	-0.0305 (0.0384)
Absence of Corruption	-0.6381*** (0.1322)	-0.6304*** (0.1322)	-0.2511** (0.1272)		-0.5528*** (0.1319)	-0.2585* (0.1417)	-0.5590*** (0.1319)	-0.2691* (0.1417)
The lack of Political Rights	-0.4395*** (0.0490)	-0.4380*** (0.0490)		-0.2556*** (0.0456)	-0.4086*** (0.0493)	-0.3013*** (0.0502)	-0.4095*** (0.0493)	-0.3029*** (0.0502)
Cross-listing (dummy variable: Y=1, N=0)			-0.1629*** (0.0260)	-0.1619*** (0.0254)	-0.1425*** (0.0259)	-0.0899*** (0.0270)	-0.1439*** (0.0259)	-0.0922*** (0.0269)

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<i>Control variables:</i>								
Industry-adjusted ROA	-0.1705 (0.1339)	-0.1855 (0.1342)	-0.1851 (0.1320)	-0.2835** (0.1328)	-0.1660 (0.1328)	-0.2596* (0.1365)	-0.1525 (0.1326)	-0.2422* (0.1361)
Log (Firm asset size)	-0.0070 (0.0084)	-0.0057 (0.0084)	-0.0045 (0.0085)	-0.0009 (0.0082)	0.0021 (0.0084)	0.0117 (0.0085)	0.0009 (0.0084)	0.0103 (0.0085)
Current Ratio	-0.2204 (0.5399)		-0.3689 (0.5548)	-0.2194 (0.5251)			-0.4006 (0.5369)	-0.3298 (0.5350)
Quick Ratio		0.8300 (0.6371)			0.5584 (0.6185)	0.7745 (0.6317)		
Industry-adjusted leverage	0.0122 (0.0625)	0.0270 (0.0622)	0.0287 (0.0626)	0.0210 (0.0614)	0.0004 (0.0626)	-0.0675 (0.0634)	-0.0144 (0.0630)	-0.0832 (0.0639)
Share of insider ownership	-0.1037 (0.1043)	-0.1056 (0.1045)	-0.1527 (0.1045)	-0.0821 (0.1015)	-0.1007 (0.1054)	-0.2079** (0.1007)	-0.0986 (0.1053)	-0.2034** (0.1005)
R&D Intensity	0.1978* (0.1167)	0.1415 (0.1178)	0.3491*** (0.1165)	0.2865** (0.1164)	0.2197* (0.1171)	0.1970* (0.1183)	0.2706** (0.1161)	0.2572** (0.1172)
Log (GDP per capita)	-0.0240 (0.0421)	-0.0282 (0.0422)	-0.0027 (0.0420)	-0.0888*** (0.0235)	-0.0393 (0.0417)		-0.0354 (0.0416)	
Log (Human Development Index)						-0.5131* (0.2651)		-0.4845* (0.2650)
Adjusted R^2	0.1946	0.1948	0.1910	0.1851	0.1992	0.1557	0.1991	0.1555

*, ** and *** represents significance at 10%, 5% and 1% levels.

Greenwashing in environmental, social and governance disclosures

This table shows regression coefficients with standard deviations in parentheses for Equation 2, where ROA is used as the operating firm performance indicator. Our international dataset comprises 1925 large-cap companies headquartered in 47 countries over the period 2012-2016. The measures for liquidity are the quick ratio and current ratio. We run regressions alternating these two liquidity variables, and the results are similar. We analyse our panel dataset by Panel EGLS Period Weight with the White diagonal as our coefficient covariance method. We perform normality tests of the residuals to examine whether our model is well-specified.

Greenwashing in environmental, social and governance disclosures

Table 4 Regression results for Greenwashing [ROA3Y used as an operating firm performance indicator]

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)
						hdi		hdi
Dependent variable	peer-relative greenwashing score	peer-relative greenwashing score	peer-relative greenwashing score	peer-relative greenwashing score	peer-relative greenwashing score	peer-relative greenwashing score	peer-relative greenwashing score	peer-relative greenwashing score
	(Industry-adjusted)	(Industry-adjusted)	(Industry-adjusted)	(Industry-adjusted)	(Industry-adjusted)	(Industry-adjusted)	(Industry-adjusted)	(Industry-adjusted)
Constant	1.5795*** (0.3799)	1.5846*** (0.3798)	0.9765*** (0.3733)	1.6823*** (0.2503)	1.6002*** (0.3758)	0.7601*** (0.1772)	1.5957*** (0.3759)	0.8090*** (0.1768)
Share of institutional owners	-0.4292*** (0.0396)	-0.4330*** (0.0396)	-0.3908*** (0.0407)	-0.3264*** (0.0395)	-0.3726*** (0.0405)	-0.3170*** (0.0399)	-0.3680*** (0.0405)	-0.3119*** (0.0399)
Share of independent director	-0.8719*** (0.0411)	-0.8673*** (0.0412)	-0.8256*** (0.0411)	-0.8676*** (0.04050)	-0.8537*** (0.0410)	-0.7879*** (0.0404)	-0.8577*** (0.0410)	-0.7927*** (0.0404)
Log (Board size)	-0.0186 (0.0386)	-0.0155 (0.0387)	0.0093 (0.0390)	0.0387 (0.0371)	0.0041 (0.0389)	-0.0036 (0.0391)	0.0014 (0.0388)	-0.0070 (0.0391)
The lack of Corruption	-0.6726*** (0.1341)	-0.6645*** (0.1342)	-0.2801** (0.1291)		-0.5829*** (0.1338)	-0.2776* (0.1444)	-0.5895*** (0.1338)	-0.2883** (0.1443)
Absence of Political Rights	-0.4420*** (0.0498)	-0.4409*** (0.0498)		-0.2536*** (0.0463)	-0.4107*** (0.0501)	-0.3029*** (0.0509)	-0.4113*** (0.0501)	-0.3040*** (0.0508)
Cross-listing (dummy variable: Y=1; N=0)			-0.1725***	-0.1717***	-0.1525***	-0.0996***	-0.1538***	-0.1017***

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			(0.0263)	(0.0258)	(0.0263)	(0.0275)	(0.0263)	(0.0274)
<i>Control variables:</i>								
Industry-adjusted ROA3Y	-0.0291	-0.0275	-0.0456*	-0.0553*	-0.0249	-0.0324	-0.0265	-0.0340
	(0.0285)	(0.0285)	(0.0272)	(0.0304)	(0.0282)	(0.0286)	(0.0282)	(0.0286)
Log (Firm asset size)	-0.0055	-0.0040	-0.0027	0.0024	0.0048	0.0159*	0.0034	0.0143
	(0.0086)	(0.0086)	(0.0086)	(0.0084)	(0.0086)	(0.0087)	(0.0086)	(0.0087)
Current Ratio	-0.3670		-0.5457	-0.4069			-0.5663	-0.5342
	(0.5610)		(0.5777)	(0.5465)			(0.5592)	(0.5607)
Quick Ratio		0.6267			0.3362	0.5026		
		(0.6464)			(0.6304)	(0.6426)		
Industry-adjusted leverage	-0.0075	0.0110	0.0040	0.0143	-0.0292	-0.1143	-0.0474	-0.1341*
	(0.0731)	(0.0729)	(0.0735)	(0.0713)	(0.0729)	(0.0731)	(0.0731)	(0.0733)
Share of insider ownership	-0.0969	-0.0985	-0.1387	-0.0649	-0.0867	-0.1992*	-0.0846	-0.1947*
	(0.1073)	(0.1075)	(0.1074)	(0.1041)	(0.1084)	(0.1036)	(0.1082)	(0.1034)
R&D Intensity	0.1657	0.1160	0.3241***	0.2663**	0.1974	0.1811	0.2417**	0.2336*
	(0.1228)	(0.1239)	(0.1222)	(0.1223)	(0.1227)	(0.1238)	(0.1218)	(0.1228)
Log (GDP per capita)	-0.0129	-0.0171	0.0075	-0.0852***	-0.0297		-0.0258	
	(0.0427)	(0.0428)	(0.0426)	(0.0239)	(0.0422)		(0.0422)	
Log (Human Development Index)	0.1956	0.1957	0.1922	0.1858	0.2004	-0.4864*		-0.4586*
						(0.2677)		(0.2676)

Greenwashing in environmental, social and governance disclosures

Adjusted R^2	0.1946	0.1948	0.1910	0.1851	0.1992	0.1558	0.2005	0.1559
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*, ** and *** represents significance at 10%, 5% and 1% levels.

This table shows regression coefficients with standard deviations in parentheses for Equation 2, where ROA3Y is used as the operating firm performance indicator. Our international dataset comprises 1925 large-cap companies headquartered in 47 countries over the period 2012-2016. The measures for liquidity are the quick ratio and current ratio. We run regressions alternating these two liquidity variables, and the results are similar. We analyse our panel dataset by Panel EGLS Period Weight with the White diagonal as our coefficient covariance method. We perform normality tests of the residuals to examine whether our model is well-specified.

Greenwashing in environmental, social and governance disclosures

Table 5 Regression results for Greenwashing [ROA5Y used as an operating firm performance indicator]

Dependent variable	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)
	peer-relative greenwashing score (Industry-adjusted)	peer-relative greenwashing score (Industry-adjusted)	peer-relative greenwashing score (Industry-adjusted)	peer-relative greenwashing score (Industry-adjusted)	peer-relative greenwashing score (Industry-adjusted)	peer-relative greenwashing score (Industry-adjusted)	peer-relative greenwashing score (Industry-adjusted)	peer-relative greenwashing score (Industry-adjusted)
Constant	1.5532*** (0.3833)	1.5890*** (0.3832)	0.9456** (0.3763)	1.6600*** (0.2524)	1.5787*** (0.3788)	0.7006*** (0.1806)	1.5737*** (0.3789)	0.7505*** (0.1799)
Share of institutional owners	-0.4457*** (0.0402)	-0.4501*** (0.0401)	-0.4096*** (0.0410)	-0.3415*** (0.0398)	-0.3846*** (0.0408)	-0.3278*** (0.0402)	-0.3795*** (0.0409)	-0.3220*** (0.0402)
Share of independent director	-0.8728*** (0.0415)	-0.8682*** (0.0416)	-0.8198*** (0.0415)	-0.8639*** (0.0409)	-0.8526*** (0.0414)	-0.7841*** (0.0408)	-0.8566*** (0.0414)	-0.7889*** (0.0408)
Log (Board size)	-0.0177 (0.0392)	-0.0151 (0.0393)	0.0144 (0.0397)	0.0434 (0.0377)	0.0060 (0.0395)	0.0018 (0.0398)	0.0038 (0.0395)	-0.0011 (0.0397)
The lack of Corruption	-0.6882*** (0.1356)	-0.6802*** (0.1357)	-0.2831** (0.1304)		-0.5949*** (0.1353)	-0.2689* (0.1462)	-0.6013*** (0.1352)	-0.2794* (0.1462)
Absence of Political Rights	-0.4498*** (0.0506)	-0.4488*** (0.0507)		-0.2554*** (0.0470)	-0.4179*** (0.0509)	-0.3064*** (0.0517)	-0.4183*** (0.0509)	-0.3074*** (0.0516)
Cross-listing (dummy variable: Y=1; N=0)			-0.1786*** (0.0267)	-0.1789*** (0.0261)	-0.1603*** (0.0266)	-0.1040*** (0.0277)	-0.1615*** (0.0265)	-0.1061*** (0.0276)

Greenwashing in environmental, social and governance disclosures

<i>Control variables:</i>								
Industry-adjusted ROA5Y	-0.0124 (0.0290)	-0.0108 (0.0291)	-0.0381 (0.0282)	-0.0458* (0.0317)	-0.0122 (0.0295)	-0.0192 (0.0296)	-0.0141 (0.0294)	-0.0210 (0.0295)
Log (Firm asset size)	-0.0023 (0.0087)	-0.0007 (0.0087)	0.0019 (0.0088)	0.0071 (0.0085)	0.0085 (0.0087)	0.0200 (0.0088)	0.0070 (0.0087)	0.0183** (0.0088)
Current Ratio	-0.4786 (0.6218)						-0.7128 (0.6047)	-0.6792 (0.6082)
Quick Ratio		0.5717 (0.7744)	0.3160 (0.7949)	0.3365 (0.7473)	0.2256 (0.7404)	0.4077 (0.7605)		
Industry-adjusted leverage	-0.0379 (0.0755)	0.0180 (0.0753)	-0.0036 (0.0754)	0.0066 (0.0732)	-0.0607 (0.0751)	-0.1551** (0.0753)	-0.0803 (0.0753)	-0.1765** (0.0755)
Share of insider ownership	-0.1125 (0.1101)	-0.1142 (0.1103)	-0.1565 (0.1102)	-0.0747 (0.1068)	-0.0977 (0.1113)	-0.2292** (0.1060)	-0.0954 (0.1111)	-0.2245** (0.1058)
R&D Intensity	0.1937 (0.1248)	0.1445 (0.1263)	0.3011** (0.1258)	0.2492** (0.1256)	0.2256* (0.1248)	0.2058 (0.1261)	0.2683** (0.1236)	0.2571** (0.1246)
Log (GDP per capita)	-0.0116 (0.0432)	-0.0160 (0.0432)	0.0049 (0.0430)	-0.0886*** (0.0242)	-0.0297 (0.0426)		-0.0257 (0.0426)	
Log (Human Development Index)	0.1997	0.1997	0.1961	0.1895	0.2046	-0.5228* (0.2692)		-0.4941* (0.2691)
Adjusted R^2	0.1946	0.1948	0.1910	0.1851	0.1992	0.1590	0.2047	0.1592

*, ** and *** represents significance at 10%, 5% and 1% levels.

Greenwashing in environmental, social and governance disclosures

This table shows regression coefficients with standard deviations in parentheses for Equation 2, where ROA5Y is used as the operating firm performance indicator. Our international dataset comprises 1925 large-cap companies headquartered in 47 countries over the period 2012-2016. The measures for liquidity are the quick ratio and current ratio. We run regressions alternating these two liquidity variables, and the results are similar. We analyse our panel dataset by Panel EGLS Period Weight with the White diagonal as our coefficient covariance method. We perform normality tests of the residuals to examine whether our model is well-specified.

Greenwashing in environmental, social and governance disclosures

Table 6 Relative importance of company characteristics, country factors, and cross-listing

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)	Model (10)	Model (11)	Model (12)
Dependent variable	peer-relative greenwashing score	peer-relative greenwashing score	peer-relative greenwashing score	peer-relative greenwashing score	peer-relative greenwashing score	peer-relative greenwashing score	peer-relative greenwashing score	peer-relative greenwashing score	peer-relative greenwashing score	peer-relative greenwashing score	peer-relative greenwashing score	peer-relative greenwashing score
	(Industry-adjusted)	(Industry-adjusted)	(Industry-adjusted)	(Industry-adjusted)	(Industry-adjusted)	(Industry-adjusted)	(Industry-adjusted)	(Industry-adjusted)	(Industry-adjusted)	(Industry-adjusted)	(Industry-adjusted)	(Industry-adjusted)
Constant	0.9131*** (0.0977)	3.7226*** (0.3525)	-0.1170 (0.1257)	0.8821*** (0.0970)	1.7245*** (0.3749)	3.7591*** (0.3423)	0.2272*** (0.0226)	1.7385*** (0.3712)	0.8090*** (0.1768)	0.7505*** (0.1799)	1.5957*** (0.3759)	1.5737*** (0.3789)
Share of institutional owners	-0.4116*** (0.0373)			-0.3546*** (0.0380)	-0.4202*** (0.0386)			-0.3659*** (0.0394)	-0.3119*** (0.0400)	-0.3220*** (0.0402)	-0.3680*** (0.0405)	-0.3795*** (0.0409)
Share of independent director	-0.8710*** (0.0382)			-0.8582*** (0.0382)	-0.8721*** (0.0406)			-0.8581*** (0.0404)	-0.7927*** (0.0404)	-0.7889*** (0.0408)	-0.8577*** (0.0410)	-0.8566*** (0.0414)
Log (Board size)	-0.0105 (0.0365)			0.0075 (0.0366)	-0.0373 (0.0380)			-0.0190 (0.0382)	-0.0070 (0.0391)	-0.0011 (0.0397)	0.0014 (0.0388)	0.0038 (0.0395)
The lack of Corruption		-0.2424* (0.1327)	-0.0901 (0.1377)		-0.6381*** (0.1322)	-0.1579 (0.1294)		-0.5590*** (0.1319)	-0.2883** (0.1443)	-0.2794* (0.1462)	-0.5895*** (0.1338)	-0.6013*** (0.1352)
Absence of Political Rights		-0.2838*** (0.0468)	-0.1094** (0.0460)		-0.4395*** (0.0490)	-0.2467*** (0.0461)		-0.4095*** (0.0493)	-0.3040*** (0.0508)	-0.3074*** (0.0516)	-0.4113*** (0.0501)	-0.4183*** (0.0509)
Cross-listing (dummy variable)				-0.1661*** (0.0254)		-0.2702*** (0.0249)	-0.2862*** (0.0246)	-0.1439*** (0.0259)	-0.1017*** (0.0274)	-0.1061*** (0.0276)	-0.1538*** (0.0263)	-0.1615*** (0.0265)

Greenwashing in environmental, social and governance disclosures

Control variables:								
Industry-adjusted ROA	-0.3267** (0.1336)	-0.2952** (0.1319)	-0.1705 (0.1339)		-0.1525 (0.1326)			
Industry-adjusted ROA3Y						-0.0340 (0.0286)	-0.0265 (0.0282)	
Industry-adjusted ROA5Y							-0.0210 (0.0295)	-0.0141 (0.0294)
Log (Firm asset size)	-0.0147* (0.0081)	-0.0062 (0.008)	-0.0070 (0.0083)		0.0009 (0.0084)	0.0143 (0.0087)	0.0183** (0.0088)	0.0034 (0.0086)
Current Ratio	-0.0590 (0.5468)	-0.2423 (0.5390)	-0.2204 (0.5399)		-0.4006 (0.5369)	-0.5342 (0.5607)	-0.6792 (0.6082)	-0.5663 (0.5592)
Industry-adjusted leverage	0.0723 (0.0609)	0.0431 (0.0611)	0.0122 (0.0625)		-0.0144 (0.0630)	-0.1341* (0.0733)	-0.1765** (0.0755)	-0.0474 (0.0731)
Share of insider ownership	-0.1525 (0.0987)	-0.1520 (0.0997)	-0.1037 (0.1043)		-0.0986 (0.1053)	-0.1947* (0.1034)	-0.2245** (0.1058)	-0.0846 (0.1082)
R&D Intensity	0.2366** (0.1164)	0.3053*** (0.1157)	0.1978* (0.1167)		0.2706** (0.1161)	0.2336** (0.1228)	0.2571** (0.1246)	0.2417** (0.1218)
Log (Human Development Index)		-1.3509*** (0.2551)				-0.4586* (0.2676)	-0.4941* (0.2691)	
Log (GDP per capita)	-0.3290*** (0.0399)		-0.0240 (0.0421)	-0.3187*** (0.0386)	-0.0354 (0.0416)		-0.0258 (0.0422)	-0.0257 (0.0426)

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Adjusted R^2	0.1754	0.0555	0.0364	0.1814	0.1946	0.0746	0.0424	0.1991	0.1559	0.1592	0.2005	0.2047
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*, ** and *** represents significance at 10%, 5% and 1% levels. This table shows regression coefficients with standard deviations in parentheses for Equation 2. Our international dataset comprises 1925 large-cap companies headquartered in 47 countries over the period 2012-2016. The measures for liquidity are the quick ratio and current ratio. We run regressions alternating these two liquidity variables, and the results are similar. We analyse our panel dataset by Panel EGLS Period Weight with the White diagonal as our coefficient covariance method. We perform normality tests of the residuals to examine whether our model is well-specified.

Appendix Table A-1: Examples of the Bloomberg ESG disclosure matrix and the Asset4 ESG performance score matrix

Examples of the Bloomberg ESG disclosure matrix	Examples of the Asset4 ESG performance score matrix
<p>Environmental</p> <p>Direct CO2 emissions</p> <p>Indirect CO2 emissions</p> <p>CO2 intensity per energy</p> <p>Total GHG emissions</p> <p>NOx emissions</p> <p>SO2 emissions</p> <p>Total energy consumption</p> <p>Total water use</p> <p>Hazardous waste</p> <p>Environmental Fines</p> <p>Social</p> <p>Employee turnover</p> <p>% of employees unionized</p> <p>% of women in the workforce</p>	<p>Environment</p> <p>Resource reduction</p> <p>Emission reduction</p> <p>Social</p> <p>Employment quality</p> <p>Diversity and opportunity</p> <p>Health and safety</p> <p>Community</p> <p>Corporate governance</p> <p>Board functions</p> <p>Shareholder rights</p> <p>Compensation policy</p>

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% of minorities in the workforce	
Workforce accidents	
Community spending	
Governance	
Board duration	
Board meetings	
Board meeting attendance	
Political donations	

Source: Bloomberg, Thomson Reuters Eikon.

Appendix Table A-2: Our sample distribution across countries and territories

Country	Company number in the country <i>i</i>
Mexico	18
Argentina	1
Qatar	6
South Korea	91
Taiwan	71
Egypt	2
China	91
Colombia	4
Poland	14
Chile	15
Japan	282
Brazil	47
Indonesia	27
Czech Republic	2

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Hungary	2
Philippines	16
Thailand	29
India	11
Portugal	3
Hong Kong	67
Norway	8
Russia	14
Israel	10
United Arab Emirates	5
Spain	16
Ireland	11
Malaysia	34
Germany	51
Australia	55
South Africa	39
Luxembourg	6

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Finland	11
Singapore	22
Netherlands	20
Canada	72
Turkey	17
Austria	3
France	63
Switzerland	36
Denmark	15
Sweden	23
United States	522
Peru	2
Belgium	7
Italy	12
New Zealand	7
Britain	81

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Source: Bloomberg, Thomson Reuters Eikon. Our sample firms are chosen from the firms listed on the MSCI All Country World Index. In this study, we aim to estimate the degree to which a company is considered to engage in greenwashing by creating a firm's relative greenwashing score. A company engaging in greenwashing behavior will have a positive greenwashing score.

Greenwashing in environmental, social and governance disclosures

Appendix Table A-3: A robustness check - regression results for Greenwashing [ROA used as an operating firm performance indicator]

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Dependent variable	peer-relative greenwashing score (Industry-adjusted)	peer-relative greenwashing score (Industry-adjusted)	peer-relative greenwashing score (Industry-adjusted)	peer-relative greenwashing score (Industry-adjusted)	peer-relative greenwashing score (Industry-adjusted)	peer-relative greenwashing score (Industry-adjusted)
Constant	0.8672*** (0.1743)	0.8172*** (0.1747)	0.7366*** (0.1725)	0.5639*** (0.1056)	0.8303*** (0.1736)	0.8785*** (0.1731)
Share of institutional owners	-0.3390*** (0.0382)	-0.3429*** (0.0382)	-0.3247*** (0.0389)	-0.2823*** (0.0378)	-0.3168*** (0.0388)	-0.3121*** (0.0388)
Share of independent directors	-0.7964*** (0.0397)	-0.7901*** (0.0397)	-0.7623*** (0.0398)	-0.7890*** (0.0394)	-0.7881*** (0.0398)	-0.7940*** (0.0398)
Log (Board size)	-0.0392 (0.0381)	-0.0349 (0.0382)	-0.0202 (0.0384)	0.0109 (0.0365)	-0.0266 (0.0384)	-0.0305 (0.0384)
Absence of Corruption	-0.2674* (0.1425)	-0.2559* (0.1425)	-0.1041 (0.1412)		-0.2585* (0.1417)	-0.2691* (0.1417)
The lack of Political Rights	-0.3127*** (0.0501)	-0.3106*** (0.0501)		-0.1980*** (0.0479)	-0.3013*** (0.0502)	-0.3029*** (0.0502)
Cross-listing (dummy variable: Y=1, N=0)			-0.0993*** (0.0270)	-0.0949*** (0.0265)	-0.0899*** (0.0270)	-0.0922*** (0.0269)

Greenwashing in environmental, social and governance disclosures

<i>Control variables:</i>						
Industry-adjusted ROA	-0.2551*	-0.2735**	-0.2722**	-0.3923***	-0.2596*	-0.2422*
	(0.1371)	(0.1376)	(0.1353)	(0.1366)	(0.1365)	(0.1361)
Log (Firm asset size)	0.0071	0.0086	0.0055	0.0069	0.0117	0.0103
	(0.0085)	(0.0085)	(0.0086)	(0.0082)	(0.0085)	(0.0085)
Current Ratio	-0.1596		-0.2913	-0.1258		-0.3298
	(0.5348)		(0.5493)	(0.5232)		(0.5350)
Quick Ratio		1.0104			0.7745	
		(0.6464)			(0.6317)	
Industry-adjusted leverage	-0.0610	-0.0456	-0.0545	-0.0600	-0.0675	-0.0832
	(0.0634)	(0.0630)	(0.0634)	(0.0623)	(0.0634)	(0.0639)
Share of insider ownership	-0.2162**	-0.2202**	-0.2629***	-0.2189**	-0.2079**	-0.2034**
	(0.0993)	(0.0995)	(0.0979)	(0.0964)	(0.1007)	(0.1005)
R&D Intensity	0.2157*	0.1520	0.3001**	0.2492**	0.1970*	0.2572**
	(0.1171)	(0.1183)	(0.1173)	(0.1169)	(0.1183)	(0.1172)
Log (Human Development Index)	-0.5279**	-0.5570**	-0.2223	-0.5432***	-0.5131*	-0.4845*
	(0.2672)	(0.2672)	(0.2592)	(0.1349)	(0.2651)	(0.2650)
Adjusted R^2	0.1538	0.1541	0.1508	0.1468	0.1557	0.1555

*, ** and *** represents significance at 10%, 5% and 1% levels.

This table shows regression coefficients with standard deviations in parentheses for Equation 2, where ROA is used as the operating firm performance indicator. As a robustness check to provide further support for our hypotheses, we replace Log (GDP per capita) with the Human Development Index in Equation (2). By adopting the Human Development Index provided by the United Nations, we can control for overall national well-being holistically. We analyse our panel dataset by Panel EGLS Period Weight with the White diagonal as our coefficient covariance method. We perform normality tests of the residuals to examine whether our model is well-specified.

Greenwashing in environmental, social and governance disclosures

Appendix Table A-4: A robustness check - regression results for Greenwashing [ROA3Y used as an operating firm performance indicator]

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Dependent variable	peer-relative greenwashing score (Industry-adjusted)	peer-relative greenwashing score (Industry-adjusted)	peer-relative greenwashing score (Industry-adjusted)	peer-relative greenwashing score (Industry-adjusted)	peer-relative greenwashing score (Industry-adjusted)	peer-relative greenwashing score (Industry-adjusted)
Constant	0.8006*** (0.1780)	0.7501*** (0.1784)	0.6653*** (0.1760)	0.4735*** (0.1081)	0.7601*** (0.1772)	0.8090*** (0.1768)
Share of institutional owners	-0.3443*** (0.0393)	-0.3486*** (0.0393)	-0.3247*** (0.0400)	-0.2806*** (0.0387)	-0.3170*** (0.0399)	-0.3119*** (0.0399)
Share of independent director	-0.7947*** (0.0404)	-0.7895*** (0.0404)	-0.7602*** (0.0404)	-0.7912*** (0.0400)	-0.7879*** (0.0404)	-0.7927*** (0.0404)
Log (Board size)	-0.0174 (0.0389)	-0.0136 (0.0389)	0.0039 (0.0392)	0.0329 (0.0371)	-0.0036 (0.0391)	-0.0070 (0.0391)
The lack of Corruption	-0.2836* (0.1452)	-0.2720* (0.1452)	-0.1188 (0.1436)		-0.2776* (0.1444)	-0.2883** (0.1443)
Absence of Political Rights	-0.3140*** (0.0508)	-0.3124*** (0.0508)		-0.1970*** (0.0485)	-0.3029*** (0.0509)	-0.3040*** (0.0508)
Cross-listing (dummy variable: Y=1; N=0)			-0.1084*** (0.0275)	-0.1039*** (0.0269)	-0.0996*** (0.0275)	-0.1017*** (0.0274)

Greenwashing in environmental, social and governance disclosures

<i>Control variables:</i>						
Industry-adjusted ROA3Y	-0.0352 (0.0288)	-0.0337 (0.0288)	-0.0472* (0.0278)	-0.0654** (0.0316)	-0.0324 (0.0286)	-0.0340 (0.0286)
Log (Firm asset size)	0.0104 (0.0087)	0.0121 (0.0087)	0.0090 (0.0088)	0.0119 (0.0084)	0.0159* (0.0087)	0.0143 (0.0087)
Current Ratio	-0.3435 (0.5590)		-0.5048 (0.5758)	-0.3639 (0.5481)		-0.5342 (0.5607)
Quick Ratio		0.7584 (0.6550)			0.5026 (0.6426)	
Industry-adjusted leverage	-0.1037 (0.0732)	-0.0841 (0.0730)	-0.0993 (0.0734)	-0.0841 (0.0713)	-0.1143 (0.0731)	-0.1341* (0.0733)
Share of insider ownership	-0.2145** (0.1021)	-0.2183** (0.1024)	-0.2551** (0.1008)	-0.2105** (0.0990)	-0.1992* (0.1036)	-0.1947* (0.1034)
R&D Intensity	0.1891 (0.1231)	0.1330 (0.1242)	0.2797** (0.1229)	0.2374* (0.1228)	0.1811 (0.1238)	0.2336* (0.1228)
Log (Human Development Index)	-0.5077* (0.2701)	-0.5361** (0.2701)	-0.2018 (0.2621)	-0.5354*** (0.1365)	-0.4864* (0.2677)	-0.4586* (0.2676)
Adjusted R^2	0.1540	0.1541	0.1510	0.1464	0.1558	0.1559

*, ** and *** represents significance at 10%, 5% and 1% levels.

This table shows regression coefficients with standard deviations in parentheses for Equation 2, where ROA3Y is used as the operating firm performance indicator. As a robustness check to provide further support for our hypotheses, we replace Log (GDP per capita) with the Human Development Index in Equation (2). By adopting the Human Development Index provided by the United Nations, we can control for overall national well-being holistically. We analyse our panel dataset by Panel EGLS Period Weight with the White diagonal as our coefficient covariance method. We perform normality tests of the residuals to examine whether our model is well-specified.

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Appendix Table A-5: A robustness check - regression results for Greenwashing [ROA5Y used as an operating firm performance indicator]

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Dependent variable	peer-relative greenwashing score (Industry-adjusted)	peer-relative greenwashing score (Industry-adjusted)	peer-relative greenwashing score (Industry-adjusted)	peer-relative greenwashing score (Industry-adjusted)	peer-relative greenwashing score (Industry-adjusted)	peer-relative greenwashing score (Industry-adjusted)
Constant	0.7425*** (0.1813)	0.6909*** (0.1821)	0.6076*** (0.1790)	0.4275*** (0.1103)	0.7006*** (0.1806)	0.7505*** (0.1799)
Share of institutional owners	-0.3582*** (0.0398)	-0.3630*** (0.0398)	-0.3363*** (0.0402)	-0.2909*** (0.0390)	-0.3278*** (0.0402)	-0.3220*** (0.0402)
Share of independent director	-0.7917*** (0.0407)	-0.7865*** (0.0407)	-0.7558*** (0.0407)	-0.7879*** (0.0403)	-0.7841*** (0.0408)	-0.7889*** (0.0408)
Log (Board size)	-0.0121 (0.0395)	-0.0088 (0.0395)	0.0105 (0.0398)	0.0389 (0.0377)	0.0018 (0.0398)	-0.0011 (0.0397)
The lack of Corruption	-0.2742* (0.1471)	-0.2626* (0.1471)	-0.1679 (0.1452)		-0.2689* (0.1462)	-0.2794* (0.1462)
Absence of Political Rights	-0.3173*** (0.0515)	-0.3159*** (0.0516)		-0.1988*** (0.0492)	-0.3064*** (0.0517)	-0.3074*** (0.0516)
Cross-listing (dummy variable: Y=1; N=0)			-0.1126*** (0.0277)	-0.1085*** (0.0272)	-0.1040*** (0.0277)	-0.1061*** (0.0276)

Greenwashing in environmental, social and governance disclosures

<i>Control variables:</i>						
Industry-adjusted ROA5Y	-0.0187*	-0.0171	-0.0386	-0.0568*	-0.0192	-0.0210
	(0.0292)	(0.0293)	(0.0286)	(0.0324)	(0.0296)	(0.0295)
Log (Firm asset size)	0.0143	0.0161*	0.0126	0.0154	0.0200	0.0183**
	(0.0088)	(0.0088)	(0.0089)	(0.0085)	(0.0088)	(0.0088)
Current Ratio	-0.4575		-0.6505	-0.5048		-0.6792
	(0.6176)		(0.6257)	(0.5966)		(0.6082)
Quick Ratio		0.7071			0.4077	
		(0.7846)			(0.7605)	
Industry-adjusted leverage	-0.1456*	-0.1244*	-0.1387*	-0.1195	-0.1551**	-0.1765**
	(0.0755)	(0.0754)	(0.0754)	(0.0733)	(0.0753)	(0.0755)
Share of insider ownership	-0.2485**	-0.2523**	-0.2889***	-0.2384**	-0.2292**	-0.2245**
	(0.1044)	(0.1046)	(0.1027)	(0.1011)	(0.1060)	(0.1058)
R&D Intensity	0.2149*	0.1593	0.3010**	0.2587**	0.2058	0.2571**
	(0.1251)	(0.1266)	(0.1248)	(0.1246)	(0.1261)	(0.1246)
Log (Human Development Index)	-0.5449**	-0.5744**	-0.2358	-0.5600***	-0.5228*	-0.4941*
	(0.2719)	(0.2720)	(0.2635)	(0.1373)	(0.2692)	(0.2691)
Adjusted R^2	0.1574	0.1574	0.1542	0.1494	0.1590	0.1592

*, ** and *** represents significance at 10%, 5% and 1% levels.

This table shows regression coefficients with standard deviations in parentheses for Equation 2, where ROA5Y is used as the operating firm performance indicator. As a robustness check to provide further support for our hypotheses, we replace Log (GDP per capita) with the Human Development Index in Equation (2). By adopting the Human Development Index provided by the United Nations, we can control for overall national well-being holistically. We analyse our panel dataset by Panel EGLS Period Weight with the White diagonal as our coefficient covariance method. We perform normality tests of the residuals to examine whether our model is well-specified.

Figures

Figure 1 Country distribution – ESG disclosure scores vs ESF performance scores, sample period of 2012-2016

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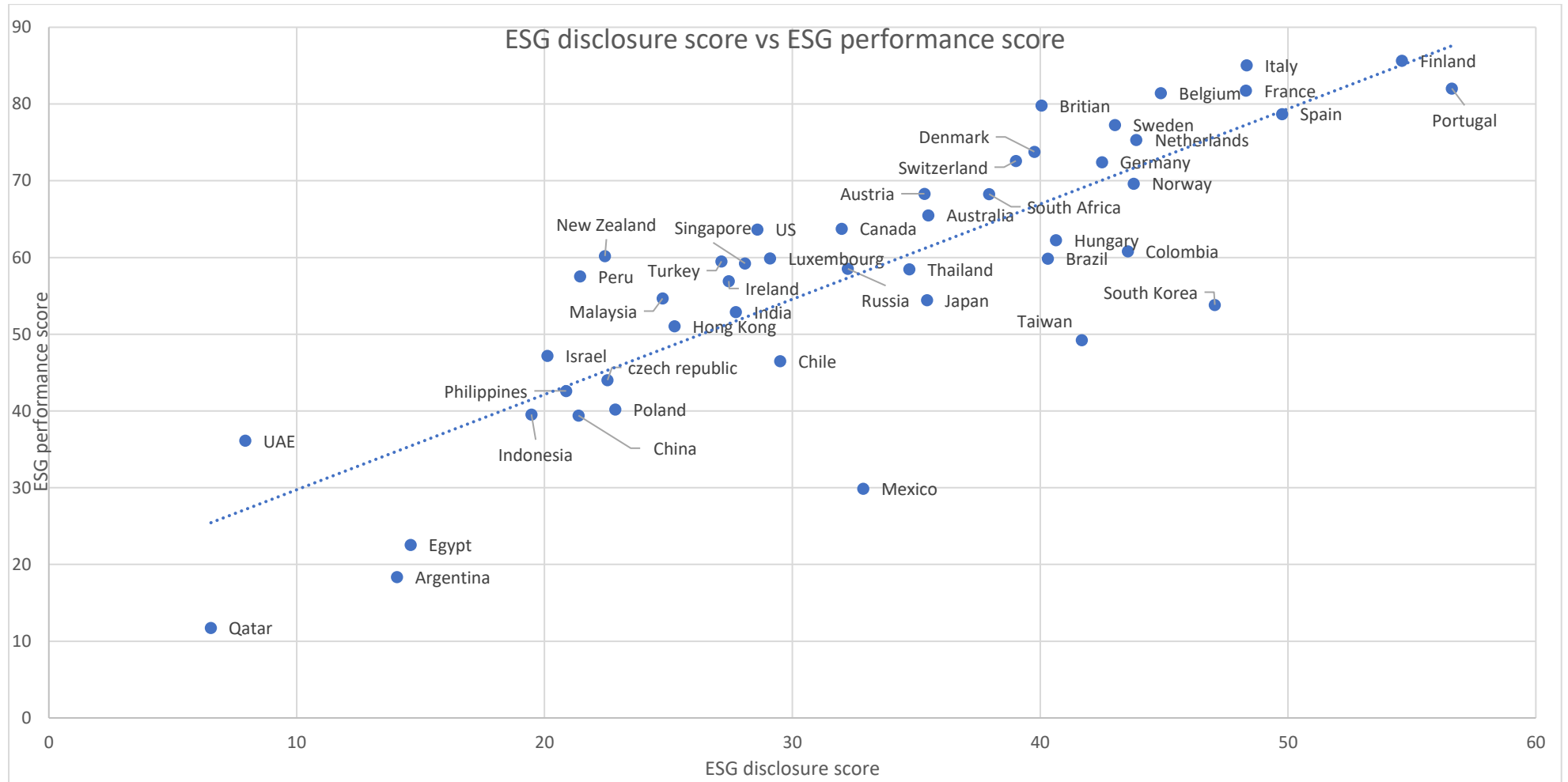
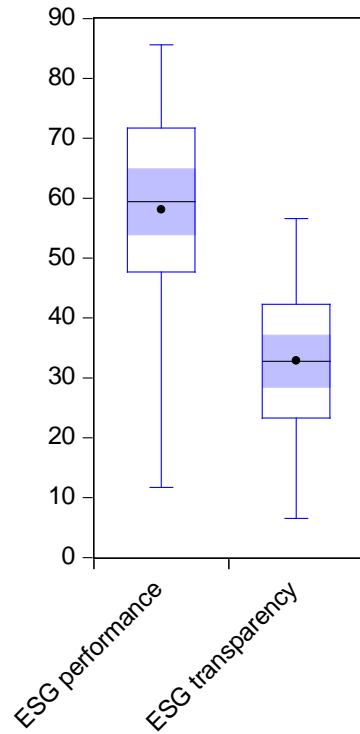
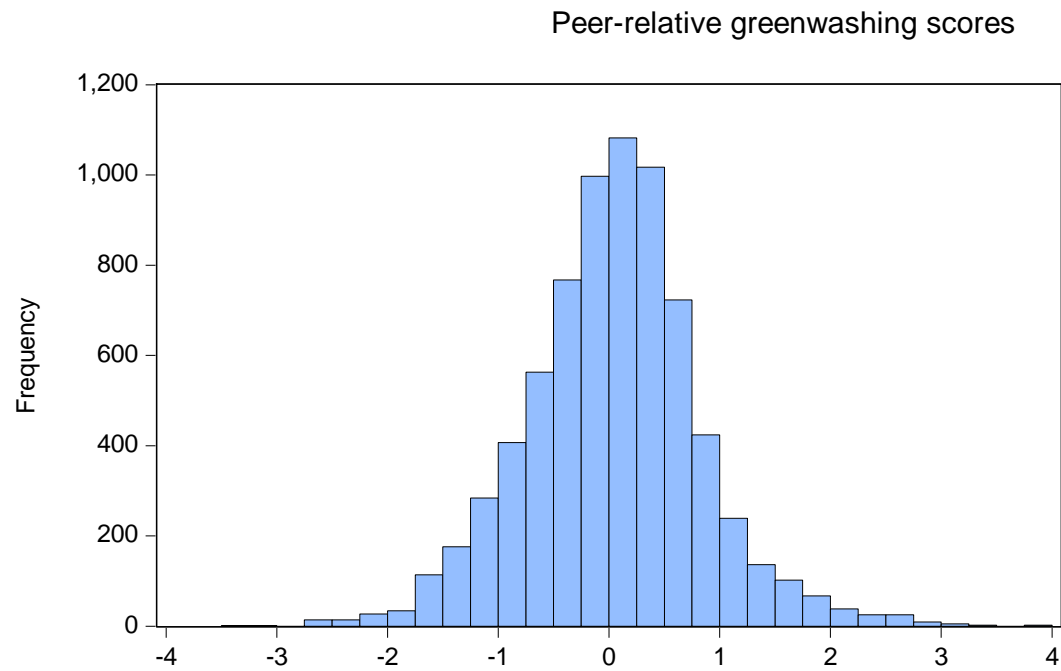


Figure 2 Boxplot of ESG disclosure score and ESG performance score for sample firms



Source: Authors' calculations. This figure shows the distribution of the ESG disclosure scores and ESG performance score for our 1925 sample firms over the sample period 2012-2016. Higher ESG disclosure scores indicate more transparency on ESG issues. The higher the ESG performance scores, the better is ESG performance.

Figure 3 Distribution of the relative greenwashing scores of sample firms



Source: Authors' calculations. This figure shows the distribution of our estimated relative greenwashing score.

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