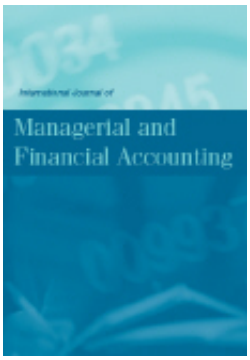

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Uncovering the drivers of environmental, social, and corporate governance reporting: evidence from Vietnam

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Uncovering the drivers of environmental, social, and corporate governance reporting: evidence from Vietnam

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Abstract: The study examines the factors that determine environmental, social, and corporate governance (ESG) disclosure in listed firms in Vietnam, focusing on critical factors influencing the transparency. Using a newly developed dataset of Vietnamese firms from 2015 to 2022 and employing ordinary least squares and ordered logistic regression with various robustness checks, the study uncovers six key factors significantly affecting ESG disclosure: firm size, listed year, financial performance, audit firm, environmental certification, and foreign investment. The findings provide important scientific and managerial insights into ESG transparency, highlighting the role of incentives for firms, investors, and state authorities in promoting better ESG reporting practices and improving market transparency.

Keywords: environmental, social and corporate governance; ESG; disclosure; transparency; Vietnam; OLS; ordered logistic.

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1 Introduction

In recent decades, there has been a noticeable change in investment decision-making, with an increasing number of investors relying on environmental, social, and corporate governance (ESG) information in firm's reports to guide their investments (Tsang et al., 2021; Chouaibi et al., 2022). Many researchers have identified significant benefits in integrating ESG aspects into business practices, including enhanced competitive advantage and brand value, increased employee loyalty and customer satisfaction, reduced costs and proved tax compliance (Herzig and Schaltegger, 2011; Sanchez-Planelles et al., 2020; Chouaibi et al., 2022). As a result, there are ongoing efforts to mandate ESG disclosure given its benefits to firms and global sustainability (Rossi et al., 2021). However, this proposal is attracting contrasting viewpoints. On one side, mandatory ESG disclosure could benefit stakeholders, particularly policymakers, by helping regulate the environmental and social impacts of corporate activities (Cormier et al., 2015; Aghamolla and An, 2021). On the other side, mandatory requirements differ across countries, potentially leading to discrepancies in the disclosure levels and creating opportunities for firms to engage in deceptive practices that hide their actual environmental performance (Lehner and Harrer, 2019). While this issue remains unresolved, it is clear that ESG reporting is still voluntary in most countries (Krueger et al., 2024). Only a few countries, such as the UK (with mandatory ESG laws), the European Union (through the Non-Financial Reporting Directive), and Malaysia, have implemented regulations requiring publicly traded firms to include ESG information in their annual reports.

In the context of most countries offering a voluntary choice for ESG information disclosure, an important question is what constitutes firms reporting their ESG information and to what extent firms will report their information. Despite the rising prevalence of ESG information disclosure, there has been relatively limited research into the determinants that determine the levels of such disclosure. Most existing studies focus on the effects of ESG information disclosure on firm characteristics and ESG performance, corporate governance and ESG performance and financial materiality of ESG disclosure (Khan, 2022; Rahman et al., 2023). Accordingly, this study attempts to fill the theoretical gap and provide practical implications for policymakers regarding relevant issues by conducting an empirical study to identify factors relating to the ESG information disclosure level of firms and propose an efficient quantitative method to guarantee the implementation of ESG information reporting. Vietnam was selected as the target country to carry out this study. First, the observation of one country can provide homogeneous results about ESG information disclosure levels. Second, Vietnam is actively catching up with global ESG information disclosure trends due to the

government's promotion of them, and to investors' growing demand for sustainable investment (Tran et al., 2022). As a result, the empirical study about ESG information disclosure in the Vietnam context can enrich the literature in the related field and provide insight into the dynamics that motivate firms to disclose ESG information, especially for countries where newly encouraging ESG practices.

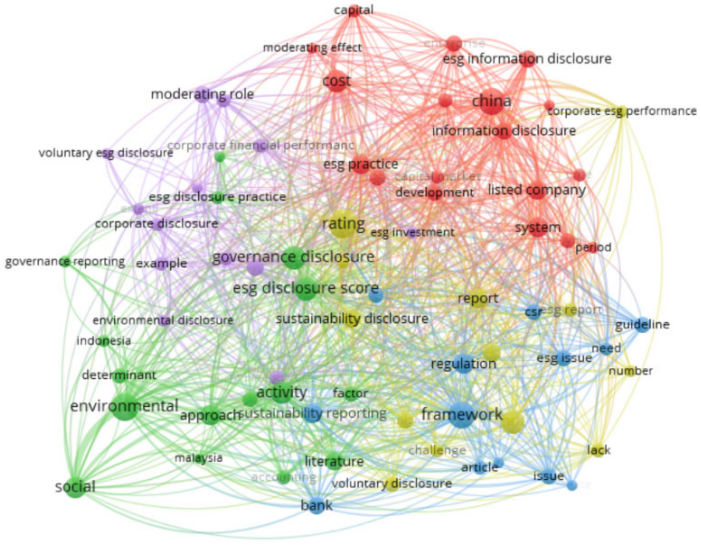
The remainder of this paper is organised as follows. Section 2 reviews the background literature and proposes the hypothesis. Section 3 presents model specifications, data, and sample selection. Section 4 reveals empirical results and hypothesis testing. Section 5 discusses the main results and presents the hypothesis tests. Section 6 concludes the paper.

2 Literature review and hypothesis development

2.1 Literature review

In recent years, there has been a substantial increase in the number of publications on ESG disclosure, particularly in Asia, including countries like China and Indonesia, as shown in Figure 1. To explore the thematic focus of these publications for a more comprehensive understanding of ESG disclosure by using visualisation, we conducted an analysis using the Scopus databases with 1,000 articles from the year 2018 to 2023, processed through VOSviewer. The bibliometric map illustrates the frequency of term usage through the size of the circles and the closeness of relationships, identify different term combinations both within and across clusters. From the analysis of ESG disclosure articles, the keywords were identified based on their frequency of occurrence (greater than five), excluding duplicates and irrelevant terms.

Figure 1 Network visualisation of commonly used terms in articles on ESG disclosure (see online version for colours)



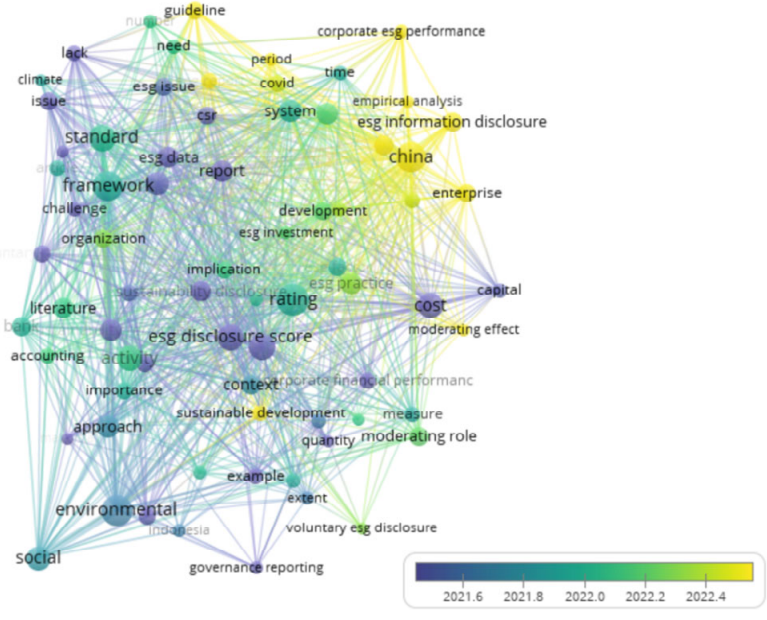
Source: Authors using VOSviewer

The conceptual framework clustering of ESG disclosure reveals five closely related clusters. The largest is the 'green cluster', centred around the term 'ESG disclosure' covering topics such as 'ESG disclosure score', and individual aspects of ESG like 'governance disclosure', 'environmental disclosure', and 'determinant factors'. The 'blue' cluster focuses on 'ESG framework', which is strongly linked to 'ESG issues' and 'CSR', while the 'purple' cluster explores the 'moderating role' of ESG disclosure. The 'red' cluster appears in the context of 'ESG practices', 'cost', and 'capital' whereas the 'yellow' cluster centres on 'ESG scoring' or 'rating', and 'voluntary disclosure'. Overall, recent research on ESG disclosure has primarily concentrated on governance and environmental metrics, the costs and capital associated with ESG disclosure, ESG disclosure scoring and rating. However, there has been limited research identifying the key determinants and moderating factors related to the extent of ESG disclosure levels. This is reflected in the relatively small size of the term 'determinant' in the green cluster and 'moderating effects' in the red cluster in the network visualisation map (Figure 1).

As depicted in Figure 2, the focus of research on ESG disclosure has increasingly raised the concentration of researchers over time. Early studies mainly concentrated on examining specific elements of ESG disclosure and standards, guidelines, and reporting frameworks. However, more recent research, up until 2023, has shifted toward to the topic of assessing ESG disclosure through various scoring and rating methodologies. Increasing attention has also been given to exploring the relationship between ESG disclosure and corporate performance, with outcomes evaluated using both financial and non-financial metrics.

Regarding theoretical background, until now, there has been a lack of an agreed theoretical foundation for measuring determinants of ESG information disclosure among firms (In et al., 2019). However, the legitimacy theory is considered the most prevalent viewpoint in ESG literature to explain or forecast specific managerial sustainability reporting activities (Huang, 2021). The legitimacy theory refers to business operations being validated by socially oriented norms, values, and beliefs (Suchman, 1995). A firm would report on actions willingly as a communication tool, such as publishing specific ESG data points, if management believed that those activities were expected by the society in which the firm works. Firms with poor ESG performance might use a more optimistic tone as a strategy for impression management to restore their legitimacy (Sun et al., 2024). It is also worth noticing that the legitimacy theory only works if there is growing public concern about a particular issue. In that case, firms may be more likely to disclose information about their performance in these areas to maintain their legitimacy with stakeholders. Several studies on ESG reporting have applied the legitimacy theory, such as those of Abdul Rahman and Alsayegh (2021), Eliwa et al. (2021) and Alda (2021) to posit that firms provide higher ESG reporting to justify the firm's continuous existence or when they perceive the existence of a legitimacy gap in compliance with the expectations and norms of the community. Following those studies, this paper adopts legitimacy theory as the premise of the theoretical framework and seeks to examine if firm size, firm's financial performance, firm's listed year, firm's environmental certificate achievement, and firm's audit may drive firms towards the level of ESG information disclosure.

Figure 2 A network visualisation of frequently used terms in ESG disclosure articles, analysed by publication timeline (see online version for colours)



Source: Authors using VOSviewer

2.2 Hypothesis development

2.2.1 Firm size and ESG information disclosure

Several studies have investigated the relationship between firm size and socially responsible behaviours, such as ESG information disclosure. Few exceptions notwithstanding, the majority of research has shown a correlation between firm size and the extent of ESG information disclosure (Barakat et al., 2015; Abdul Rahman and Alsayegh, 2021). Specifically, large firms tend to publish ESG information more actively than small firms due to their concern about business transparency. Based on the legitimacy theory, when a firm expands, it is asked to assume more responsibility for social and environmental concerns; hence, firms report more ESG information to establish the credibility and relevance of their activities (Cho and Patten, 2007). In addition, because large firms are often optimistic about their future, they are more likely to be eager to separate themselves from competitors and increase their worth by voluntarily reporting more ESG information (Hasan and Hosain, 2015). Moreover, it is suggested that the cost of reporting ESG information is high, so that only large firms have sufficient resources to pay the cost of ESG information disclosure to meet government and societal needs (Mun et al., 2011). Consequently, the larger the firm, the greater its capacity to disclose ESG information. The hypothesis is offered as follows.

Hypothesis 1 Firm size has a positive relationship with ESG information disclosure.

2.2.2 Listed years and ESG information disclosure

Listed years refer to the year companies were listed on the stock exchange. Some studies, such as those by Wachira et al. (2020) and Barakat et al. (2015), have shown that the listed year of firms affects the level of environmental disclosure. According to the legitimacy theory, the longer listed firms are, the more likely they are to comply with disclosure requirements due to greater scrutiny from investors and the desire to maintain their image and reputation (Galani et al., 2011). Moreover, firms with a long listing period have more advantages in improving practical conditions to support information disclosure, improving technology, and meeting the costs of information disclosure. Therefore, these firms will tend to pay for ESG information disclosure. Thus, the hypothesis is proposed as follows.

Hypothesis 2 The listed years of a firm have a positive relationship with ESG information disclosure.

2.2.3 Financial performance and ESG information disclosure

A large body of prior studies has shown that the positive financial performance of a firm has a positive effect on voluntary ESG information disclosure by firms. However, there still exist some studies, such as those by Huang and Kung (2010), Clarkson et al. (2011) and Orazayeva and Arslan (2024), have found a negative or no relationship between financial performance and ESG information disclosure level. Despite these contradictory empirical results, this study argues that firms with better economic performance have a higher likelihood of investing financial resources in activities with higher social value and have the desire to disseminate this information (Khan, 2010). Moreover, firms with better financial performance also have more resources to devote to the preparation of voluntarily drawn-up information documents (Mun et al., 2011). Thus, it can be expected based on the argument that the greater the financial performance, the more often businesses ensure sufficient financial resources for the development of a sustainable environment in which they operate, and there exists a positive relationship between financial performance and ESG information disclosure. Among proxies, return on equity (ROE), return on sales (ROS), and financial leverage is the most used strategy that involves in measuring firm's financial performance (Mun et al., 2011; Sharma et al., 2020; Chiu et al., 2020; Chouaibi et al., 2021). When firms have the higher ratio of ROE, ROS, and financial leverage, they will attract more investors but also face risk of higher debt-to-equity ratio (Huang and Kung, 2010). Thus, investors will increase the need to monitor information about the firm's performance, including ESG performance (Thawani and Bhatia, 2024). Furthermore, firms with higher financial leverage are more likely to increase the volume of corporate social responsibility disclosure to reduce costs (Sharma et al., 2020). From the discussion, the hypotheses are proposed as follows.

Hypothesis 3 The ROE of firm has a positive relationship with ESG information disclosure.

Hypothesis 4 The ROS of firm has a positive relationship with ESG information disclosure.

Hypothesis 5 The financial leverage of firm has a positive relationship with ESG information disclosure.

2.2.4 Independent audit and ESG information disclosure

Independent audit is defined as the practice of auditing firms examining and providing independent opinions on a firm's financial statements and operations. Because audit is a reputation market, a large number of studies have used audit firm reputation as a measure of client firm performance (Abay, 2022). The most well-known, reputable firms in the field are often known as the 'Big Four'. With a history of more than 100 years, Big Four have formed since the beginning of auditing and dominated the market, including PricewaterhouseCoopers (PWC), Deloitte Touche Tohmatsu Limited (Deloitte), Ernst and Young (EY), and Klynveld Peat Marwick Goerdeler (KPMG) (Tien et al., 2019). When firms are audited by Big Four, the reliability of financial statements is more assured (Huang and Kung, 2010). According to several studies, firms use Big Four audit outperform non-Big Four audit firms in terms of performance and predictive value (Chung et al., 2023). This is because, firstly, if firms actively choose Big Four audit firms, it can be considered a good signal for ensuring transparency and clarity of environmental information. Secondly, clients of Big Four audit firms are generally more profitable than those of Non-Big Four audit firms (Huang and Kung, 2010). As a result, using the Big Four audits increases transparency and the level at which firms disclose environmental information. The hypothesis is proposed as follows.

Hypothesis 6 Firms using Big Four independent audits have a positive relationship with ESG information disclosure.

2.2.5 Environmental certification and ESG information disclosure

Environmental certification is a legal certificate issued by a competent state agency to industrial establishments to identify the environmental criteria set by the state that the agencies set out to meet environmental standards (Nebel et al., 2005). Few studies have demonstrated that environmental certification of firms results in better environmental performance (Chiu et al., 2020; Ramba et al., 2021). This is because those firms show that they are actively geared towards social needs and CSR activities and are thus more likely to provide substantial environmental claims about their activities. In other words, the existence of environmental certification is an important driving force to enhance ESG information reporting and increase the transparency of environmental information (Ienciu, 2012). A reason is that firms with environmental certification can facilitate the entire process of environmental information reporting and reduce legal risks related to environmental issues. Accordingly, the hypothesis is proposed as follows.

Hypothesis 7 The existence of environmental certification of firm has a positive relationship with ESG information disclosure.

2.2.6 Foreign investment and ESG information disclosure

Foreign investment refers to the investment in domestic firms and assets of another country by foreign investors (Encarnation and Wells, 2021). Foreign investment is measured by the percentage of foreign investors' firm ownership. Firms with more foreign investors tend to disclose more ESG information because these firms undergo the pressure of attracting strict foreign investors (Pareek and Sahu, 2022). Moreover, foreign investors are likely to have greater leverage in advocating for improved ESG disclosure

within the companies they invest in. They may use their ownership stakes to engage with companies on ESG issues, push for improvements in ESG disclosure and performance, and hold companies accountable for meeting ESG targets. This justification also applies to the legitimacy theory when firms consider society's perception of them (Breuer et al., 2018). Thus, the hypothesis is formulated as follows.

Hypothesis 8 Firms with foreign investor ownership have a positive relationship with ESG information disclosure.

3 Data collection and methodology

3.1 Data collection

For research purposes, data was collected from the Financial Statements, Annual Reports and Corporate Governance Reports of manufacturing firms listed on the Ho Chi Minh City Stock Exchange (HOSE) from 2015 to 2022. The choice of time span (2015–2022) is reasoned. The year 2015 marks the start of the Circular 155/2015/TT-BTC in Vietnam issued by the Ministry of Finance, which officially mentioned about ESG information and guided listed companies to disclose ESG information (PwC, 2022). Furthermore, manufacturing firms seemingly have a better understanding of the significance of ESG information, leading them to gather and report information at a more comprehensive level than their counterparts. Consequently, manufacturing firms are easier to integrate ESG information into their business operations compared with merchandise and service firms. ESG disclosure information of manufacturing firms tends to be more extensive. This study uses the information of firms listed on the HOSE which is the exchange for Vietnam's largest listed firms. The final sample of 111 listed firms was selected by eliminating recently listed firms that lacked data, resulting in 888 observations over eight years.

3.2 Measuring dependent and dependent variables

Since Vietnam has not applied a legal benchmark for measuring ESG information yet, ordinal scales will be used to measure depth, with '0' indicating that the issue is not discussed and '4' indicating that the issue is fully disclosed (Holder-Webb et al., 2009). This type of benchmark tells information users to what extent firms give a comprehensive account of each dimension of content. This study followed the work of Holder-Webb et al. (2009) and adjusted for the research context. Using the firms' Annual Reports, the coding scheme for the extent of ESG information disclosure uses a four-point scale, where 0 = no mention of ESG; 1 = brief mention of ESG with no detail; 2 = discussion of ESG with little detail; 3 = extensive discussion of ESG with qualitative detail; and 4 = extensive discussion of ESG with quantitative detail (see Table 1). *ESG*(*nom.*) is thus a nominal variable.

Table 1 Measurement of dependent variables

ESG information	*Scales*
Corporate governance report (CGR)	
No publication of the CGR	0
Publication of the CGR	1
Business annual report – ESG(nom.)	
No mention of ESG	0
Brief mention of ESG with no detail	1
Discussion of ESG with little detail	2
Extensive discussion of ESG with qualitative detail	3
Extensive discussion of ESG with quantitative detail	4

Table 2 Measurement of independent variable

Independent variables	*Measurement*
Firm size (*SIZE*)	The natural logarithm of a firm's total assets.
Listed years (*AGE*)	The variable measures the years of being a listed firm, counting from the first public year to 2022.
Return on equity (*ROE*)	Dividing a firm's net income by the average of its total shareholder's equity.
Return on sales (*ROS*)	The ratio is calculated by dividing operating profit by net revenue from sales.
Leverage (*LEV*)	Dividing a firm's total debt by the total equity.
Independent audit (*AUD*)	The variable considers if the firm is audited by an independent and reliable party. It is coded using a dummy variable, with 1 = Big 4 – audited firm, 0 = otherwise.
Environment certification (*CER*)	The variable considers if the firm has a good track of environmental performance. Using a dummy variable, it is coded as 1 = having environmental certification in the observed year, 0 = otherwise.
Foreign investment (*FI*)	This variable observes the firm's foreign investment. It uses a dummy variable, with 1 = receiving foreign investment, 0 = otherwise.

This study also utilises the corporate governance report (*CGR*). Since its publication is optional, we hypothetically associate the information transparency with the publication of the CGR. We code 1 if the firm publishes the report and 0 otherwise. Table 1 summarises the coding schemes. We then combine *ESG*(*nom.*) and *CGR* using the principal component analysis (PCA). PCA reduces the dimensionality of the dataset by linearly combining the constituent variables such that they are not correlated. The number of component variables that are consequently extracted is equal to the number of constituent variables. It relies on the variances among the variables to compress the maximum possible information into the first component variable, and the maximum possible remaining information into the second component, and so on. This technique allows PAC to extract the most information of both variables of interest and project them into the resultant variable (*ESG*(*PCA*)). The scree plot on PCA between *ESG*(*nom.*) and *CGR*

indicates that the first component variable is adequate, and the second component is not necessary (plot not reported).

PCA is mathematically given as the follows:

$$ESG(PCA)_1 = a_{1ESG} * z_{ESG} + a_{2CGR} * z_{CGR} \quad (1)$$

$$ESG(PCA)_2 = b_{1ESG} * z_{ESG} + b_{2CGR} * z_{CGR} \quad (2)$$

In which, $ESG(PCA)_1$ and $ESG(PCA)_2$, of which this study only uses the former, are the first and second PCA components of the two variables $ESG(nom.)$ and CGR. z_{ESG} and z_{CGR} are the standardised values of the variables $ESG(nom.)$ and CGR:

$$z_i = {X_i - \mu_i}/{\sigma_i} \text{ with } i = ESG(nom.) \text{ and } CGR \quad (3)$$

z_i is the standardised value, X_i is the observation value, μ_i is the mean of i, and σ_i is the standard deviation of i. a_{1ESG}, a_{2CGR}, b_{1ESG}, and b_{2CGR} are the coefficients corresponding to the eigenvector of the covariance matrices:

$$CV_i = \lambda_i V_i \text{ with } i = ESG(PCA)_1, ESG(PCA)_2 \quad (4)$$

C is the covariance matrix between $ESG(nom.)$ and CGR. $V_{ESG}(PCA)_1$ is the eigenvector containing the pair a_{1ESG}, a_{2CGR}. $V_{ESG}(PCA)_2$ is that of the pair b_{1ESG}, b_{2CGR}. λ_i are the respective eigenvalues. The follows must be satisfied:

$$\sigma^2_{ESG(PCA)_1} > \sigma^2_{ESG(PCA)_2} \Leftrightarrow \lambda_{ESG(PCA)_1} > \lambda_{ESG(PCA)_2} \quad (5)$$

$$Corr\left(ESG(PCA)_2, ESG(PCA)_2\right) = 0 \quad (6)$$

$$a^2_{iESG} + a^2_{iCGR} = 1 \text{ with } i = 1, 2 \quad (7)$$

The results report regressions on both $ESG(PCA)$ and $ESG(nom.)$ for reference purpose. The independent variables are coded following the schemes in Table 2.

3.3 Empirical strategy

3.3.1 Benchmark models

The empirical strategy was designed to systematically examine the relationship between firm characteristics and ESG disclosure. We began by applying PCA to combine the ESG and CGR data into a single index, which simplified the analysis while maintaining the integrity of the information. Regression analysis was then conducted to investigate how factors influence ESG information disclosure. The models were designed to account for year-specific effects and potential biases, ensuring that the conclusions drawn reflect a robust analysis of the data.

$ESG(PCA)$ is a continuous variable, for which OLS estimation is used. It is formally given as equation (8).

$$ESG(PCA) = \alpha + VAR * \beta' + \in \quad (8)$$

$ESG(nom.)$ is an ordered categorical variable, taking one of five values x = 0, 1, 2, 3, 4, for which ordered logistic estimation is used. It is formally given as equation (9).

$$ESG(nom.) = \alpha + VAR * \beta' + \in \tag{9}$$

ESG(*PCA*) and *ESG*(*nom.*) are the independent variables of interest that measure the business transparency in disclosing ESG information. α is the constant and $\in$ is the error term.

VAR is the list of independent variables in Table 2, including *SIZE*, *ROE*, *LEV*, *AVE*, *AUD*, *CER*, and *FI*. β' is the list of respective coefficients.

Estimations in equation (9) are ordered logistic model – an extended form of logistic regression. It is formally given as the following:

$$\begin{aligned} &\Pr\left(ESG(nom.) \geq y_j \middle| \alpha, VAR, \beta'\right) = \sqrt{1 + \left(\frac{1}{e^{(\alpha + VAR * \beta')}}\right)} \\ &\Leftrightarrow \text{logit}(P) = \log\left(\frac{\Pr\left(ESG(nom.) \geq y_j \middle| \alpha, VAR, \beta'\right)}{1 - \Pr\left(ESG(nom.) \geq y_j \middle| \alpha, VAR, \beta'\right)}\right) = \alpha + VAR * \beta' \end{aligned} \tag{10}$$

with y_j is the cut-off points, $j = 0, 1, 2, 3, 4$.

3.3.2 Robustness checks

Based on equations (8) and (9), this study incorporates numerous mechanisms to robustness-check the results.

$$ESG(PCA) = \alpha + VAR * \beta' + \lambda + \gamma * ESG(PCA)_{t-1} + VAR_{t-1} * \delta' + \in \tag{11}$$

$$ESG(nom.) = \alpha + VAR * \beta' + \lambda + \gamma * ESG(nom.)_{t-1} + VAR_{t-1} * \delta' + \in \tag{12}$$

It sequentially introduces more elements to the benchmark models (1), (2), and (3). Such elements may have otherwise misled, biased, or obscured the results. λ is the dummy fixed-effect variable. λ assumes that years are idiosyncratic. Each year may have multiple external events, such as changes in business regulations, that homogenously apply to all firms but differ from other years. λ takes this into account and control for the invariant unobserved characteristics of each year. $ESG(PCA)_{t-1}$ and $ESG(nom.)_{t-1}$ are the one-year lag of the dependent variables. They assume that the dependent variables at t may be determined by those at $t - 1$, which may therefore bias the estimations. A similar idea applies to VAR_{t-1}, but as independent variables.

4 Results

Table 3 reports the results. Across fifteen models, most independent variables that significantly impact the ESG transparency variables do so positively. Meanwhile, most variables that negatively impact ESG information disclosure transparency are statistically insignificant. In the benchmark models, 6 out of 8 independent variables are statistically significant. The majority, financial and non-financial factors alike, withstand robustness and remain the statistical significance with more controlling mechanisms are introduced, such as the dummy fixed-effect variable μ_i that accounts for the firm's time-invariant idiosyncrasies enters.

Table 3 Regression results – factors of the ESG information disclosure transparency

	Benchmark model		*Fixed effects*		*Lagged dependent variable*		*Lagged independent variables*	
	ESG (PCA)	*ESG (dum.)*	*ESG (PCA)*	*ESG (dum.)*	*ESG (PCA)*	*ESG (dum.)*	*ESG (PCA)*	*ESG (dum.)*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
SIZE	0.142***	0.204***	0.118***	0.149**	0.117***	0.140*	0.108***	0.134*
	(0.0250)	(0.0777)	(0.0248)	(0.0746)	(0.0248)	(0.0737)	(0.0246)	(0.0765)
AGE	0.0588***	0.0689***	0.0451***	0.0421***	0.0466***	0.0445***	0.0477***	0.0498***
	(0.00722)	(0.0141)	(0.00749)	(0.0149)	(0.00755)	(0.0150)	(0.00753)	(0.0153)
ROE	0.000343**	0.000734**	0.000288*	0.000648*	0.000270	0.000604*	0.000282*	0.000616*
	(0.000173)	(0.000340)	(0.000170)	(0.000343)	(0.000171)	(0.000344)	(0.000170)	(0.000348)
ROS	–0.00269	–0.00440	–0.00153	–0.00161	–0.00145	–0.00141	–0.00100	–0.000679
	(0.00228)	(0.00409)	(0.00225)	(0.00411)	(0.00225)	(0.00411)	(0.00222)	(0.00416)
LEV	0.0326	–0.107	0.0365	–0.111	0.0298	–0.119	0.0134	–0.146
	(0.0938)	(0.165)	(0.0925)	(0.167)	(0.0927)	(0.167)	(0.0918)	(0.169)
AUD	0.175**	0.525***	0.170**	0.543***	0.166**	0.542***	0.156**	0.542***
	(0.0718)	(0.143)	(0.0703)	(0.144)	(0.0708)	(0.144)	(0.0713)	(0.149)
FDI	1.025***	1.180***	1.075***	1.290***	1.068***	1.279***	1.053***	1.324***
	(0.0970)	(0.198)	(0.0978)	(0.205)	(0.0984)	(0.206)	(0.0976)	(0.209)
CER	0.336***	0.769***	0.374***	0.918***	0.386***	0.935***	0.392***	0.983***
	(0.101)	(0.211)	(0.0994)	(0.217)	(0.0997)	(0.217)	(0.0994)	(0.220)

Notes: Standard errors in parentheses; *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Dependent variables: *ESG* (*PCA*) is the continuous combination index of transparency in disclosing *ESG* information; *ESG* (*dum*) is a binary variable. Independent variables: *SIZE* is the firm size; *ROE* is the return to equity; *ROS* is the return to sales; *LEV* is the liabilities/assets ratio; *AGE* is the firm age; *AUD* is whether the firm is Big Four-audited; *FI* is whether the firm receives foreign investment; *CER* is whether the firm having environmental certification in the observed year; λ_t is the year fixed effect; $Y_{i,t-1}$ is the one-year lag of the respective dependent variables; and $X'_{i,t-1}$ is the one-year lag of the independent variables. Models (1), (3), (5), and (7) use multiple regression; models (2), (4), (6), and (8) use ordered logistic regression. Models (1) and (2) use benchmark estimation. Models (3) and (4) incorporate fixed effects. Models (5) and (6) incorporate $Y_{i,t-1}$. Models (7) and (8) incorporate $X'_{i,t-1}$.

Table 3 Regression results – factors of the ESG information disclosure transparency (continued)

	Benchmark model		*Fixed effects*		*Lagged dependent variable*		*Lagged independent variables*	
	ESG (PCA)	*ESG (dum.)*	*ESG (PCA)*	*ESG (dum.)*	*ESG (PCA)*	*ESG (dum.)*	*ESG (PCA)*	*ESG (dum.)*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Fixed			Yes	Yes	Yes	Yes	Yes	Yes
$Y_{i,t-1}$					Yes	Yes	Yes	Yes
$X'_{i,t-1}$							Yes	Yes
N	888	888	888	888	770	770	770	770
R^2	0.354		0.386		0.389		0.412	
Adj. R^2	0.348		0.374		0.377		0.395	
Pseudo R^2		0.073		0.095		0.095		0.117

Notes: Standard errors in parentheses; *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Dependent variables: *ESG (PCA)* is the continuous combination index of transparency in disclosing *ESG* information; *ESG (dum)* is a binary variable. Independent variables: *SIZE* is the firm size; *ROE* is the return to equity; *ROS* is the return to sales; *LEV* is the liabilities/assets ratio; *AGE* is the firm age; *AUD* is whether the firm is Big Four-audited; *FI* is whether the firm receives foreign investment; *CER* is whether the firm having environmental certification in the observed year; λ_t is the year fixed effect; $Y_{i,t-1}$ is the one-year lag of the respective dependent variables; and $X'_{i,t-1}$ is the one-year lag of the independent variables. Models (1), (3), (5), and (7) use multiple regression; models (2), (4), (6), and (8) use ordered logistic regression. Models (1) and (2) use benchmark estimation. Models (3) and (4) incorporate fixed effects. Models (5) and (6) incorporate $Y_{i,t-1}$. Models (7) and (8) incorporate $X'_{i,t-1}$.

In summary, firm size, ROE, listed year, independent audit, foreign investment, and being a firm acquiring environmental certification are significant in four models. Four variables whose p-values are coherent in both statistical strength and relationship sign even when the last robustness mechanism is in place are listed year, independent audit, foreign investment and environmental certification. The next section focuses on analysing the two variables and their impacts on ESG information disclosure transparency.

Table 4 Summary of hypotheses

Hypotheses		*Result*
Hypothesis 1	Firm size has a positive relationship with ESG information disclosure.	Accepted
Hypothesis 2	The listed years of a firm have a positive relationship with ESG information disclosure.	Accepted
Hypothesis 3	The ROE of firm has a positive relationship with ESG information disclosure.	Accepted
Hypothesis 4	The ROS of firm has a positive relationship with ESG information disclosure.	Rejected
Hypothesis 5	The financial leverage of firm has a positive relationship with ESG information disclosure.	Rejected
Hypothesis 6	Firms using Big Four independent audits have a positive relationship with ESG information disclosure.	Accepted
Hypothesis 7	The existence of environmental certification of firm has a positive relationship with ESG information disclosure.	Accepted
Hypothesis 8	Firms with foreign investor ownership have a positive relationship with ESG information disclosure.	Accepted

5 Discussion and implications

The empirical findings, which were proven through all robustness checks, provide important scientific and managerial insights. Regarding scientific perspective, this study enriches the literature on ESG information disclosure and helps address the contradictions in previous findings regarding which metrics are relevant for ESG disclosure. Regarding managerial perspectives, it reveals that large and long-listed firms tend to disclose more information about their ESG practices. This seems apparent since ESG reporting is a costly and time-consuming process that often requires particular experience from the preparers (Mun et al., 2011). As a result, large and long-listed firms are ideal implementors with more available resources, which can facilitate more transparent reporting of ESG information. However, these findings, in turn, suggest that smaller and newly listed firms are less likely to report sufficient ESG information. Other than insufficient resources, another reason is that these firms may not perceive ESG reporting as a priority compared to other business activities, especially short-term growth and profitability goals. To improve this, it is necessary to increase the awareness of those firms about the benefits of reporting ESG information through official government channels. By reporting ESG information, smaller and newly listed firms can demonstrate

their commitment to sustainability, build trust with stakeholders, and attract more investments in the future.

The study also emphasises the correlation between firms' financial performance and ESG transparency. When firms have healthier finances, particularly stronger returns on equity, they have more potential financial resources to invest in ESG initiatives and reporting. On the contrary, firms with low or negative financial performance may face challenges in cost management and are more likely to perceive ESG as a cost centre rather than a way to create value. So far, there is a lack of consensus on which financial proxies are most relevant for measuring ESG transparency in the existing literature. This study has successfully suggested that ROE is an indicative metric of a company's ESG performance while failing to capture the correlation with ROS and financial leverage. A possible reason is that a high-level leverage company is riskier and a high ROS company may be more focused on maintaining profitability than investing in sustainable growth. Meanwhile, a high ROE firm is often more likely to pressure them to disclose their ESG practices. Investors are increasingly interested in companies that demonstrate a commitment to ESG issues and may be more likely to invest in companies that are transparent about their practices. Encouraging firms with low financial performance to report on their ESG performance voluntarily will require a multifaceted approach that combines incentives and the development of industry-wide standards. These incentives could include access to capital, recognition or awards for sustainability leadership, or increased stakeholder support. The development of industry-wide standards for ESG reporting can help create a level playing field for companies and increase the value of ESG reporting.

Additionally, the study implies that when a firm is audited by a Big4 accounting firm (more established), the quality of its corporate disclosure tends to be viewed more favourably. It appears that Big4 auditors have a significant influence over such disclosures, and existing research suggests that these auditors often demand that corporations disclose more information to maintain their brand reputation and avoid costly litigation (Huang and Kung, 2010). However, it is essential to consider that using a Big4 auditor alone does not guarantee high levels of ESG disclosure, as it ultimately depends on the firm's commitment to ESG issues and willingness to disclose information. Companies may also choose to supplement the services provided by the Big4 firms by engaging other audit or consulting firms with ESG reporting expertise. Should the state want to improve the transparency of ESG disclosure by listed firms, they should create a more robust and accountable audit industry, which will ultimately benefit both companies and investors alike. The Ministry of Finance should work to enrich the quality of audited firms. This will help to ensure that companies audited by non-Big4 firms are held to the same high standards as those audited by the more established Big4 firms. By doing so, the transparency and reliability of ESG disclosure from these companies will be improved.

Moreover, firms certified by an environmental certification tend to be more voluntary and committed to showcasing their ESG practices in their reports. It is in line with the findings of Chiu et al. (2020) and Ramba et al. (2021) that accredited environmental certifications are effective mechanisms for facilitating environmental transparency. Notably, the positive effect of environmental certification may extend beyond the environmental domain and reach a more holistic approach to corporate social responsibility, including issues such as labour rights, ethical sourcing, and community

development. Such acknowledgment of a firm's certification can help stakeholders, including investors, consumers, and regulators, make more informed decisions about investing and management. However, most observing companies received national certifications but not systematic international environmental ones. It may affect the quality of environmental information they will be revealing to the public due to their experience reflected through environmental certificates, one of which has quality limitations. It is suggested that local practices will have to reach levels of compliance deemed appropriate by other nations. The government should introduce more international standards for the environment and encourage firms to achieve them to maintain excellent performance in ESG information disclosure.

Last but not least, the foreign investment variable proves to endure robustness checks across all models, which deserves a deeper investigation. Firms with foreign investment are more willing to transparently disclose ESG information (and even more likely to comply with ESG business conduct) because ex-ante they want to continue attracting foreign capital, or ex-post their foreign investors press them. It may also be a combination of both. This finding also suggests that firms without foreign investment are underperforming in this respect. If all else is equal, domestic mechanisms for ESG compliance alone are prima facie insufficient. While this argument can be logically far-fetched, our preliminary evidence provides grounds for future research and policy considerations to address any weaknesses in the domestic legal frameworks concerning ESG standards and business due diligence.

6 Conclusions

This study constructs a new dataset on ESG information disclosure among various Vietnamese firms. Data spans over 111 firms in an eight-year period (from 2015 to 2022), drawn from the financial statements, annual business report, and corporate governance report. Based on the existing literature, this study looks for some financial and non-financial factors and sets up economic models to test their relationship with the disclosure and transparency of ESG information. Most of the factors stand the benchmark model estimation and robustness checks by presenting their significance in determining information transparency. After all, six variables are statistically significant, including the company's size, listed year, company's financial performance, audit firm, environmental certification, and foreign investment.

One limitation of our study is that we could not examine the impact of financial factors namely return on sales (ROS) and leverage on ESG disclosure practices. While our analysis considers a range of financial and non-financial factors, we recognise that ROS and leverage may also play a significant role in shaping firms' ESG reporting practices. Future research could explore the relationships between these financial factors and ESG disclosure, providing a more comprehensive understanding of the drivers of sustainability reporting in the Vietnamese context.

Despite such inevitable limitations, the study proposed in this study is still valid for reference in several ways. This study contributed to the existing literature by providing the most active determinants of ESG performance through a case study of Vietnamese companies. In conclusion, the study is an effort to understand the ESG outcomes in a newly emerging ESG context. It demonstrates how some financial and non-financial attributes of companies affect the level of ESG disclosure. In some ways, the study

provides a clear direction for future researchers. Further research may examine the disclosure by conducting surveys and interviews. Moreover, future research can also be conducted on the linkage between ESG and corporate performance.

Declarations

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