

## DETERMINANTS OF ENVIRONMENTAL DISCLOSURES: GREEN INITIATIVES BY LISTED COMPANIES IN MALAYSIA

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### Article history

Received date : 15-2-2025  
Revised date : 16-2-2025  
Accepted date : 23-3-2025  
Published date : 15-4-2025

### To cite this document:

Ismail, F., Mohamed, Z., & Mohd Saad, N. (2025). Determinants of environmental disclosures: Green initiatives by listed companies in Malaysia. *Journal of islamic, social, economics and development (JISED)*, 10 (71), 675 - 694.

**Abstract:** *In an era of heightened emphasis on sustainability and transparency, it is essential to understand the factors that drive effective environmental disclosure to advance Environmental, Social, and Governance (ESG) practices. This study aimed to identify the determinants of environmental disclosure and assess the impact of firm size, leverage, liquidity, profitability, and stakeholder engagement score on environmental disclosure, both collectively and individually, within the context of ESG green initiatives among corporate companies listed on Bursa Malaysia for the period 2020 to 2024. The data analysis, involving 357 companies, was conducted using panel regression analysis and the analysis was performed with EViews 13. The findings indicated that firm size, leverage, liquidity, profitability, and stakeholder engagement score significantly impact environmental disclosure when considered together. However, when examined separately, only firm size, profitability, and stakeholder engagement score show a notable partial effect on environmental disclosure, while leverage and liquidity do not significantly influence environmental disclosure. These results highlighted the importance of certain firm characteristics and stakeholder engagement in driving corporate transparency and accountability in environmental reporting. This study has provided valuable insights for improving environmental reporting and integrating sustainability into corporate strategies, offering practical implications for policymakers, corporate leaders, and investors seeking to promote robust ESG practices.*

**Keywords:** *Environmental Disclosure, ESG practices, Firm Size, Leverage, Liquidity, Profitability, Stakeholder Engagement Score, Sustainability*

## Introduction

As the global focus on sustainability grows, businesses are realizing the importance of integrating Environmental, Social, And Governance (ESG) practices into their operations. These practices are crucial for advancing the Sustainable Development Goals (SDGs), which are essential for sustainable development at both micro and macroeconomic levels (Radu et al., 2023). By implementing ESG strategies, companies can effectively address environmental issues, such as waste management, and make progress towards the SDGs (Moktadir, 2023). More companies are now using the SDGs as a benchmark for evaluating their sustainability efforts and aligning their ESG practices accordingly (Hidayati, 2024; Soni, 2023). Research shows a strong connection between ESG implementation and progress towards the SDGs. ESG practices help companies understand on their ESG strategy impacts the SDGs (Tyan, 2024).

Moreover, adopting ESG standards and engaging in sustainability reporting can provide a competitive advantage while effectively advancing the SDGs for stakeholders and investors (Sarkar, 2023). The positive relationship between corporate sustainability practices, including ESG factors, and financial performance demonstrates the broader benefits of integrating ESG principles into business strategies. This integration supports the achievement of the SDGs and fosters long-term value creation (Singh, 2024). Additionally, the credibility of sustainability reporting is closely tied to ESG engagement, reinforcing the importance of ESG practices in achieving corporate sustainability in line with the SDGs (Sideri, 2023). By incorporating ESG practices into corporate strategies which enhances sustainability and governance while significantly contributing to the achievement of the SDGs. This promotes sustainable development and long-term value creation.

The evaluation of environmental disclosures in corporate companies with green initiatives can be challenging and complex, affecting their sustainability efforts. While these initiatives aim to improve environmental performance, reduce resource consumption, and promote eco-friendly practices, there are several issues that can hinder their effectiveness. One critical challenge is greenwashing, where companies may exaggerate or misrepresent their environmental efforts to appear more sustainable than they are (Muniba, 2023). This can undermine the credibility of their green marketing messages and erode the trust of stakeholders and consumers in the company's environmental commitments. Furthermore, the adoption of green initiatives can be influenced by factors such as market competition, strategic orientation, and the intensity of competition (Aziz et al., 2018). It is crucial for companies to understand the key drivers of their green initiatives to address environmental challenges effectively and derive performance benefits from their implementation.

Additionally, the impact of ESG performance on green innovation in traditional energy enterprises highlights the importance of factors like innovation investment, external monitoring, and government subsidies in driving green initiatives (Ren, 2024). Companies must consider these pathways to foster a culture of innovation and sustainability in their operations. Moreover, the role of green finance in sustainable business strategies presents both opportunities and challenges for companies (Lakasse, 2024). Uncertainty regarding regulations, complexities in measuring environmental impacts, and initial costs associated with adopting green financial practices can pose obstacles to the successful implementation of green initiatives. While green initiatives are vital for improving environmental performance and sustainability in corporate companies, challenges such as greenwashing, market competition, innovation investment, and financial considerations can impact their effectiveness. Companies

must strategically navigate these challenges to ensure that their environmental pillar scores accurately reflect their commitment to sustainability and drive positive environmental outcomes.

The integration of climate change strategies into corporate governance is increasingly important as businesses navigate the complexities of environmental sustainability. The environmental pillar score within corporate companies is closely linked to climate change considerations and strategies. Several studies have shown a connection between corporate commitment to climate change action and environmental performance, particularly in reducing greenhouse gas (GHG) emissions (Littlewood et al., 2018). Research has demonstrated that a strong commitment to reducing GHG emissions positively impacts GHG performance, underscoring the significance of corporate initiatives in addressing climate change challenges.

Moreover, there is a correlation between carbon reduction targets, risk management integration, and climate change strategies, emphasizing the importance of setting clear environmental goals and integrating climate considerations into business practices (Eleftheriadis & Anagnostopoulou, 2017). Companies that establish carbon reduction targets and effectively manage climate risks are better positioned to improve their environmental performance and contribute to climate change mitigation efforts. Additionally, company size has been identified as a significant factor influencing corporate disclosures regarding climate change practices (Eleftheriadis & Anagnostopoulou, 2014).

Larger firms typically disclose more information about their climate change initiatives, demonstrating a positive relationship between firm size and the extent of environmental disclosures. This underscores the importance of organizational size in fostering transparency and accountability in environmental reporting. Ismail et al. (2024) highlights that transparent environmental disclosures enhance corporate accountability, a point further supported by Almaghrabi (2023), who examined the impact of climate change exposure on firm performance and the significance of managerial competencies in tackling climate-related challenges. Companies must assess their level of climate change exposure and the skills of their management to effectively address climate risks and seize opportunities for sustainable performance. Environmental disclosure in corporate settings is closely linked to considerations of climate change, corporate commitments to reducing greenhouse gas emissions, carbon targets, risk management integration, and the effect of firm size on environmental disclosures. Understanding these relationships is essential for companies aiming to enhance their environmental performance, manage climate risks, and adopt sustainable business practices in the face of climate change challenges.

Malaysian companies are becoming increasingly aware of the importance of addressing climate change and have implemented various green initiatives to reduce their environmental impact and promote sustainability. According to Jaaffar et al. (2018), Malaysian companies have significantly increased their corporate environmental reporting because of institutional pressures related to climate change. This growing transparency indicates a heightened awareness among businesses in Malaysia about the need to address climate concerns through sustainable practices. Additionally, Ahmad & Hossain (2019) found a positive correlation between climate change disclosure by Malaysian companies and factors such as company size, profitability, industry membership, government ownership, and business networks. Larger, more profitable, and well-connected companies in Malaysia tend to be more transparent about

their climate change initiatives. Aziz et al. (2018) examined the impact of green initiatives on the environmental performance of publicly listed companies in Malaysia and found a positive correlation between these practices and environmental sustainability. This suggests that green initiatives are crucial for improving the environmental performance of Malaysian companies.

Furthermore, Bidin (2023) emphasizes Malaysia's focus on sustainable management in response to global climate change challenges. The government's commitment to strategies and mitigation measures for sustainable growth likely influences corporate behavior towards green initiatives. The reality of climate change in Malaysia has prompted companies to adopt green initiatives and improve their environmental performance. The increasing emphasis on sustainability, along with institutional pressures and government actions, is shaping corporate sustainability in Malaysia, indicating a positive trend towards addressing climate change through proactive green initiatives.

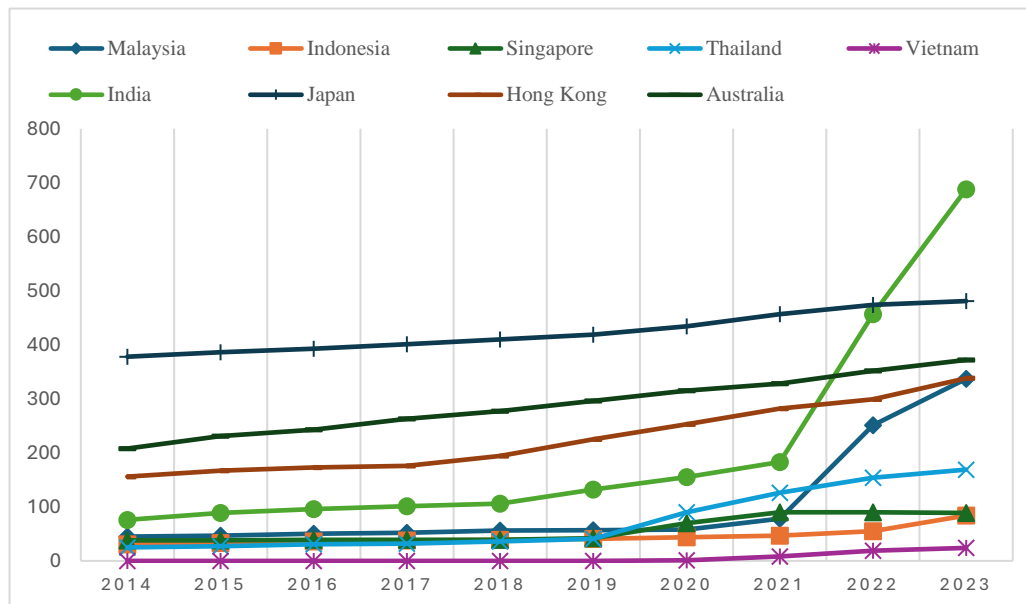
Environmental disclosure among corporate companies in Malaysia continues to exhibit gaps despite growing interest in ESG practices. Research indicates a need for improvement in both the extent and quality of environmental disclosures by Malaysian public-listed companies. Although there is a trend towards voluntary environmental disclosures, their depth and breadth remain limited, highlighting a gap in transparency and accountability (Said et al., 2019). Studies have demonstrated the impact of ESG disclosures on financial performance and firm value in Malaysia (Zainon et al., 2020). Companies prioritizing ESG practices often see positive effects on economic growth and corporate value, underscoring the importance of incorporating ESG considerations into business strategies (Mohd et al., 2024).

Nonetheless, there is still significant room for improvement in environmental reporting practices to fully leverage the benefits of ESG initiatives (Said et al., 2019). Additionally, the role of corporate governance in enhancing the quality of environmental disclosures has been highlighted within the Malaysian context. Recommendations emphasize the importance of timely and high-quality disclosures, pointing to governance mechanisms as crucial for promoting transparency and sustainability (Ghuslan et al., 2021). Furthermore, implementing whistleblowing policies and stakeholder engagement tools can further enhance environmental disclosures and accountability within Malaysian companies (Mohd Ali et al., 2023).

Despite growing interest in ESG practices, environmental disclosure by Malaysian public-listed companies remains limited in scope and quality (Said et al., 2019). While ESG disclosures positively impact financial performance and corporate value (Zainon et al., 2020; Mohd et al., 2024), significant improvements in reporting are needed to maximize these benefits. Corporate governance plays a key role in enhancing disclosure quality, with timely reporting, whistleblowing policies, and stakeholder engagement tools identified as critical for promoting transparency and sustainability (Ghuslan et al., 2021; Mohd Ali et al., 2023).

The chart in Fig. 1 illustrates the frequency of environmental disclosure practices among publicly listed companies in several Asia-Pacific countries from 2014 to 2023, specifically highlighting trends in Malaysia, Indonesia, Singapore, Thailand, Vietnam, India, Japan, Hong Kong, and Australia. Malaysia shows a consistent increase in green disclosures throughout this period, with a significant rise beginning around 2021. Although Malaysia's rate of disclosure is relatively high compared to some countries, it still lags far behind leaders like India and Japan. For example, India experienced a dramatic increase in green disclosures starting in 2021,

and by 2023, it achieved the highest level among these nations. Japan, Australia, and Singapore also exhibit steady growth in green disclosures, although not as sharply as India's recent surge. Meanwhile, Thailand and Vietnam have shown upward trends in recent years, but at lower levels than Malaysia.



**Figure 1: Frequencies of Environmental Disclosure Practices Adoption among Public Listed Companies across Asia-Pacific Region countries for 2014-2023**

Source: Eikon DataStream Terminal (2024)

Despite steady progress, Malaysia has yet to reach the high levels of adoption seen in countries like India and Japan, indicating significant potential for further growth. As a major economy in Southeast Asia, Malaysia's advancements in sustainability practices could serve as an example for neighboring countries, particularly those with similar regulatory environments. Additionally, examining Malaysia's green disclosure trends provides insights into the unique opportunities and challenges the country faces, supporting efforts to align with global sustainability standards and enhance its appeal to environmentally conscious investors. By concentrating on Malaysia, this study aims to offer actionable recommendations that can accelerate the country's leadership in sustainability practices within the region.

The primary objective of this study is to identify and analyze the determinants of environmental disclosure among Malaysian corporate companies engaged in ESG green initiatives. Specifically, the study aims to assess the impact of firm size, leverage, liquidity, profitability, and stakeholder engagement on environmental disclosure levels. By examining these factors collectively and individually, the study seeks to provide insights into the drivers of transparency and accountability in environmental reporting.

This research focuses on companies listed on Bursa Malaysia over the period from 2020 to 2024, contributing to the understanding of ESG practices within the Malaysian corporate context. The importance of this research lies in its ability to shed light on the factors that influence environmental disclosure score in the context of sustainable business practices in the Malaysian corporate sector. Firm size indicates the resources available for implementing green



initiatives, while leverage and liquidity provide insights into a company's financial flexibility to invest in sustainability. Profitability can impact the extent to which a company is willing to finance environmental projects, and stakeholder engagement highlights the role of external and internal stakeholders in driving corporate commitment to environmental sustainability.

By focusing specifically on Malaysian companies, this study offers a nuanced understanding of how local corporate characteristics and practices influence environmental performance in the context of green initiatives. Through the analysis of these variables, the study enhances our understanding of the different corporate attributes and practices can either support or hinder environmental performance in Malaysia. The findings provide valuable insights for corporate strategy, policymaking, and investor decision-making, particularly in promoting sustainability within the Malaysian business landscape.

## Literature Review

### Theoretical Background

Environmental disclosure has become a vital aspect of corporate responsibility, driven by a growing global awareness of sustainability and the demand for transparency. Companies are now expected to share their environmental practices as part of their ESG initiatives to comply with regulatory standards, address stakeholder concerns, and build a positive reputation. Legitimacy theory suggests that companies strive to align their actions with societal expectations and norms to maintain their legitimacy (Ogunode, 2022; Sari, 2023). By sharing their environmental practices, companies demonstrate responsible operations and contribute to broader sustainability goals.

Legitimacy theory provides a comprehensive framework for understanding the relationship between various firm characteristics: firm size, leverage, liquidity, profitability, and stakeholder engagement with environmental disclosure practices. Larger firms tend to disclose more environmental information due to increased scrutiny from stakeholders and the availability of resources, which compels them to align their operations with societal expectations (Rini & Adhariani, 2021; Pinheiro, 2023). Conversely, the relationship between leverage and environmental disclosure is nuanced; firms with higher leverage may disclose more to mitigate risks associated with stakeholder perceptions, although this can depend on their financial health (Widianto & Sari, 2020; Kalash, 2020). Liquidity, while less frequently studied, suggests that firms with greater financial flexibility are better positioned to invest in sustainable practices and engage with stakeholders (Nur, 2023).

The impact of profitability on environmental disclosure remains complex, with some studies indicating no significant correlation, suggesting that firms may disclose information more in response to stakeholder pressures than as a direct reflection of financial performance (Deswanto & Siregar, 2018; Portella & Borba, 2020). Lastly, stakeholder engagement is critical; firms that actively engage with stakeholders are more likely to disclose environmental information, as this engagement signals a commitment to addressing stakeholder concerns and expectations (Ardiana, 2021; Pucheta-Martínez et al., 2020). Overall, legitimacy theory underscores the importance of aligning disclosures with societal expectations and actively engaging stakeholders to maintain legitimacy and enhance corporate reputation in an increasingly environmentally conscious market.

### Environmental Disclosure

Environmental disclosure and sustainability are key to shaping corporate behavior and performance. Research highlights the mediating role of environmental accounting in linking financial and non-financial disclosures to sustainable development (Mondal, 2024). ESG disclosure correlates positively with economic, environmental, and social sustainability, underscoring the importance of governance and environmental strategies (Alsayegh et al., 2020). It also promotes corporate growth, especially in non-environmentally sensitive industries, and enhances green innovation, improving sustainability performance (Wang et al., 2022; Ding et al., 2022).

Corporate governance mechanisms play a key role in shaping environmental sustainability disclosures, influencing reporting practices (Oyekale et al., 2022). The Environmental Pillar Score (EPS), a key component of ESG scores, assesses sustainability practices and societal impacts (Sahin, 2021). Studies show a positive correlation between EPS and governance pillar scores, enhancing firm value and financial performance (Abdi et al., 2020). Higher EPS is linked to lower capital costs (Ramirez et al., 2022) and impacts market value, showing complex relationships with firm valuation (Ersoy et al., 2022). Breaking down ESG scores into individual pillars provides deeper insights (Qasem et al., 2022).

### Firm Size

Firm size, measured by total assets, significantly impacts a company's environmental pillar score and sustainability practices (Ruwanti et al., 2023). Larger firms have more resources to implement comprehensive environmental initiatives and comply with sustainability standards (Jing et al., 2018). Their size and market presence increase visibility and exposure to environmental risks, leading to greater pressure to adopt responsible practices and disclose environmental performance (Elsayed, 2006; Moshud et al., 2021). Larger firms also tend to engage more in sustainability reporting, resulting in higher-quality disclosures (Brammer & Pavelin, 2006).

Hypothesis 1: Firm size has a significant effect on environmental disclosures.

### Leverage

Leverage is commonly measured using metrics like debt-to-assets, liabilities-to-assets, or debt-to-equity ratios (Zhang & Zhou, 2020). Research shows a positive correlation between ESG scores and leverage, suggesting firms with higher environmental scores may use more debt financing, aligning sustainability initiatives with financial structure (Adeneye et al., 2022). Additionally, higher environmental scores are linked to greater firm value, measured by metrics like market-to-book ratio and Tobin's Q, influencing leverage and capital structure decisions (Abdi et al., 2020).

The quality of ESG reporting influences the relationship between leverage and environmental pillar scores. Transparent reporting enhances credibility and stakeholder trust, improving access to debt capital (Sharma et al., 2022). Companies with higher environmental scores may strategically manage leverage to support sustainability initiatives, balancing financial stability with long-term sustainability goals (Radu et al., 2023).

Hypothesis 2: Leverage has a significant effect on environmental disclosures.

### **Liquidity**

Liquidity is assessed using measures like liquidity cost and time to liquidation, which reflect asset liquidity and market efficiency (Roncalli et al., 2021). Research shows that strong ESG performance, including high environmental pillar scores, can reduce liquidity risk by enhancing financial stability (Liu, 2024). Environmental and governance pillars positively influence stock returns, boosting liquidity through increased investor confidence (Laokulrach, 2022). Companies with higher environmental scores attract sustainable investment, potentially increasing liquidity. However, the impact of environmental scores on liquidity may vary based on other performance metrics, such as profitability.

Higher environmental pillar scores may weaken the relationship between sustainability efficiency and profitability, reflecting a complex link between environmental practices and financial performance (Kuo et al., 2022). Quality sustainability reporting enhances transparency and investor confidence, positively impacting liquidity (Al-Shaer, 2020). In emerging markets, sustainable practices like reducing carbon emissions can lower the cost of equity, improving liquidity by boosting investor confidence and reducing perceived risk (Garzón & Zorio, 2021).

Hypothesis 3: Liquidity has a significant effect on environmental disclosures.

### **Profitability**

Profitability measures a company's ability to generate profits relative to its expenses and investments (De et al., 2020). Evaluating performance requires considering both financial metrics and ESG factors. Research shows that high ESG environmental pillar scores can lead to better performance, with portfolios outperforming low-score ones by up to 2.51% monthly (Chandra et al., 2021). In industries like healthcare, the environmental pillar boosts firm value, while governance and social pillars can enhance profitability (Nanna, 2021; Kuo et al., 2022). However, the impact of ESG pillars on operational performance varies by industry and region (Abu, 2024; Khoury et al., 2021).

Hypothesis 4: Profitability has a significant effect on environmental disclosures.

### **Stakeholder Engagement Score**

Stakeholder engagement score measures on effective organizations involve stakeholders in activities and decision-making (Panda & Sangle, 2019). Active stakeholder engagement promotes environmental sustainability through practices like green supply chain management and effective communication, leading to improved environmental performance (Dzomonda, 2020; Jang, 2020). It also enhances sustainability reporting by aligning stakeholder concerns with strategic goals and metrics, fostering consistent prioritization of sustainability across the supply chain (Kaur & Lodhia, 2018; Reynolds, 2024).

It is crucial for sustainability reporting, particularly among Fortune Global 500 companies (Ardiana, 2021). It drives dialogic change and enhances sustainability practices, contributing to positive environmental outcomes (Gonzalez et al., 2021; Matikainen, 2022). The Triple Bottom Line framework underscores the role of engagement in advancing corporate sustainability (Mushtaq, 2023). Additionally, environmental pillar scores within ESG frameworks significantly influence stock returns, highlighting the financial relevance of environmental performance (Laokulrach, 2022).



Hypothesis 5: Stakeholder engagement score has a significant effect on environmental disclosures.

## Methodology

### Research Design

This study employs a quantitative research design to objectively assess the impact of firm characteristics on environmental disclosure among Malaysian companies participating in ESG green initiatives. This approach facilitates statistical testing of relationships between variables and supports an empirical analysis of the key determinants of environmental disclosure. By concentrating on Malaysian corporations listed on Bursa Malaysia from 2020 to 2024, the research offers insights that are particularly relevant to the Malaysian context.

### Data Collection

This study examines how firm size, leverage, liquidity, profitability, and stakeholder engagement affect the score on environmental disclosure of Malaysian companies involved in ESG green initiatives. The environmental disclosure is evaluated using the environmental pillar score as the dependent variable. The focus is on Malaysian corporate companies that are actively engaged in ESG green initiatives and listed on Bursa Malaysia from 2020 to 2024. The sample comprises 357 companies that meet the criteria of being publicly listed by 2024. Panel data regression, which combines time series and cross-sectional data to capture variations across companies and over time, is used for analysis. The data is sourced from the Eikon DataStream database, with firm selection based on data availability during the sample period to ensure recent information is included. Purposive sampling is used to select participants, as outlined by Campbell et al. (2020), where samples are chosen based on specific predetermined criteria. This method aims to ensure the sample accurately represents the relevant population and aligns with the research objectives (Sitio et al., 2023). The sampling criteria for this study are as follows:

**Table 1: Sampling Criteria**

No	Criteria	Amount
1.	Number of corporate companies listed on the Bursa Malaysia in 2024	1055
2.	Exclude the number of non-active corporate companies listed on the Bursa Malaysia within the period 2020-2024.	(21)
3.	Exclude the number green initiatives of corporate companies listed on the Bursa Malaysia that do not disclosed EPS within the period 2020-2024.	(677)
	Number of Samples	357

### Data Types and Data Sources

This research is based on quantitative data, which refers to data obtained through observations or measurements and expressed numerically (Sitio et al., 2023). Quantitative data can be categorized into different types based on time classification, such as time-series data, cross-section data, and panel data. For this study, panel data is used, which combines both time series and cross-sectional data. This study utilizes Eikon DataStream as a source of secondary data. The specific data source for this study is publicly listed companies on Bursa Malaysia that engaged with ESG green initiatives from 2020 to 2024.

### Variable Measurement

In this study, the dependent variable, Environmental Disclosure Score, is derived from the Environmental Pillar Score in the Eikon DataStream database. This score indicates each company's transparency in reporting environmental practices, policies, and impacts, with higher scores signifying more comprehensive disclosures. The independent variables include

Firm Size, Leverage, Liquidity, Profitability, and Stakeholder Engagement Score. Firm Size (SIZE) is determined by the company's total assets or market capitalization, reflecting the scale of its resources. Leverage is measured using the Debt-to-Equity Ratio (DER), which captures the extent to which a company relies on debt compared to equity. Liquidity is represented by the Current Ratio (CR), calculated as current assets divided by current liabilities, indicating the company's ability to meet short-term obligations. Profitability is assessed through Operating Income (OROA), which offers insight into the company's core operational efficiency. Lastly, the Stakeholder Engagement Score (YES), also sourced from Eikon DataStream, reflects the company's efforts to engage with stakeholders on sustainability issues. These measurements provide consistent and reliable data, ensuring accuracy in the subsequent analysis.

### Data Analysis

This study employs descriptive statistics and multiple regression analysis for data analysis. The analysis was conducted using Econometric Views (EViews) version 13. Prior to hypothesis testing, classical assumptions were checked, including: (1) normality test; (2) multicollinearity test; (3) heteroscedasticity test. Model feasibility is assessed through: (1) the Chow test; (2) the Hausman test; (3) the Lagrange multiplier test. Following the classical assumption and model feasibility tests, partial and simultaneous hypothesis testing were performed using the t test and F test. The data analysis technique used is panel data regression, which integrates time series and cross-sectional data.

According to Anuja (2023), panel data regression offers several advantages over using only time series or cross-sectional data. The key benefit is that it provides more comprehensive data by merging these two types of data. This study utilizes multiple regression analysis to test and explain the impact of each research variable (Olive, 2017). The analysis aims to determine the effect of the independent variables: liquidity, leverage, firm size, and profitability on financial distress, both collectively and individually. The panel data regression model applied in this study is as follows shown in Eq. (1):

$$Y = \beta_0 + b_1X_{1i-t} + b_2X_{2i-t} - b_3X_{3i-t} - b_4X_{4i-t} + b_5X_{5i-t} + e_{i-t} \quad (1)$$

Information:

Y – Environmental Disclosure (EPS)

$\beta_0$  - constant  $b_1$ - $b_5$  - regression coefficient

$X_1$  - Firm Size (SIZE) in unit i in period t

$X_2$  - Leverage (DER) on unit i in period t

$X_3$  - Liquidity (CR) in unit i in period t

$X_4$  - Profitability (OROA) in unit i in period t

$X_5$  - Stakeholder Engagement Score (YES) in unit i in period t

e - error term in unit i in period t

## Result and Discussion

### Descriptive Analysis

Descriptive analysis and sample data research aim to characterize the company's status using measurement tools aligned with the specified research variables. According to Table 2, the sample comprises 357 observations, resulting in a total of 1,785 data points. The Environmental Disclosures (Y), as the dependent variable, ranges from a minimum of 0.00000 to a maximum of 94.47, with an average of 17.80 and a standard deviation of 23.49. The independent variable Firm Size (X1) has values ranging from 0.01 to 262.00, with an average of 109.00 and a standard deviation of 267.00. The Leverage variable (X2) ranges from 0.00 to 125.62, with an average of 0.76 and a standard deviation of 3.53. The Liquidity variable (X3) ranges from 0.33 to 15.16, with an average of 2.864063 and a standard deviation of 0.23. The Profitability (X4) variable ranges from -0.00 to 0.00, with an average value of 0.00 and a standard deviation of 0.00. The Stakeholder Engagement Score variable (X5) ranges from 0.00 to 54.21, with an average of 27.28 and a standard deviation of 26.50.

**Table 2: Descriptive Statistics**

	SIZE	DER	CR	OROA	YES	EPS
Mean	109.0000	0.76044	0.00000	57250141.00	27.28932	17.80153
Maximum	262.0000	125.625	0.00000	0.000000007	54.21000	94.47750
Minimum	0.010920	0.00000	0.00000	-0.000000008	0.000000	0.000000
Std. Dev.	267.0000	3.53737	0.00000	0.000000032	26.50726	23.49474
Observations	1785	1785	1785	1785	1785	1785

### Unit Root Test

Conducting a unit root test is essential to check for stationarity in the data, as it helps prevent spurious results in regression analysis, which is crucial for drawing reliable inferences (Herranz, E., 2017). Table 3 below presents the results of the panel unit root test, showing that all probability values are 0.0000. This indicates statistical significance at common thresholds, confirming that each variable is stationary at level.

**Table 3: Panel Unit Root Test**

Assumes common unit root process			Assumes individual unit root process			
Variables	Levin, Lin & Chu t*	Prob.	ADF – Fisher Chi-square	Prob.	PP – Fisher Chi-square	Prob.
SIZE	-52.632	0.0000	1198.74	0.0000	1686.66	0.0000
DER	-187.602	0.0000	931.194	0.0000	1166.72	0.0000
CR	-44.1613	0.0000	872.603	0.0000	1072.91	0.0000
OROA	-59.4509	0.0000	823.089	0.0000	974.749	0.0000
YES	-151.811	0.0000	888.225	0.0000	892.821	0.0000
EPS	-3.68416	0.0000	291.646	0.0000	322.636	0.0000

As a result, the data used for these variables is free from unit roots, ensuring stability in the time series properties. This stability supports the reliability of the information derived from the panel data on Malaysian publicly listed companies engaged in environmental disclosures, thereby minimizing the risk of spurious regression results.

### Panel Data Regression Model Selection

This study employs a panel data regression approach, utilizing three models: the common effects model (CEM), fixed effects model (FEM), and random effects model (REM). According to Basuki and Prawoto (2023), after selecting the panel data regression method, identifying the most appropriate model requires conducting a series of three paired tests for model selection.

### Common Effect with Fixed Effect (Chow Test)

The Chow test is used to determine the most suitable model for panel data regression estimation, specifically to choose between the common effects model and the fixed effects model. Based on Table 4, the probability value (Prob.) for the Chi-square cross-section is 0.0000, which is less than 0.05. Therefore, the fixed-effect model is more appropriate than the common effect model. Since the fixed-effect model has been selected, the Lagrangian Multiplier Test is not necessary (Li, Z., & Yao, J., 2021).

**Table 4: Chow Test Effects Test**

Effects Test	Statistic	d.f.	Prob.
Cross-section F	4.977292	(356,1423)	0.0000
Cross-section Chi-square	1443.696233	356	0.0000

### Fixed Effect with Random Effect (Hausman Test)

The Hausman test is employed to identify the most appropriate model for estimating a panel data regression, specifically comparing the fixed effects model to the random effects model. As presented in Table 5, the probability value is 0.0000, which is below the 0.05 threshold. This outcome suggests that the fixed effects model is the preferred option.

**Table 5: Hausman Test**

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	106.848746	5	0.0000

### Model Conclusion

Based on the results of the three tests conducted, it can be concluded that the Fixed Effects Model (FEM) is the appropriate panel data regression model to be used for hypothesis testing and the panel data regression equation.

**Table 6. Panel Data Regression Model Selection**

No	Method	Testing	Result
1	Chow Test	CEM with FEM	FEM
2	Hausman Test	REM with FEM	FEM
3	Lagrangian Multiplier Test	CEM with REM	-

### Fixed Effect Model Test Result

Table 7 presents the results of the Fixed Effects Model, which demonstrates a strong fit with an R-squared value of 0.7788. This indicates that approximately 77.88% of the variance in the dependent variable is explained by the model. The SIZE, OROA, and YES variables are statistically significant, evidenced by their low p-values, suggesting they have a meaningful impact on the dependent variable. Notably, SIZE has a small but significant negative effect, while OROA and YES exhibit positive impacts, with YES being highly significant.

**Table 7. Test Results for Fixed Effect Model**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	55.1330	13.00376	4.2397	0.0000
SIZE	-0.0000	0.0000	-3.6543	0.0003
DER	-0.0400	0.0990	-0.4037	0.6865
CR	0.0000	0.0000	1.0730	0.2834
OROA	0.0000	0.0000	2.1397	0.0325
YES	0.3492	0.0128	27.2852	0.0000
Cross-section fixed (dummy variables)				
R-squared	0.7788	Mean dependent var		17.8015
Adjusted R-squared	0.7226	S.D. dependent var		23.4947
S.E. of regression	12.3722	Akaike info criterion		8.0477
Sum squared resid	217822.7000	Schwarz criterion		9.1605
Log likelihood	-6820.6100	Hannan-Quinn criter.		8.4586
F-statistic	13.8791	Durbin-Watson stat		1.8481
Prob(F-statistic)	0.0000			

In contrast, the DER and CR variables are not statistically significant, implying a lack of substantial influence on the dependent variable in this model. The F-statistics are significant at the 1% level (p-value of 0.0000), confirming the overall validity of the model. Additionally, model selection criteria such as AIC, BIC, and Hannan-Quinn further support the model's fit. The Durbin-Watson statistics of 1.8480 indicate no issues with autocorrelation, suggesting reliable regression results. Overall, the Fixed Effects Model is robust and suitable for hypothesis testing in this analysis. The model is formulated Eq. 2 as follows:

$$\text{EPS} = 55.1330 - 0.0000 (\text{SIZE}) - 0.0400 (\text{DER}) + 0.0000 (\text{CR}) + 0.0000 (\text{OROA}) + 0.3492 (\text{YES}) + e \quad (2)$$

Based on the multiple regression equations, the following conclusions can be drawn:

- SIZE has a negative coefficient (-0.0000) and is statistically significant ( $p = 0.0003$ ), indicating a slight decrease in EPS as SIZE increases, possibly due to scale inefficiencies or higher operational costs.
- OROA has a positive coefficient (0.0000) and is significant ( $p = 0.0325$ ), showing that better operational efficiency marginally increases EPS.
- YES has a substantial positive coefficient (0.3492) with high significance ( $p = 0.0000$ ), indicating a strong and meaningful impact on EPS.
- DER has a negative coefficient (-0.0400) but is not significant ( $p = 0.6865$ ), suggesting no meaningful effect on EPS.



e. CR has a positive coefficient (0.0000) but is not significant ( $p = 0.2834$ ), showing that liquidity does not significantly influence EPS.

### Hypothesis test

The F-test results (F-count = 13.8791,  $p = 0.0000$ ) indicate that firm size, leverage, liquidity, profitability, and stakeholder engagement collectively impact environmental disclosure, leading to the rejection of  $H_0$  and acceptance of  $H_1$ - $H_5$ . For Firm Size ( $X_1$ ), the t-test value (3.6543,  $p = 0.0003$ ) shows a significant positive effect on environmental disclosures, with larger firms more likely to disclose due to increased scrutiny. Leverage ( $X_2$ ) shows no significant effect ( $t = 0.4037$ ,  $p = 0.6865$ ), contradicting previous findings. Liquidity ( $X_3$ ) also has no significant effect ( $t = 1.0731$ ,  $p > 0.05$ ), opposing other studies. Profitability ( $X_4$ ) significantly influences environmental disclosures ( $t = 2.1397$ ,  $p < 0.05$ ), as higher profitability enhances transparency. Stakeholder Engagement ( $X_5$ ) has a strong positive impact ( $t = 27.2852$ ,  $p < 0.05$ ), confirming that greater engagement leads to more transparency in reporting. The model's  $R^2$  value is 0.7226, indicating that 72.26% of the variation in environmental disclosure is explained by the independent variables.

### Conclusion

Based on the research and hypothesis testing reveal that firm size, leverage, liquidity, profitability, and stakeholder engagement score collectively exert a significant influence on the environmental disclosure scores of ESG green initiative companies listed on Bursa Malaysia for the period 2020 to 2024. Profitability and stakeholder engagement individually demonstrate a significant positive impact on these disclosure scores, indicating that more profitable entities and those actively engaging with stakeholders are more likely to provide comprehensive environmental information. Conversely, firm size shows a partially negative and significant effect on environmental disclosures, while leverage and liquidity do not have a significant impact, suggesting that financial leverage and liquidity levels may not directly affect the extent of environmental reporting. The model's Adjusted R Square value of 0.7227 suggests that these variables collectively explain approximately 72.27% of the variation in environmental disclosure scores, underscoring their substantial role in shaping the level of environmental reporting among these companies.

### Recommendations

This study recommends that companies aiming to enhance their environmental disclosures prioritize stakeholder engagement and align their profitability goals with sustainable practices. Future research could further investigate the complex role of firm size in environmental disclosure, potentially examining on industry type, regulatory requirements, or corporate governance practices influence this relationship. Additionally, exploring other factors, such as board diversity or levels of innovation, could provide a more comprehensive understanding of the elements affecting environmental transparency within ESG frameworks.

### Limitations of the Study

These findings align with previous literature that highlight profitability and stakeholder engagement as key drivers of improved environmental transparency. However, the observed partial negative effect of firm size indicates that larger companies may encounter unique challenges or pressures in meeting environmental disclosure expectations. This result is consistent with studies that address corporate visibility and regulatory scrutiny. It is important

to note that this study is limited by its focus on companies listed on Bursa Malaysia, which may not be representative of ESG green initiative companies in other regions or markets.

### Acknowledgement

This research was supported by funding from the Institute of Graduate Studies (IPSis) at Universiti Teknologi MARA (UiTM) through the Conference Support Fund (CFS). Sincere gratitude is extended to IPSis for their generous support, which has been instrumental in facilitating this research.

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