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Article

The Big 4 audit dilemma: Board characteristics, audit quality, and sustainability disclosure in Malaysian companies

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Abstract: Our study investigates the relationship between firm profitability, board characteristics, and the quality of sustainability disclosures, while examining the moderating effects of financial leverage and external audit assurance. A key focus is the distinction between Big 4 and non-Big 4 audit firms. Using data from Malaysia's top 100 publicly listed organizations from 2018 to 2020, we analyze sustainability reports based on the Global Reporting Initiative (GRI) standards. Unexpectedly, our results indicate a negative association between firm profitability and board characteristics, challenging traditional assumptions. We find that non-Big 4 audit firms significantly enhance sustainability disclosure quality, contradicting the widely held belief in the superiority of Big 4 firms. Our finding introduces the "Big 4 dilemma" in the Malaysian context and calls for a reassessment of audit firm selection practices. Our study offers new perspectives on the strategic role of board composition and audit firm selection in advancing sustainability disclosures, urging Malaysian organizations to evaluate audit firms on criteria beyond the global prestige of Big 4 firms to improve sustainability reporting.

Keywords: Big 4 firms; firm profitability; board characteristics; sustainability disclosure quality; financial leverage; external audit assurance; Malaysia

1. Introduction

Sustainability reporting has transitioned from a voluntary initiative to a strategic necessity in the corporate world (Fernandez-Feijoo et al., 2014). It serves as an important means for organizations to disclose their environmental, social, and governance (ESG) practices, satisfying the rising expectations of stakeholders, including investors and the public (Yen-Yen, 2019). This shift highlights the growing importance of transparency and accountability in corporate operations, reflecting a broader change where ethical and sustainable business practices are now benchmarks for success (Giacomini et al., 2020; Garcia-Sanchez et al., 2016; Pan et al., 2022). In sustainability reporting, environmental disclosures include issues such as carbon emissions, waste management, and resource conservation (Green and Zhou, 2013), signaling an organization's dedication to environmental stewardship. Social disclosures involve labor practices, community engagement, and human rights (Hussain et al., 2018), while governance disclosures focus on corporate practices like board diversity and ethical behavior (Deegan and Kamal, 2013). The importance of these disclosures has elevated the need for robust audit mechanisms to ensure the credibility of sustainability reports, reinforcing stakeholders' trust in the disclosed information.

Despite the heightened focus on sustainability reporting, variations in the quality of disclosures remain widespread (Thun and Zülch, 2023). These inconsistencies raise important questions about what factors drive the comprehensiveness, accuracy, and credibility of these reports (Roszkowska-Menkes et al., 2024). One area that has drawn significant academic interest is the role of board characteristics in influencing sustainability disclosure quality (Ashraf and Nazir, 2023; Cicchiello et al., 2021; Erin et al., 2022; Kiliç and Kuzey, 2019). However, research on the moderating role of external audit assurance—particularly comparing Big 4 audit firms with non-Big 4 firms—remains scarce. Our study seeks to address this gap by investigating whether Big 4 audit firms enhance the relationship between board characteristics and the quality of sustainability disclosures. Our research brings new perspectives into the mechanisms that ensure effective sustainability reporting.

In addition, our study goes beyond previous research by analyzing how firm profitability interacts with board characteristics in the context of sustainability reporting, considering the role of financial leverage. Understanding this relationship is important, as financial health is likely to affect how governance structures influence sustainability outcomes. By examining the connections between firm profitability, board characteristics, external audit assurance, and sustainability disclosure quality, our research aims to fill significant gaps in the literature. We provide new perspectives that have practical implications for corporate governance and policy development. Specifically, our findings challenge conventional beliefs regarding Big 4 audit firms and suggest that firms may benefit from re-evaluating their criteria for audit firm selection, especially when aiming to improve sustainability reporting practices. Following this introduction, we present a review of the relevant literature, followed by the development of hypotheses. A detailed description of the methodology used for data collection and analysis is provided. The results section offers an analysis of the findings, exploring the relationships between the variables, and the discussion section provides theoretical and practical implications, concluding with recommendations for future research.

2. Literature review and hypotheses development

2.1. Firm profitability and board characteristics

Research has established a link between board characteristics and organizations' profitability (Vafaei et al., 2015). Agency theory explains the relationship between principals (shareholders) and agents (managers) within an organization. Conflicts of interest between these parties can lead to agency costs, particularly in highly profitable organizations where managers might have substantial resources at their disposal. This situation could result in the misallocation or misuse of resources, such as excessive executive compensation or investments in projects that primarily benefit managers rather than maximizing shareholder value. The composition and characteristics of the board are important in addressing these challenges. A well-composed board serves as an effective monitoring mechanism, reducing the risk of resource misallocation by ensuring that managerial actions align with shareholder interests. Diverse and skilled board members bring varied perspectives and expertise, enhancing the board's ability to oversee management effectively. Hence, we propose that board characteristics are

essential for ensuring that the organization's resources, particularly those derived from profitability, are utilized efficiently and in ways that promote long-term growth and shareholder value.

Stewardship theory further reinforces this relationship by positing that when executives are entrusted with significant resources, they act as stewards of the organization's assets, prioritizing the long-term success of the company over personal gains (Davis et al., 1997). In this perspective, profitability not only provides resources but also signals trust and support from shareholders, promoting a more collaborative relationship between the board and management. Stewardship theory complements agency theory by suggesting that, under conditions of high profitability, the board is more likely to cultivate a governance environment that aligns both managerial and shareholder interests, thereby enhancing overall firm performance.

In addition, the resource dependency theory posits that profitable organizations can leverage their financial success to attract and retain board members with valuable external connections and expertise, further strengthening the organization's strategic capabilities and oversight functions (Pfeffer and Salancik, 1978). Profitable organizations are often perceived as prestigious and may offer greater resources or higher compensation to board members, making such positions more appealing to highly qualified individuals (Jensen, 1986). Hence, we hypothesize that the relationship between profitability and board characteristics transcends internal governance. It also involves the organizations' ability to secure external resources through strategic board appointments. As organizations become more profitable, they have greater resources for monitoring and enhanced avenues for strengthening their governance structures, thereby reducing agency costs and aligning managerial and shareholder interests (Eisenhardt, 1989). Based on this literature, we propose the following hypothesis:

H1: Firm profitability is positively related to board characteristics.

2.2. Board characteristics, environmental and social disclosure quality

Empirical studies (Agyemang et al., 2020; Bhatia and Marwaha, 2022; Bollas-Araya et al., 2019; Hameed et al., 2023) have shown the impact of board characteristics on sustainability disclosure. The composition and diversity of the board significantly influence how an organization responds to stakeholder pressures and societal expectations, ultimately shaping the quality and transparency of its sustainability disclosures (Bear et al., 2010). This relationship can be explained through stakeholder theory, which stresses the importance of managing relationships with various stakeholders, including investors, customers, employees, and the community. Stakeholders are increasingly concerned about environmental impacts, prompting organizations to disclose more information about their sustainability initiatives (Jamali, 2008). High-quality environmental disclosures signal the organization's commitment to environmental stewardship and sustainability, contributing to stakeholder trust and legitimacy. Stakeholder theory theorizes that organizations are obligated to both internal and external stakeholders and must address stakeholders' interests and concerns to maintain legitimacy and ensure survival (Freeman, 2010). Besides, legitimacy theory complements this view by suggesting that organizations

seek to legitimize their actions and decisions to align with societal norms and expectations, particularly in their environmental disclosures (Suchman, 1995). We hypothesize that a diverse board can better understand and engage with these stakeholders, leading to enhanced environmental disclosure practices. Boards with diverse characteristics, including gender, ethnicity, and professional background, bring a range of perspectives and understandings of social and environmental issues. This diversity enhances the board's ability to oversee and guide the organization's environmental reporting practices, ensuring that disclosures are comprehensive, accurate, and reflective of actual environmental performance.

Moreover, board members with specific expertise in environmental matters or sustainability can further enhance the quality of environmental disclosures. Their knowledge and experience contribute to more informed decision-making regarding what to disclose and how to address stakeholder concerns effectively, particularly in industries where environmental issues are pronounced, and regulatory pressures for transparency are high. Accordingly, we hypothesize as below:

H2: Board characteristics positively affect environmental disclosure quality.

Stakeholders are increasingly evaluating organizations based on their social performance, extending beyond environmental practices to include aspects such as labor practices and community engagement. High-quality social disclosures provide insights into the organization's social practices, policies, and performance, serving as an important mechanism for building trust and legitimacy among stakeholders. Empirical evidence supports this notion, with studies demonstrating the significant impact of board characteristics on sustainability disclosure (Agyemang et al., 2020; Bhatia and Marwaha, 2022; Bollas-Araya et al., 2019; Hameed et al., 2023). Boards with diversity, encompassing not only demographic factors but also a broad range of skills and experiences, are better equipped to comprehend the social issues confronting organizations in contemporary society. Such boards are more likely to recognize the importance of social disclosures in managing stakeholder relationships and safeguarding the organization's reputation.

Moreover, boards with members who have experience in social issues or community relations can offer valuable insights and guidance on best practices in social reporting. They can help ensure that the organization's social disclosures are not just compliant with regulations but also meaningful to stakeholders, reflecting a genuine commitment to social responsibility and ethical practices. This notion is further supported by resource dependency theory, which posits that diverse boards can provide access to key resources, including knowledge and networks, that are essential for addressing complex social issues (Pfeffer and Salancik, 1978). Based on stakeholder theory and resource dependency theory, we propose the following hypothesis:

H3: Board characteristics positively affect social disclosure quality.

2.3. Financial leverage as a moderator between firm profitability and board characteristics

Financial leverage, reflecting an organization's reliance on debt to finance its operations, is a key determinant of corporate governance. According to agency theory,

debt can impose discipline on corporate managers, necessitating heightened oversight and governance to mitigate associated risks, including the risk of financial distress. The presence of significant debt alters the link between firm profitability and board characteristics. While profitable organizations may attract and retain high-quality boards, the addition of financial leverage introduces complexity, requiring stringent monitoring to ensure sustainable profitability. Furthermore, organizations with higher financial leverage may prioritize board characteristics that enhance credibility and reassure creditors, such as financial expertise and experience in managing leveraged situations. Hence, we expect that financial leverage could amplify the positive relationship between organizational profitability and the pursuit of enhanced board characteristics, as organizations seek to balance profitability benefits with demands and risks associated with high leverage.

The concept of financial leverage as a mechanism is further supported by the pecking order theory, which suggests that organizations with higher leverage may face greater scrutiny from external stakeholders, including creditors, who may demand stronger governance structures (Majluf and Myers, 1984). In such scenarios, organizations are likely to strengthen their board composition to demonstrate their commitment to sound financial management and to mitigate the risk associated with high debt levels. This theory complements agency theory by providing an additional perspective on how financial leverage can influence the governance decisions of profitable organizations.

Resource dependency theory offers further insight by positing that organizations with substantial financial leverage must secure external resources, such as favorable credit terms or refinancing opportunities, which are more accessible when the organization's board includes members with financial expertise and connections in the industry (Pfeffer and Salancik, 1978). We, therefore, suggest that financial leverage could strengthen internal governance and encourage organizations to strategically enhance board characteristics to navigate the challenges posed by high debt. Based on this rationale, we propose the following hypothesis:

H4: Financial leverage moderates the relationship between firm profitability and board characteristics, such that the relationship between firm profitability and Board characteristics is strengthened when financial leverage is high.

2.4. The moderating role of external assurance of audit quality on board characteristics and sustainability disclosure quality

Audit quality, often considered an assurance of high financial reporting quality, represents a continuum of constructs aimed at enhancing the credibility of financial statements. This enhancement facilitates a clearer and more accurate depiction of firms' operational and managerial status, aiding investors and creditors in making informed economic and financial decisions (Defond and Zhang, 2014). Given the criticality of audit quality, various means, approaches, and strategies are employed to ensure its efficacy. One such focus of our study is external assurance, typically provided by auditing service providers external to the firms. In Malaysia, where regulatory and corporate governance increasingly emphasizes credible sustainability reporting (Securities Commission Malaysia, 2017), the choice of auditor assumes

strategic significance, signifying a firm's commitment to high standards of disclosure and accountability. The engagement of Big 4 firms—comprising Deloitte, PwC, Ernst andYoung, and KPMG—as auditors is often viewed as a means of external assurance regarding audit quality, whether in public (Defond and Zhang, 2014; Howard et al., 2023) or private firms (Schelleman and Vanstraelen, 2017), a phenomenon commonly referred to as the Big 4 effect. Even auditors with experience in Big 4 firms are associated with higher audit quality (Zimmerman et al., 2021). The superior incentives and monitoring mechanisms of Big 4 firms contribute to their audit quality. In comparison, auditors from non-Big 4 firms with better audit competence and performance are more likely to be accepted by Big 4 firms, often through switching or being poached, thereby benefiting from enhanced learning experiences that can enhance their audit quality (Che et al., 2020).

According to legitimacy theory, organizations legitimize their operations and communications with stakeholders through various means (Suchman, 1995), including external assurances. High-quality sustainability reporting, therefore, can be viewed as an attempt by firms to legitimize their operations and strategies in the eyes of stakeholders, showcasing their commitment to ESG (Deegan, 2002). Engagement of prestigious external auditors, particularly Big 4 firms, signals quality and reliability to stakeholders, strengthening the firm's legitimacy, especially in its reporting practices. In the context of environmental and social disclosures, the role of the board is important in ensuring the accuracy and transparency of reported information. However, the engagement of Big 4 auditors could further fortify this relationship by imparting additional credibility and assurance to the disclosures. This becomes particularly pertinent given the escalating scrutiny and skepticism surrounding corporate sustainability reports. External assurance can act as a potential mechanism amplifying the positive impact of robust board characteristics on disclosure quality, ensuring that the disclosures are well-prepared and also carry the weight of external validation.

Further theoretical support for this moderating role is provided by Signal Theory, which posits that firms use external assurance as a signaling mechanism to convey the credibility and quality of their disclosures to stakeholders (Spence, 1973). The engagement of a reputable external auditor, particularly from the Big 4, serves as a strong signal of the firm's commitment to transparency and high-quality reporting. This signaling effect is especially important in the realm of sustainability disclosures, where stakeholders may be particularly skeptical of the information provided. By securing external assurance from a Big 4 firm, organizations can enhance the perceived reliability of their disclosures, thereby reinforcing the positive impact of board characteristics on both environmental and social disclosure quality. Therefore, we hypothesize the following:

H5a: External assurance of audit quality positively moderates the effect of board characteristics on environmental disclosure quality, with a stronger impact facilitated by the additional external assurance of audit quality offered by Big 4 firms.

H5b: External assurance of audit quality positively moderates the effect of board characteristics on social disclosure quality, with a stronger impact facilitated by the additional external assurance of audit quality provided by Big 4 firms.

Figure 1 presents our research model.

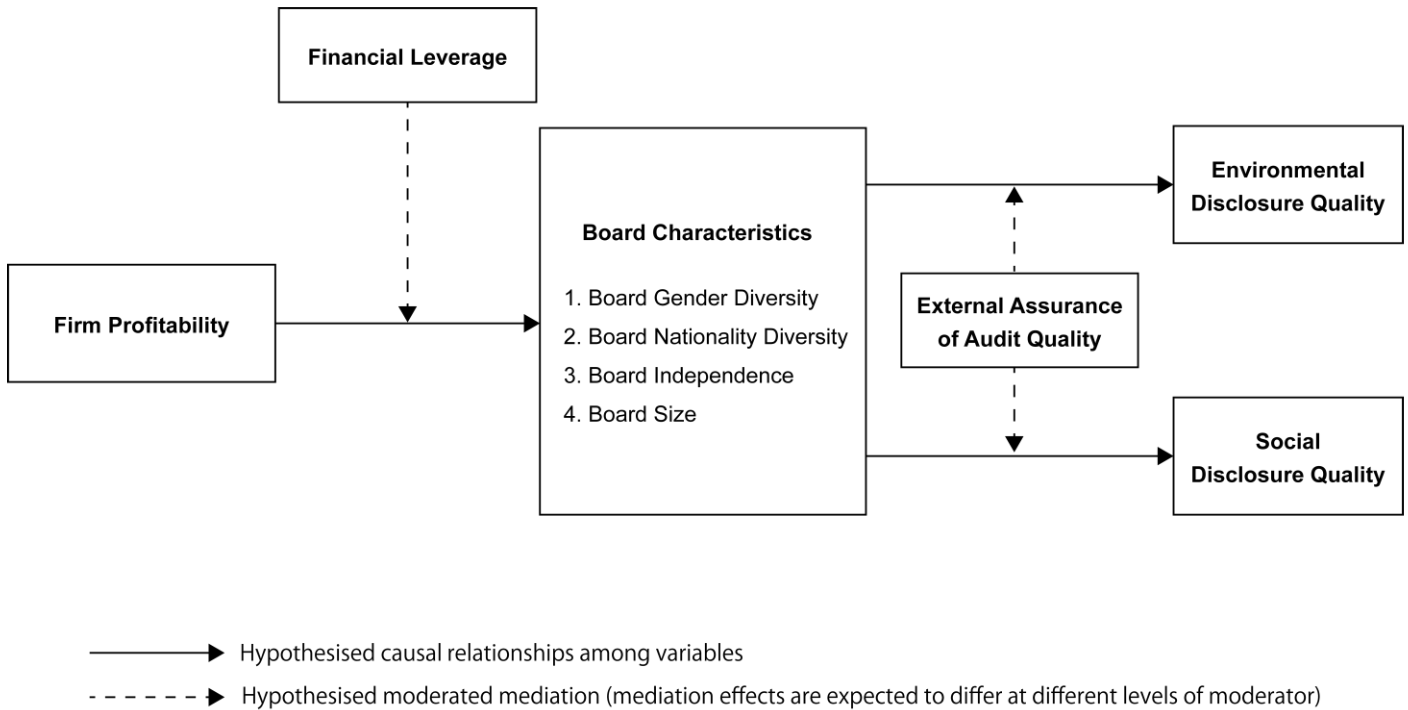

Figure 1. Our research model.

3. Method

3.1. Sample and procedure

This dataset includes a total of 300 firm-year observations collected over three years, specifically from 2018 to 2020. The selection criteria focused on organizations with the highest market capitalization in Malaysia during this period, ensuring the inclusion of organizations that are key players in the market. By including all the top 100 organizations based on market capitalization, we adopted a comprehensive sampling approach that helps to minimize selection bias. This approach captured a diverse range of industries and corporate practices, enhancing the representativeness of the sample.

The selected organizations represent a diverse range of industries, allowing for an in-depth examination of corporate practices across various sectors. The industry distribution is as follows: energy ($N = 4$), financial services ($N = 14$), healthcare ($N = 5$), industrial products and services ($N = 9$), plantation ($N = 9$), telecommunications and media ($N = 6$), transportation and logistics ($N = 6$), real estate ($N = 5$), construction ($N = 3$), consumer products and services ($N = 24$), property ($N = 7$), technology ($N = 2$), and utilities ($N = 6$). This broad industry representation enhances the generalizability of our findings by capturing a wide spectrum of corporate behaviors and practices.

For financial data from the years 2018 and 2019, we utilized restated figures from subsequent reports, ensuring accuracy and consistency in our analysis. To further address potential reporting bias, we implemented a triangulation method by cross-referencing information from multiple sources, including third-party sustainability assessments and independent audits of the organizations' reports. This verification process significantly enhances the reliability of the data collected. Through these

selection criteria and diverse industry representation, we aim to provide an examination of corporate practices and their implications for environmental disclosure quality.

3.2. Measures

3.2.1. Firm profitability

Based on previous studies (Christensen et al., 2010; Dhaliwal et al., 2011; Le et al., 2020), we employed return on assets (ROA) and return on equity (ROE) to represent firm profitability. This utilization of both as measures of firm profitability is predicated on their complementary insights into financial performance. ROA offers a perspective on how efficiently a firm utilizes its assets to generate profit, reflecting operational effectiveness independent of capital structure. In contrast, ROE provides a gauge of the financial return on shareholders' equity, encapsulating the firm's capacity to generate earnings from investors' capital, thereby presenting a holistic view of profitability that encompasses both operational efficiency and financial leverage.

3.2.2. Board characteristics

We operationalize the following board characteristics to ensure consistency and comparability across organizations:

Board gender diversity. Measured as the ratio of the number of women on the board to the total board size. Board gender diversity is widely used in corporate governance literature as a measure, helping to evaluate the impact of gender diversity on governance outcomes and audit quality (Disli et al., 2022; Mahmood and Orazlin, 2021).

Board independence. The board independence ratio is defined as the number of independent directors divided by the total board size. Independent directors play a key role in enhancing audit quality and corporate governance, as supported by the literature (Disli et al., 2022; Mahmood and Orazlin, 2021).

Board nationality diversity. We calculate the board nationality diversity ratio as the proportion of non-Malaysian directors on the board, divided by the total board size. This measure is justified as it accounts for the influence of cross-national board composition on governance practices, particularly in multinational organizations (Chen and Hao, 2022).

Board size. Board size is operationalized as the total number of directors on the board, with the natural logarithm applied to account for differences in firm sizes and to mitigate the effects of outliers. This board characteristic is often used in corporate governance literature (Disli et al., 2022).

For the purpose of our analysis, we only include regular directors as formal board members. Non-regular directors, such as alternate directors, are excluded from our analysis. In addition, Malaysian citizens holding formal Malaysian nationality and permanent residency are not considered when measuring board nationality diversity.

3.2.3. Financial leverage

We operationalize financial leverage using the debt-to-assets ratio, calculated as the total debt divided by total assets. This measure, widely utilized in financial

research (Doocheol and Ghosh, 2005), is chosen for its ability to capture the extent of an organization's reliance on debt financing.

3.2.4. Environmental and social disclosure quality

Environmental disclosure quality and social disclosure quality are computed after evaluating 300 firm-year sustainability reports (both standalone and as a part of other reports). We employed content analysis based on the metric of GRI standard (GRI 301–308 and GRI 401–419) to make the evaluation, referring to the evaluation process revealed in the data paper of Rosman et al. (2023), which utilized a binary mechanism of scoring for each item, marking as "1" an organization demonstrated a particular sustainability attribute and "0" if otherwise and then summed up to get the total scores. Two separate authors, each leading a research team, conducted this evaluation individually, and a standalone discussion would be held to solve the discrepancies in the evaluation.

3.2.5. External assurance of audit quality

The authors measure the external assurance of audit quality (EAAQ) by identifying if a firm hires any of the Big 4 firms as their external auditor. Hence, a dummy variable is utilized, where EAAQ = 1 if the external auditing of a firm was provided by a Big 4 firm while EAAQ = 0 if it was not.

3.2.6. Control variables

In accordance with the recommended process for selecting appropriate control variables developed by Aguinis and Bernerth (2016) and taking into consideration the suggestions of Brannick and Spector (2011) regarding the use of statistical control variables, we included industry as a control variable. This decision was made to account for potential industry-specific effects that could influence corporate reporting and disclosure behaviors. By controlling for industry, we aimed to minimize the impact of industry-related factors on our analyses of the relationships between board characteristics, external audit quality, and disclosure quality.

3.2.7. Ethical considerations

While our research relies on secondary data, which does not involve direct interaction with participants, maintaining transparency and accuracy in the use of such data remains essential. We are committed to ethical research practices, ensuring that all data sources are appropriately cited and that the integrity of the data is upheld throughout our analysis.

4. Results

The key variable's mean, standard deviation and correlation are presented in **Table 1**. Board characteristics exhibited a positive correlation with Environmental disclosure quality ($r = 0.135$, $p < 0.05$) and social disclosure quality ($r = 0.159$, $p < 0.01$). External audit assurance showed a positive correlation with financial leverage ($r = 0.165$, $p < 0.01$) but a negative correlation with Environmental disclosure quality ($r = -0.156$, $p < 0.01$). In addition, social disclosure quality demonstrated a positive correlation with Environmental disclosure quality ($r = 0.725$, $p < 0.001$).

Table 1. Key variables' mean, standard deviation and correlations.

Variables	M	SD	1	2	3	4	5	6
Firm profitability	0.191	0.489	—					
Financial leverage	0.527	0.221	0.072	—				
Board characteristics	9.587	2.000	−0.079*	0.090	—			
External assurance of audit quality[a]	0.872	0.334	0.012	0.165**	0.087	—		
Environmental disclosure quality	18.785	24.870	−0.028	−0.090	0.135*	−0.156**	—	
Social disclosure quality	20.638	19.417	0.009	−0.047	0.159**	−0.067	0.725***	—

Note: [a] Dummy variable. 1 = employing any of Big 4 firm as their auditor, 0 = not employing Big 4 firm as their auditor. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

4.1. Test of full model effects

Figure 2 below presents the path coefficients of the Full Model. We employed SEM to test the model, incorporating bootstrapping (5000 samples) while controlling for industry effects. We chose SEM because SEM is particularly suited for testing complex relationships between multiple variables, allowing us to simultaneously examine direct and indirect effects among constructs. Given our research model, which includes various interrelated variables such as board characteristics, financial leverage, and environmental disclosure quality, SEM enables a comprehensive assessment of these relationships.

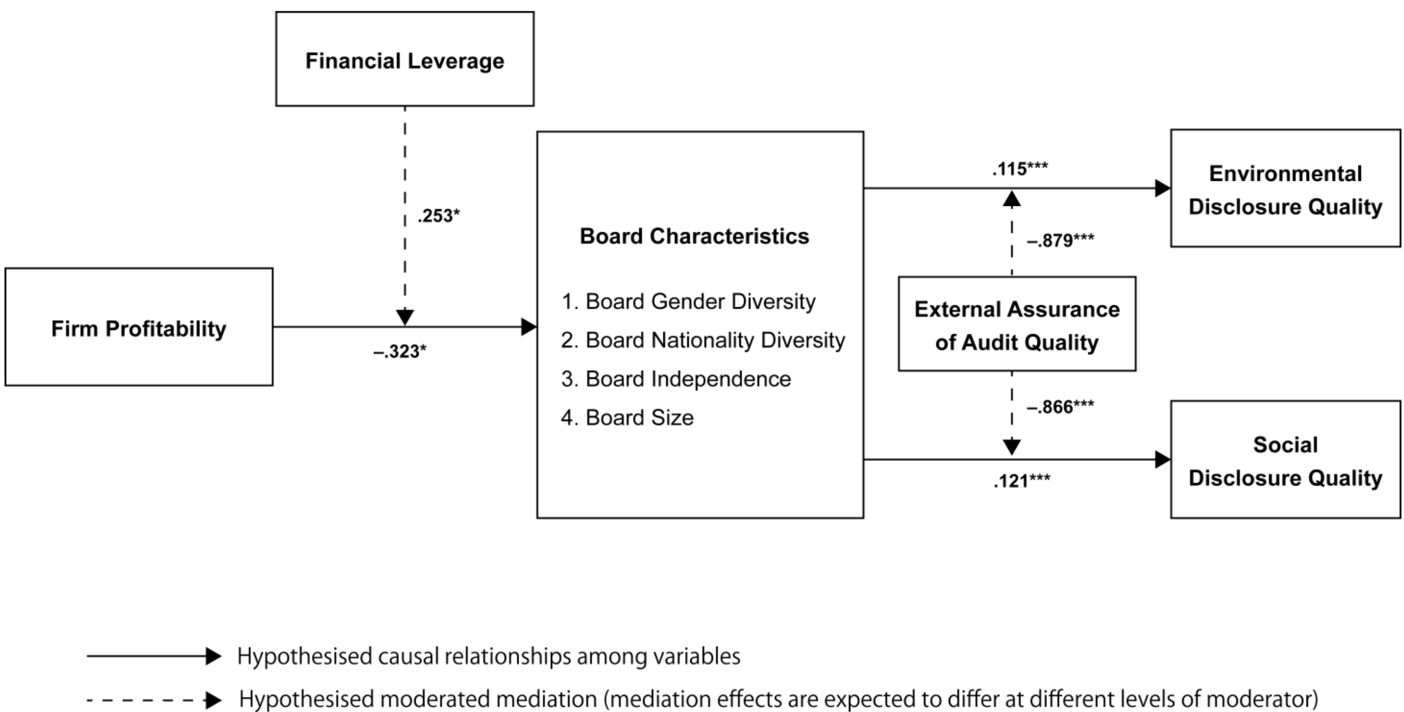

Figure 2. Path coefficients of the full model.

Note: Standardized coefficients are reported.

Contrary to expectations, firm profitability negatively predicts Board characteristics ($\beta = -0.323$, $p < 0.05$), and this relationship is strengthened by financial leverage ($\beta = 0.253$, $p < 0.05$), contradicting Hypothesis 1 (H1). Board characteristics positively influence environmental disclosure quality ($\beta = 0.115$, $p < 0.001$), although this relationship is weakened by external assurance of audit quality ($\beta = -0.879$, $p <$

0.001), supporting Hypothesis 2 (H2). Similarly, board characteristics positively affect social disclosure quality ($\beta = 0.121$, $p < 0.001$), but external assurance of audit quality attenuates this relationship ($\beta = −0.866$, $p < 0.001$), supporting Hypothesis 3 (H3). The results of the model are presented in **Table 2**.

Table 2. Results of the full model.

	Board characteristics	Environmental disclosure quality[a]	Social disclosure quality[b]
Firm profitability	–0.323 (0.257)*	0.021(1.240)	0.024(0.970)
Financial leverage (FL)	0.129 (0.163)		
Firm profitability × FL	0.253 (0.154)*		
Board characteristics (BC)		0.115 (1.650)***	0.121 (1.283)***
EAAQ[c]		−0.055 (17.130)***	0.059 (13.362)***
BC × EAAQ (average)		−0.879 (0.643)***	−0.866 (0.051)***
BC × EAAQ (= 0)		0.504 (0.598)***	0.503 (0.466)***
BC × EAAQ (= 1)		0.039(0.597)	0.047(0.466)
F	2.12	9.99	10.1
ΔR^2	0.108	0.270	0.271

Note: Standardized coefficients are reported. Standard errors are reported in parentheses. Abbreviation: External assurance of audit quality (EAAQ). [a] Environmental disclosure quality is the outcome variable of the Full Model 1; [b] Social disclosure quality is the outcome variable of the Full Model 2; [c] Dummy variable. 1 = employing any of Big 4 firm as their auditor, 0 = not employing Big 4 firm as their auditor. * $p < 0.05$, *** $p < 0.001$.

4.2. The moderation effects of financial leverage and external assurance of audit quality

We produced simple slope plots (**Figure 3–5**) to interpret the moderation effects of financial leverage (compared by one standard deviation above and below the mean of it) and external assurance of audit quality (compared by two levels of it). The negative impact of firm profitability on board characteristics was less pronounced when financial leverage was high (simple slope = −0.164, 95% CI [−0.589, −0.066], $p < 0.05$) compared to when it was low (simple slope = −0.482, 95% CI [−1.733, −0.194], $p < 0.05$). Therefore, H4 is not supported. Instead, we find an opposite situation in which financial leverage weakens firm profitability's effect on board characteristics.

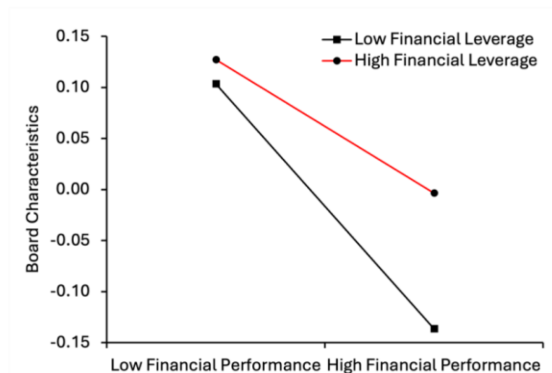

Figure 3. Interaction between firm profitability and financial leverage over board characteristics.

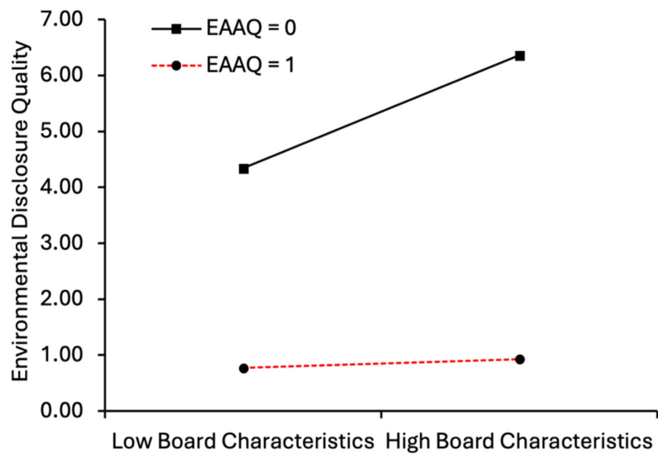

Figure 4. Interaction between board characteristics and external assurance of audit quality over environmental disclosure quality.

Note: The dotted line indicates insignificance.

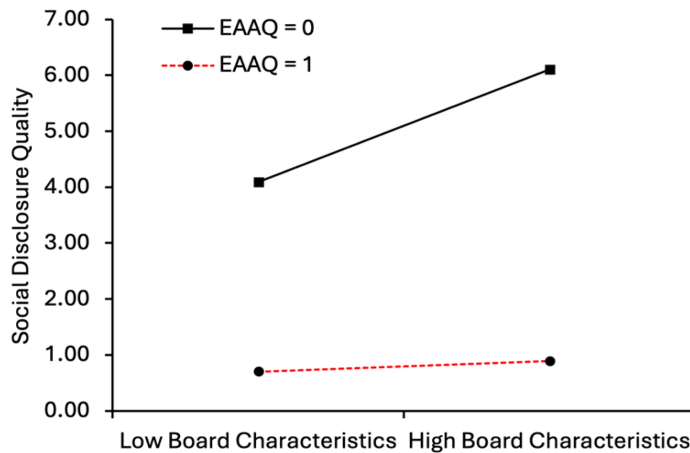

Figure 5. Interaction between board characteristics and external assurance of audit quality over social disclosure quality.

Note: The dotted line indicates insignificance.

When external assurance of audit quality was at 0 level (simple plot = 0.504, 95% CI [6.709, 9.051], $p < 0.001$), Board characteristics positively affected environmental disclosure quality, whereas the relationship was not significant when external assurance of audit quality equals 1 (simple slope = 0.039, 95% CI [−0.687, 1.655], $p >$ 0.05). The effect of board characteristics on social disclosure quality was not significant when External assurance of audit quality equals 1 (simple slope = 0.047, 95% CI [−0.458, 1.368], $p > 0.05$). However, the effect was significant and positive when External assurance of audit quality equals 0 (simple slope = 0.503, 95% CI [5.203, 7.034], $p < 0.001$). The results indicate that our hypotheses H5a and H5b are not supported. Interestingly, we observed that the impact of board characteristics on both environmental and social disclosure quality is significantly greater when organizations choose non-Big Four audit firms. Conversely, the moderation effects are insignificant when organizations employ any of the Big Four as their external auditors. This lack of significance may be attributed to the varying effectiveness of external

assurance between Big Four and non-Big Four firms. While Big Four firms are generally perceived to provide higher-quality audits, organizations that opt for non-Big Four firms may engage in more proactive governance practices, leading to stronger relationships between board characteristics and disclosure quality.

Grouping by Industry, we conducted a one-way ANOVA to explore the difference of all variables involved in this study among different industries. Because of the inhomogeneity variances of all variables found ($p < 0.05$), as shown in **Table 3**, we employed the Welch Test. Results in **Table 4** prove the statistically significant difference among different industries of Firm Profitability ($F = 5.45$, $p < 0.001$), Financial Leverage ($F = 42.82$, $p < 0.001$), Board Characteristics ($F = 1.95$, $p < 0.05$), Environmental Disclosure Quality ($F = 13.22$, $p < 0.001$), and Social Disclosure Quality ($F = 12.05$, $p < 0.001$). Pairwise comparisons using the Games-Howell post hoc testing were also conducted to explore the significant mean differences of those variables among 13 groups of Industry.

Table 3. Homogeneity of variances tests.

		Statistic	**df**	**df2**	***p*-value**
Firm Profitability	Levene's	6.41	12	285	< 0.001
	Bartlett's	433.3	12		< 0.001
Financial Leverage	Levene's	3.79	12	285	< 0.001
	Bartlett's	53.2	12		< 0.001
Board Characteristics	Levene's	3.84	12	285	< 0.001
	Bartlett's	32.6	12		0.001
Environmental Disclosure Quality	Levene's	12.15	12	285	< 0.001
	Bartlett's	187.2	12		< 0.001
Social Disclosure Quality	Levene's	13.46	12	285	< 0.001
	Bartlett's	110.8	12		< 0.001

Note: External assurance of audit quality is a dummy variable and thus was not reported in Homogeneity of Variances Tests.

Table 4. One-Way ANOVA (Welch's).

	F	**df1**	**df2**	***p*-value**
Firm Profitability	5.45	12	70.0	< 0.001
Financial Leverage	42.82	12	71.4	< 0.001
Board Characteristics	1.95	12	69.2	0.043
Environmental Disclosure Quality	13.22	12	68.7	< 0.001
Social Disclosure Quality	12.05	12	68.4	< 0.001

Note: External Assurance of Audit Quality is a dummy variable and thus was not reported in One-Way ANOVA.

5. Discussion

5.1. The counterintuitive negative impact of firm profitability on board characteristics

The observed negative relationship between firm profitability and board characteristics, which contradicts H1's expectation of a positive link, reveals a complex facet of corporate governance that merits deeper investigation. Similar findings have been documented in past research (Arora and Sharma, 2015). One plausible explanation for this counterintuitive finding could be derived from a subtle interpretation of entrenchment theory (Shleifer and Vishny, 1989). It might be that highly profitable firms experience a form of governance complacency, where the abundance of resources leads to an underemphasis on enhancing board diversity and capabilities. Specifically, firm leaders, buoyed by success, might prioritize maintaining control over integrating diverse or external perspectives that could challenge their strategic directions. Such a pattern reveals a critical oversight in governance practices, highlighting the need for continuous emphasis on board quality irrespective of firm performance levels.

Furthermore, our finding prompts a reassessment of the resource-based view (RBV) of the firm within the realm of corporate governance. The RBV suggests that firms' internal capabilities and resources are crucial for attaining competitive advantages (Rugman and Verbeke, 2002). From this perspective, our findings may imply that profitable firms overlook the strategic resource that a well-composed board represents, potentially missing out on opportunities to leverage this resource for sustained competitive advantage and risk mitigation. These findings also raise important theoretical implications regarding the relationship between financial performance and governance structures. The counterintuitive nature of this relationship suggests that traditional views of corporate governance may need to be re-evaluated, particularly concerning the dynamics of board composition in relation to firm profitability. Future research could explore how different dimensions of board characteristics, such as diversity in gender, nationality, and independence, interact with profitability to shape governance outcomes. This expanded exploration can contribute to a better understanding of how organizations can optimize their governance practices to align with success in the long run.

5.2. Financial leverage as a moderator

The moderation analysis revealing that financial leverage adjusts the impact of firm profitability on board characteristics provides critical insights into the financial-governance nexus. This relationship, as elaborated in H4, indicates the simplistic view of leverage as a mere financial tool, positioning it instead as a catalyst for governance refinement. The reduced negative impact of firm profitability on board characteristics in the context of high financial leverage suggests that leverage imposes a governance discipline, possibly due to the heightened scrutiny from creditors and the imperative to manage financial risks more prudently. This finding can be further dissected through the perspective of signaling theory (Spence, 2002). High leverage may signal to the market and other stakeholders a firm's confidence in its cash flow stability and future profitability. However, this signal also brings about increased expectations for rigorous governance to safeguard against the risks associated with high debt levels. Consequently, firms might be incentivized to bolster their board characteristics not

just as a response to creditor demands but also as a strategic maneuver to signal their commitment to effective oversight and risk management.

5.3. Aberrance within Big 4 firm's auditing and sustainability disclosure quality

The moderation effect of external assurance by Big 4 audit firms—Deloitte, PricewaterhouseCoopers (PwC), Ernst and Young (EY), and KPMG—on the relationship between board characteristics and disclosure quality (both environmental and social) unravels a complex scenario that may not fully align with the evidenced positive moderation hypothesis, especially those often posited in Western contexts. In Malaysia, the prestige and perceived assurance quality associated with Big 4 audit firms do not unequivocally translate into enhanced sustainability disclosure quality. This observation challenges the conventional wisdom that Big 4 auditors inherently bolster disclosure practices through their global reputations and rigorous auditing standards. Several critical considerations may be able to explain this phenomenon. The regulatory environment in Malaysia, characterized by specific local reporting standards and corporate governance codes (Elaigwu et al., 2024; Jamil et al., 2021), may influence the effectiveness of external assurance in ways that differ markedly from Western contexts. Moreover, the Malaysian market, including the prominence of family-owned businesses and state-owned enterprises (Menon and Ng, 2017; PwC, 2021), may affect the perception and value of external assurance. In such contexts, the choice between Big 4 and non-Big 4 auditors might be influenced by factors beyond global reputation and perceived assurance quality, including considerations of cost, auditor-client relationship, and specific industry expertise.

Contrary to expectations, our findings suggest that non-Big 4 audit firms may indeed exert a positive moderation effect on the relationship between board characteristics and disclosure quality. This outcome could be attributed to several factors unique to the Malaysian context. This scenario raises critical reflections on the "Big 4 dilemma" where the global reputation and assumed superiority of Big 4 audit firms may not universally apply, particularly in markets with distinct corporate governance like Malaysia. Indeed, similar evidence was also identified in a few studies (Boone et al., 2010; Lawrence et al., 2011; Leung et al., 2019) located in different regions. This stresses the importance of considering local contexts in evaluating the impact of external assurance on corporate disclosures. The Malaysian context exemplifies that non-Big 4 firms possess the potential to substantially enhance disclosure quality, potentially surpassing the presumed effectiveness of Big 4 firms. This challenges the conventional notion of the universal efficacy of Big 4 firms, highlighting the importance of considering a broader spectrum of audit service providers in assessing disclosure quality within the accounting and finance domain.

5.4. Theoretical implication

Our findings invite a re-examination of traditional theoretical frameworks, particularly Agency theory, stakeholder theory, and legitimacy theory, within the context of corporate disclosure practices in Malaysia. Agency theory, with its focus on the principal agent, typically points out the role of governance mechanisms in

mitigating agency costs. However, the findings regarding the negative impact of firm profitability on board characteristics and the complex interplay between financial leverage and audit firm choice challenge the conventional wisdom that financial success straightforwardly leads to enhanced governance structures. This suggests that Agency theory may need to incorporate a broader understanding of how financial strategies and external pressures influence governance choices beyond the binary principal-agent model.

Similarly, the stakeholder theory's emphasis on managing stakeholder relationships through disclosure practices gains additional complexity with the observation that the perceived assurance quality of Big 4 versus non-Big 4 firms has varied impacts on disclosure quality. This highlights the need for a stakeholder model that considers the diversity of stakeholder expectations and the symbolic capital of audit firms in different industries and cultural contexts.

Legitimacy theory, particularly in its application to disclosure practices, traditionally posits that firms seek to legitimize their operations through transparent reporting. The mixed effects of audit firm reputation on disclosure quality in this study suggest that legitimacy is not merely a function of disclosure comprehensiveness but also the credibility and context-specific reputation of assurance providers. This calls for an expanded view of legitimacy that encompasses the strategic selection of audit partners as a means of negotiating legitimacy in diverse regulatory and market environments.

5.5. Practical implication

Our study presents several key recommendations for practitioners and policymakers in Malaysia. Firstly, organizations should recognize the important link between profitability and disclosure quality within their governance frameworks. We advise organizations to develop financial strategies that prioritize transparency and accountability, particularly in industries subject to significant environmental and social scrutiny. Implementing disclosure policies that accurately reflect financial performance and align with stakeholder expectations is essential. Secondly, organizations should re-assess their audit firm selection criteria, moving beyond the assumption that Big 4 firms are always the best choice for high-quality disclosures. Instead, organizations should consider the specific expertise and experience of audit firms relevant to their industry, focusing on their track record in addressing industry-specific disclosure needs. This tailored approach can significantly enhance the overall quality of financial reporting.

For regulators and industry bodies, there is a pressing need to create governance and disclosure standards that reflect the diverse operational contexts of organizations. We recommend developing guidelines for auditor selection that prioritize industry expertise and unique assurance needs over traditional metrics such as firm size and reputation. This approach will ensure that organizations engage audit firms capable of providing effective evaluation and improving disclosure quality. In addition, policymakers should encourage organizations to actively engage with stakeholders to better understand their disclosure needs. Implementing mechanisms for stakeholder

feedback can help organizations refine their disclosure practices, thereby enhancing transparency and building trust.

5.6. Limitations and future research directions

Our study has several limitations. One significant limitation is the focus on Malaysia, which may not fully capture the complexities present in other jurisdictions with varying regulatory environments, cultural norms, and corporate governance structures. Future research could conduct comparative studies across different countries. Such studies would be valuable in examining how distinct corporate governance frameworks and cultural contexts shape the relationships among firm characteristics, audit firm selection, and disclosure quality.

Another limitation of our study is the potential variability in how organizations interpret and implement environmental and social disclosure standards. This variation may influence the observed impacts of board characteristics and audit firm reputation on disclosure quality. Future research could employ qualitative methods, such as interviews or case studies, to gain a deeper understanding of the decision-making processes behind disclosure practices and auditor selection. This approach could help explain the complexities that quantitative studies may overlook.

Lastly, the nature of corporate disclosure standards, especially in light of the increasing global emphasis on sustainability and corporate responsibility, highlights the need for longitudinal studies. Such research could track changes in disclosure practices over time and provide unique perspectives into how organizations adapt their governance and assurance strategies in response to shifting stakeholder expectations and regulatory requirements. By recognizing these limitations and proposing specific areas for future inquiry, future research can enhance our understanding of corporate governance and sustainability reporting practices.

6. Conclusion

Our study investigates the relationships between firm profitability, financial leverage, board characteristics, external assurance of audit quality, and the quality of environmental and social disclosures in Malaysian publicly listed organizations. Our analysis reveals several key findings, particularly highlighting a counterintuitive negative relationship between firm profitability and board characteristics. This finding suggests that greater financial success does not necessarily lead to improved board diversity or capabilities, indicating a potential governance complacency that could undermine the quality of decision-making at the board level. Our research also emphasizes the significance of external audit quality in influencing sustainability disclosures, challenging the prevailing notion that Big 4 audit firms are always the best choice for enhancing disclosure quality. We found that non-Big 4 firms can provide comparable, if not superior, assurance in certain contexts, thereby broadening the criteria for audit firm selection beyond traditional assumptions.

The implications of these findings are profound for practitioners and policymakers. Organizations are encouraged to re-assess their governance frameworks by integrating strategies that prioritize board diversity and accountability, regardless of their financial performance. Policymakers should consider developing guidelines

that emphasize the selection of audit firms based on industry expertise and specific disclosure needs rather than solely on reputation or size.

In summary, our study makes significant contributions to the fields of corporate governance and sustainability reporting, particularly within the Malaysian context. By revealing the links between financial performance, governance structures, and external audit quality, our findings provide a solid foundation for future research. We advocate for further comparative and longitudinal studies to deepen the understanding of sustainability reporting practices and to drive the advancement of effective corporate governance strategies.

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