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Article

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Audit committee effectiveness and integrated reporting quality: Does family ownership matter?

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Abstract: With the increasing demand for greater financial and sustainability reporting transparency, firms globally have embraced integrated reporting (IR). However, little is known about how audit committee effectiveness (ACE) affects IR quality and whether family ownership moderates this relationship. This study aims to address this research gap by examining the impact of ACE on IR quality in the Malaysian market. In addition, the study further examined the moderating role of family ownership on this relationship. Data are extracted from firms' annual reports and Thomson Reuters DataStream to analyse Malaysian firms spanning the period 2017–2021. Our findings indicate that ACE positively influences IR quality, fostering more transparent disclosure. Additionally, our analysis reveals a negative moderation effect by family ownership on the ACE-IR quality nexus. Further scrutiny of a sub-sample suggests a positive ACE–IR quality relationship in firms without family ownership, contrasting with a negative relationship in those with family ownership. Our results withstand alternative measures of IR, ACE, estimation techniques, and control for endogeneity issues. This research contributes to the literature on IR by adding new insights into the impact of ACE and family ownership on IR quality and provides important implications for regulators, stakeholders, researchers, managers, and investors.

Subjects: Auditing; Corporate Governance; Corporate Social Responsibility & Business Ethics

Keywords: integrated reporting; audit committee effectiveness; family ownership; Malaysian market

1. Introduction

Integrated reporting (IR) represents an innovative reporting tool. Scholars widely acknowledge that the limitations of traditional types of corporate reporting (e.g., financial and sustainability reporting) have prompted the emergence of IR (Stubbs & Higgins, 2018). IR places significant emphasis on presenting corporate social responsibility (CSR) disclosures comprehensively and integrated (De Villiers et al., 2017). Unlike traditional CSR reporting, IR effectively incorporates essential CSR information and establishes connections between different types of data (Vitolla et al., 2020). The novelty of IR stems from its inherent integration of various disclosures, reflecting a distinct paradigm shift in reporting practices. Malaysian companies began to adopt IR in 2015. Government Malaysia has created an encouraging environment to foster high-quality reporting through a variety of initiatives, such as establishing the Integrated Reporting Steering Committee

(IRSC) and launching a new IR award (Hamad et al., 2022). Further, the Malaysian government's commitment to incorporating sustainable development goals (SDGs) into its 11th Malaysia Plan underscores its active role in guaranteeing the effective implementation and achievement of IR. Despite these initiatives, the adoption of IR in Malaysia is still voluntary, still questionable and needs more exploration. Empirically, IR quality (IRQ) has been posited to enhance the reputational capital of firms (Vitolla et al., 2020), mitigate information asymmetry (Cortesi & Vena, 2019), and facilitate access to finance (Raimo et al., 2021), decrease in a firm's cost of capital (Vitolla et al., 2020) through diminished information asymmetries, resulting in improved accuracy of analyst forecasts.

The audit committee (AC) represents the corporate boards, overseeing both financial and non-financial reporting which facilitates the mitigation of information asymmetry and agency issues between managers and stakeholders (Mohammadi et al., 2021). ACs have several key responsibilities, including reviewing financial matters, supervising the internal audit systems (Tumwebaze et al., 2022), influencing the board's decisions, ensuring the accuracy and quality of information disclosed by the board (Raimo et al., 2020), and overseeing the overall disclosure process (Umar et al., 2023). Therefore, effective ACs may influence IRQ. Based on stakeholder-agency theory that states that internal corporate governance (CG) mechanisms play a critical role in supervising an organization's sustainability practices and ensuring the company's accountability to a diverse range of stakeholders (Hill & Jones, 1992; Taurigana & Chithambo, 2015).

Extensive research have shown the beneficial impact of ACs attributes on various types of disclosure, including CSR reporting (Mohammadi et al., 2021; Qaderi et al., 2020), corporate philanthropic donations (Umar et al., 2023), risk disclosure (Almunawwaroh & Setiawan, 2023), forward-looking disclosure (Al Lawati et al., 2021), and sustainability reporting practices (Arif et al., 2021; Pozzoli et al., 2022; Tumwebaze et al., 2022). A few earlier works have analysed the impact of AC attributes individually (e.g., size, independence, financial expertise, and meetings) on IRQ and reported inconsistent results. Erin and Adegboye (2022) in South Africa and Raimo et al. (2020) in 125 international firms from 26 different countries indicate that AC's size, meetings, and independence are positively related to IRQ. However, other studies reveal an insignificant relationship between AC's independence, financial expertise and IRQ in South Africa (Ahmed, 2023; Ahmed Haji & Anifowose, 2016). Although two studies (e.g., Ahmed Haji & Anifowose, 2016; Wang et al., 2020) have explored the connection between ACE and IRQ in South Africa, none of these research have focused on the ACE-IRQ nexus in Asian region (i.e. Malaysia). Against this backdrop, ACE is an interesting question unexplored to determine IRQ. Our study, thus, adds to this ongoing debate by examining how ACE jointly affects IRQ.

Family-owned firms are very powerful in society and play a key role in the world economy (Fehre & Weber, 2019). Family ownership can demonstrate a propensity to disclose IR and promote its development. Scholarly have found that family businesses significantly impacts corporate decision-making. Even though numerous studies have examined the moderating influence of family ownership on the relationship between AC and non-financial reporting (Alani & Makhoul, 2023; El-Kassar et al., 2018), no existing research have examined the moderating role of family ownership on the ACE-IRQ nexus.

This research seeks to bridge these gaps in the IR literature and respond to recent calls for discussing AC's role in shaping corporate responses relative to IR strategy (Raimo et al., 2020). Specifically, we aim to explore two main research questions: (1) Is effective AC related to greater IRQ? and (2) Is the ACE-IRQ nexus moderated by the family ownership? To answer these questions, we analyse an unbalanced Malaysian sample of 495 company-year observations during the 2017–2021 period. The result shows that ACE positively affects IRQ. This means that firms having effective AC, engage in more IR initiatives This implies that firms with effective AC engage in more IR initiatives. However, our evidence finds that family ownership negatively moderates the positive impact of ACE on IRQ.

Malaysia offers a rich and natural setting for the pursuit of our research goals, primarily for the following reasons. First, the adoption of IR in Malaysia has experienced rapid growth, driven by support from the International Integrated Reporting Council (IIRC) and initiatives like the establishment of the IRSC by the Malaysian Institute of Accountants (MIA). According to Securities Commission Malaysia [Scm] (2021), large companies are encouraged to adopt IR by the 2017 Malaysian Code on Corporate Governance (MCCG) revision. This transition to IR is motivated by Malaysia's strategic position within the ASEAN economic bloc and its goal of attracting capital, improving stakeholder communication, and enhancing international competitiveness while aligning with global reporting trends (Fayad et al., 2022). Second, Malaysian regulators have made extensive efforts to enhance the audit profession in Malaysia, through the introduction and subsequent revisions of the MCCG in 2012 and 2017. The MCCG 2017 revision emphasized the AC having non-executive directors with financial expertise while the 2012 code focused on strengthening the board of directors' composition and their role as active fiduciaries; however, despite these efforts, there remains a pressing need for significant improvement in audit quality to ensure the preservation of firm quality in Malaysia.

This study contributes to the AC and IR literature in several ways. Our first contribution lies in our study differs from previous research (Ahmed, 2023; Erin & Adegboye, 2022; Raimo et al., 2020) since we explore the role of ACE in influencing IRQ in the Malaysian market using stakeholder-agency theory. To our knowledge, no empirical study attempted this in Malaysia. This topic remains relatively limited since most studies have investigated the relationship between individual AC attributes and IRQ. Our second contribution to the family business literature pertains to our analysis highlighting the moderating role of family ownership, resulting in advancing the debate on the role of family ownership. This is, our knowledge, the first research anywhere to investigate the moderating impact of family ownership on the correlation between ACE and IRQ. Practically, the study's findings provide policymakers with valuable insight into the types of firms that are more inclined to participate in IR reports and those that may require some policy support to enhance their IR practices in Malaysia to meet the growing expectations of stakeholders.

This paper is organised as follows: Section 2 discusses the literature, followed by Section 3, outlining the data sources and empirical methodology. Section 4 presents the research findings. Section 6 concludes the paper.

2. Theoretical background and hypothesis

2.1. Stakeholder-agency theory

The combination of stakeholder theory and principal-agent theory, known as stakeholder-agency theory (Hill & Jones, 1992), provides a valuable theoretical framework to examine the AC-IRQ relationship. By integrating these two theories, we can better understand and analyse the complex dynamics between stakeholders and managers concerning IR (Raimo et al., 2022). Thus, we draw on stakeholder-agency theory in this study to examine whether ACE can make boards more effective in implementing IR strategy. Stakeholder-agency theory posits an active stakeholder dialogue and a trade-off of the interests of stakeholder groups (Veltri et al., 2021). Gerged (2021) reports that stakeholder-agency theory considers a broader group of stakeholders beyond just shareholders. This theory provides valuable insights into how corporations navigate various external and internal pressures, making it a suitable framework for understanding the relationship between CG mechanism and non-financial reporting. Furthermore, stakeholder-agency theory argues that the internal CG mechanisms are responsible for overseeing an organization's sustainability practices and ensuring that the company remains answerable to a diverse range of stakeholders (Taurigana & Chithambo, 2015). According to this theory, an effective AC characterised by size, independence, financial expertise, and regular meetings is expected to enhance IRQ (Velte, 2018).

2.2. Literature review

IR has emerged as a prominent reporting approach that seeks to present a comprehensive picture of an organization's value-creation process by integrating financial and non-financial information

(Eccles & Krzus, 2010; Nicolò et al., 2023; Qaderi et al., 2023). The quality of IR has become a significant focus of research, as it holds the potential to enhance transparency, accountability, and communication between organizations and their stakeholders (Adams et al., 2016). In terms of measuring the IRQ, recent studies have explored various dimensions of IRQ, from the comprehensiveness of content to alignment with reporting frameworks (Kılıç & Kuzey, 2018; Pistoni et al., 2018). Using an IR scoring model, Kılıç and Kuzey (2018) evaluated the level of disclosure in IR obtained from the IIRC website, revealing that, despite firms adhering to the global framework, the quality of their IRs remains low, with limited information on pertinent aspects.

However, IRQ is beneficial for a firm. For instance, Pistoni et al. (2018), using data from the 148 companies in 16 countries, indicate that higher IRQ is linked with better financial performance, lower cost of capital, and higher reputation. Muttakin et al. (2020) report that IR is related to lower cost of debt and higher financial reporting quality in emerging markets (e.g., South Africa), particularly for companies with higher financial reporting quality, suggesting that it enhances the credibility and transparency of financial information, reducing information asymmetry and agency costs, and improving capital accessibility and cost. More recently, Nicolò et al. (2022) reveal that firm size, industry environmental sensitivity, and profitability positively influence the level of visual disclosure of IR in 134 international companies. Additionally, some research has examined the CG implications of IRQ. Pavlopoulos et al. (2017) indicate that disclosure on IRQ is positively linked with CG among 82 international firms. However, while two studies, namely Ahmed Haji and Anifowose (2016) and Wang et al. (2020) in the context of South Africa, have explored the link between ACE and IRQ, there is still a significant gap in the literature about how ACE affects IRQ within Asian-emerging economies, such as Malaysia. Therefore, this research seeks to address and fill this gap in the IR literature.

2.3. Hypotheses development

AC characteristics are part of internal CG mechanisms, which are crucial in overseeing and monitoring management decisions (Karim et al., 2021; Pucheta-Martínez et al., 2021). For this reason, AC is essential in shaping a firm's social, ethical, and environmental responsibility and strategic decision-making (Tumwebaze et al., 2022; Umar et al., 2023). According to stakeholder-agency theory, the AC's role in monitoring is not solely crucial for shareholders as principals but also extends to other stakeholders, who rely on both reliable financial and non-financial reporting as well as associated control systems (Velte, 2023).

Empirical studies examining the influence of individual AC attributes on IRQ remain limited (Raimo et al., 2020). Furthermore, the existing evidence is inconclusive, highlighting the need for a more comprehensive and nuanced analysis to validate the previous findings. Some researchers have independently analysed the individual AC attributes influencing IRQ (Ahmed, 2023; Erin & Adegboye, 2022; Raimo et al., 2020; Velte, 2018). For example, Raimo et al. (2020), drawing data from 125 international firms in 2017, demonstrate that AC's size, independence, and meetings are positive, while financial expertise is insignificantly related to IRQ. Another study found that AC attributes (e.g., size, independence, and financial expertise, except meeting frequency) are essential in driving corporate IRQ for the top 100 of South African listed companies (Erin & Adegboye, 2022). In an analysis of Sri Lankan firms, Cooray et al. (2020) demonstrate that AC independence is positively associated with IRQ. In contrast, Ahmed (2023) shows that AC characteristics do not determine IRQ in South Africa.

Moving to analyse the. Ahmed Haji and Anifowose (2016) reveal that ACE is essential in increasing IRQ. This is because firms with effective AC tend to disclose more information, which could decrease information asymmetry and increase IRQ. Similarly, Wang et al. (2020) indicate that effective AC leads to a high corporate IRQ. They reason that effective ACs are more likely to adopt more IR policies. Velte (2018) reports that ACs' sustainability and financial expertise positively impact the readability of integrated reports.

Based on the aforementioned prior studies, there is no evidence regarding the nature of the ACE-IRQ relationship in Malaysian companies. In line with the stakeholder-agency theory, we predict that higher effective ACs will lead to better IRQ. Thus, we posit the following research hypothesis:

H1. Audit committee effectiveness is positively related to integrated reporting quality.

For the moderating role of family ownership on the ACE-IRQ relationship, family ownership represents the family's participation in firms. Whereas Malaysia is one of the countries where family members have greater involvement in firms (Badru & Qasem, 2021; Ghaleb et al., 2020), this also happens in other countries. Numerous previous studies have found that family ownership is linked with decision-making processes, particularly those relative to internal control quality (Jadoon et al., 2021), earnings management practices (Ghaleb et al., 2020; Kumala & Siregar, 2020), firm performance (Yun et al., 2021), and equity capital (Gavana et al., 2017). In addition, family control diminishes the monitoring role of ACs (Jaggi & Leung, 2007) and board effectiveness (Ararat et al., 2015; Omer & Al-Qadasi, 2019) toward financial reporting quality. This could be because family shareholders involved in management are expected to monitor managers effectively, reducing the governance monitoring role (Omer & Al-Qadasi, 2019). Further, researchers argue that family members may focus more on satisfying the family interests than other stakeholders' needs (Veltri et al., 2021). Thus, they will not be interested in disclosing more information (Ananzeh et al., 2023; Arayssi & Jizi, 2023). Under the stakeholder-agency theory, family ownership may constrain non-financial reporting (Veltri et al., 2021).

Little research has explored the direct impact of family ownership on corporate decisions, such as CSR transparency (Badru & Qasem, 2021; Rahman & Zheng, 2023) and sustainability reporting (Gavana et al., 2017). These studies find that companies with a greater percentage of family ownership tend to improve their CSR practices and disclosure by adopting or aligning with CSR guidelines and regulations. Their pursuit of state support drives this as a persuasive stakeholder, enabling them to attain economic efficiency through access to additional subsidies and gain moral legitimacy in their business operations. However, two empirical research have investigated the moderating effect of family ownership on the AC-non-financial reporting relationship. For example, El-Kassar et al. (2018) reveal that the involvement of family members in the corporate boards and decision-making moderates the positive AC-CSR relationship. Alani and Makhoulf (2023) also find that family ownership adversely affects the AC independence-CSR reporting relationship. This is because of the interference of family members in the firm's management, leading to decisions that affect social activities.

Based on the aforementioned literature review, no research studies attempts to examine empirically the moderating role of family ownership on the ACE-IRQ link. Given the lack of moderating literature on family ownership and consistent with the stakeholder-agency theory, this study expects that the negative power of family ownership on IR can be reduced by having an effective AC. Hence, this study proposes the following hypothesis:

H2. The positive relationship between the audit committee's effectiveness and integrated reporting quality is adversely moderated by family ownership.

3. Research design

3.1. Sampling and data collection

Our initial sample comprises all Malaysian-listed companies that applied for IR from 2017 to 2021. Since the MCCG revision in 2017 recommended large firms implement an IR strategy in 2017, IR disclosure data is available from 2017. Our sample covers a total of 509 company-year

Table 1. Sample selection

Details	Firm-years
Observations that apply IR	509
Unavailability data and delisted from Bursa Malaysia	(14)
Final sample	495

observations for five years. From the original sample, 14 company-year observations were excluded due to data unavailability and delisted from Bursa Malaysia over the study period. This leaves us with 495 firm-year observations across 13 sectors of activity. The sample process is detailed in Table 1. IR data was manually collected from firms' annual reports, whereas the financial data of the sample firms were gathered from Thomson Reuters DataStream.

3.2. Estimation model

The multivariate regression model is specified as follows:

$$\begin{aligned}
 IRQ_{it} = & \beta_0 + \beta_1 ACE_{it} + \beta_2 FOWN_{it} + \beta_3 ACE * FOWN_{it} + \sum_{z=1}^7 \beta_z Cntrl_{it} + \sum_{k=1}^{13} Industry\ effect_i \\
 & + \sum_{j=1}^5 Year\ effect_t + \varepsilon_{it}
 \end{aligned} \quad (1)$$

In these variables, *i* denotes the firm, *t* represents the fiscal year, and ε_{it} is the residual term. The dependent variable is IRQ. To assess this variable, we developed an IR index using the International IR framework, encompassing form, background, assurance and reliability, and content indicators (Pistoni et al., 2018). This index was created through a manual content analysis of IR and firms' annual reports. This approach is more informative in earlier studies (Pistoni et al., 2018; Raimo et al., 2020). More specifically, we employed an aggregate construct that involved the combination of 100 items and measured the percentage of qualitative items a firm disclosed to total items in the disclosure index. ACE is represented by the variables for AC effectiveness (e.g., size, independence, financial expertise, and meetings). In addition to ACE, board independence, audit quality, and firm-specific characteristics are included in the regression model as control variables. We use seven control variables and incorporate industry- and year-fixed effects. Table 2 summarizes all the variables' definitions and data sources. Following the AC and IR literature (Ahmed, 2023; Raimo et al., 2020), this study applies ordinary least squares (OLS) regression.

4. Empirical results

4.1. Descriptive statistics

Table 3 shows the descriptive statistics (mean and standard deviation) for all the numerical variables used in the analysis for 2017–2021. The dependent variable, IRQ, has a mean of 54.648%. Regarding the independent variables, the mean ACE is 2.826, indicating moderate levels of effective AC in the sampled firms. Concerning the moderating variables, the average family ownership (FOWN) is 12.752%. Regarding the control variables, the mean BINDEP is 53.6%. On average, firm size and age (logarithms) are 15.749 and 3.323, respectively, while the mean market-to-book value ratio (MTBV) is 3.541. In addition, the average return on assets (ROA) is 5.777%, and the mean firm leverage (LEV) is 49.586%. Finally, only 82.200% of the firms are audited by one of the BIG4 firms.

Table 3 illustrates Pearson's correlation matrices for all variables employed in this study to assess the presence of multicollinearity. The findings indicate that none of the coefficient values exceeds 0.499, indicating the absence of significant concerns related to multicollinearity in this study.

Table 2. Variables definition

Variable	Abbreviation	Definition	References
Dependent variable			
IR quality	IRQ	The ratio between the aggregation of 280 items a firm disclosed and the total items in the disclosure index (280 items)	Ahmed Haji & Anifowose, (2016)
Independent and control variables			
AC effectiveness	ACE	The aggregation of four dummy variables: (1) AC size, represented by a binary variable, is given “1” if a firm has an AC size exceeds the median and “0” otherwise, (2) AC independence, represented by a binary variable, is given “1” if a firm has AC independence exceeds the median and “0” otherwise, (3) AC financial expertise, represented by a binary variable, is given “1” if a firm has AC with financial expertise exceeds the median and “0” otherwise and (4) AC meetings, represented as a binary variable, takes the value of “1” if a firm conducts more meetings per year than the median and “0” otherwise	Baatwah et al. (2021)
Family ownership	FOWN	Percentage of family-owned shares to total firm shares	Al Fadli et al. (2022)
Board independence	BINDEP	Percentage of independent directors	Raimo et al. (2020); Yun et al., (2021)
Audit quality	BIG4	Dummy variable: “1” if the external auditor is one of the BIG4, “0” otherwise	Qaderi et al., (2023)
Firm size	Ln_FSIZE	Natural log of total assets	Cooray et al., (2020); Wang et al. (2020)
Firm age	Ln_FAGE	Natural log of firm age	Ahmed Hashed & Ghaleb, (2023); Rahman & Zheng, (2023)
Return on asset	ROA	Ratio of net income to total assets	Alshorman et al. (2022); Qaderi et al. (2023)
Firm leverage	LEV	Ratio of liabilities to total assets	Al-Jaifi et al., (2019)
Market-to-book-value ratio	MTBV	Ratio of market value to book value per share	Qaderi et al. (2023)
Variables used in the additional analysis			
IR quantity	IR quantity	Ratio of IR information disclosure quantity	Ahmed Haji & Anifowose, (2016)
AC size	ACSIZE	Number of members on an AC	Ahmed, (2023); Qaderi et al. (2020); Raimo et al. (2020)
AC independent	ACINDEP	Proportion of AC independent directors on the board	
AC financial expertise	ACEXP	Proportion of AC directors holding financial experts	
AC meetings	ACMEET	Number of AC meetings held during the year	
AC effectiveness dummy	ACE_DUM	A binary variable, equals “1” if the ACE is above the median of the sample distribution and “0” otherwise	Baatwah et al. (2019)
Inverse Mills ratio	IMR	Inverse Mills ratio obtained from the probit model of ACE	-
Industry average of AC effectiveness	ACE [^]	Proportion of ACE instrumented with industry average ACE	Al-Jaifi et al. (2019)
Lagged of AC effectiveness	ACE _{t-1}	One-year lagged values of ACE.	-

Table 3. Descriptive analysis of research variables and correlation matrix

Variables	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	VIF
IRQ	54.648	9.848	1.000										-
ACE	2.826	0.811	0.179***	1.000									1.333
FOWN	12.752	22.214	-0.225***	0.120***	1.000								1.192
BINDEP	0.536	0.133	0.251***	0.156***	-0.202***	1.000							1.469
Ln FSIZE	15.749	1.746	0.493***	0.272***	-0.127***	0.224***	1.000						1.996
Ln FAGE	3.323	0.618	-0.074*	0.022	-0.074*	0.155***	0.170***	1.000					1.34
MTBV	3.541	8.023	0.027	-0.160***	-0.073*	0.004	-0.170***	0.066	1.000				1.777
ROA	5.777	9.830	-0.074*	-0.184***	0.081*	-0.122***	-0.157***	0.121***	0.499***	1.000			1.702
LEV	49.586	24.594	0.184***	0.047	-0.196***	0.294***	0.458***	0.131***	0.158***	-0.142***	1.000		1.85
BIG4	0.822	0.383	0.197***	-0.080*	0.096**	0.361***	0.288***	0.089**	-0.010	0.096**	-0.236***	1.000	1.566

Notes: N= 495. ***p < 0.01; **p < 0.05; *p < 0.10. The variable's descriptions are provided in Table 2.

4.2. Multivariate analysis

Table 4 presents the results of the OLS regression analysis. Column (1) explores the direct impact of ACE on IRQ. The ACE has a positive effect (coef. = 0.941) on IRQ for a confidence level of 95%, as predicted. Thus, H1 is accepted. Column (2) explores the moderating influence of family ownership on the ACE-IRQ nexus. Family ownership adversely moderates (coef. = -0.041) the positive impact of ACE on IRQ for a confidence level of 95%, as predicted. Thus, H2 is accepted.

Moreover, Table 4, Column (3) displays the regression result of the ACE-IRQ relationship. We divided the sample into two subsamples depending on family-owned and non-family firms. Results of Table 4 highlight an insignificant relationship between AC and IRQ when the family members own firms. This means ACEs in family-owned firms are unwilling to produce more quality IR-related information due to board ineffectiveness. Conversely, the ACE-IRQ nexus in nonfamily-owned firms is highly significant (coef. = 1.697), suggesting ACE will increase IRQ when firms are non-family. Although ACs have the tremendous responsibility to monitor the integrity of firms' reporting and controlling risk management and internal control systems, their effectiveness is diminished in

Table 4. OLS regression results

Variables	Column (1)	Column (2)	Column (3)	
	Full Sample	Moderating role	Family-controlled firms	Non-family-controlled firms
	Coef. (t-test)	Coef. (t-test)	Coef. (t-test)	Coef. (t-test)
ACE	0.941** (2.018)	1.381*** (2.681)	-0.404 (-0.452)	1.697*** (3.107)
FOWN	-0.084*** (-5.215)	0.037 (0.588)		
ACE*FOWN		-0.041** (-1.983)		
BINDEP	14.842*** (4.989)	14.365*** (4.828)	-6.137 (-1.043)	15.027*** (4.161)
Ln_FSIZE	3.320*** (12.523)	3.295*** (12.452)	3.882*** (5.341)	3.144*** (10.186)
Ln_FAGE	-2.600*** (-4.235)	-2.634*** (-4.302)	-3.996*** (-3.187)	-0.952 (-1.211)
MTBV	0.166*** (3.051)	0.168*** (3.096)	0.088 (0.414)	0.087 (1.448)
ROA	0.014 (0.315)	0.012 (0.275)	0.037 (0.507)	0.092 (1.513)
LEV	-0.010 (-0.575)	-0.009 (-0.470)	-0.018 (-0.359)	-0.028 (-1.362)
BIG4	1.643 (1.534)	1.435 (1.338)	3.965** (2.184)	1.767 (1.066)
Constant	-3.061 (-0.672)	-3.916 (-0.858)	9.663 (0.845)	-14.219*** (-2.649)
Year-fixed effects and industry-fixed effects included				
No of Obs.	495	495	147	348
R ²	0.481	0.486	0.621	0.472
F-Stat	17.40***	16.99***	8.32***	12.04***

Notes: t-statistics in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$. The variable's descriptions are provided in Table 2.

firms with family ownership. This could indicate that when family members are involved in firm management, they may reduce the role of governance monitoring. Thus, ACs become less effective in enhancing transparency and adopting high-quality IR.

4.3. Robustness tests

4.3.1. Alternative regression estimation

Following prior studies (Al-Duais et al., 2021; Petersen, 2009), we use two alternative regression estimation (e.g., OLS with robust standard error and the Driscoll-Kraay standard errors (SCC) regressions) as an additional robustness test use to confirm the strength of the main results. The results in Table 5 (Columns 1 and 2) demonstrate that ACE is positively related to IRQ. Overall, the results in this section support our main tests.

4.3.2. Alternative measure of ACE

Instead of aggregating the AC effectiveness, we re-run our main analyses using alternative measures for individual AC attributes (e.g., size, independence, financial expertise, and meetings). The results in Column 3 of Table 5 indicate that ACSIZE has a significantly positive relationship with IR, while ACINDEP, ACFEXP and ACMEET have an insignificant relationship with IR. The result in this section supports that individual AC characteristics may not fully reflect ACE as these characteristics tend to complement each other (Al-Dhamari et al., 2018). Also, employing a composite measurement instead of a single structural variable measurement could reduce the error (Al-Jaifi et al., 2019).

4.3.3. Alternative measure of IR

To increase the consistency of the results, following earlier research (e.g., Ahmed Haji & Anifowose, 2016), we use a different measure for the dependent variable (i.e. IR quantity) which serves as a more direct proxy for IR practice. The binary scale unweighted scoring method assigns a score of “1” to disclosed IR items and “0” if it is not, then, we re-run our regression models. The results in Table 5 (Column 4) reveal that the coefficient on ACE is positively associated with IR quantity, which align with the IRQ findings in Table 4.

4.3.4. Endogeneity test

The above analysis examining the impact of AC effectiveness on IR quality could potentially encounter selection bias because not all firms disclose their IR information. To exclude this kind of selection bias, we apply Heckman's (1979) two-step model, following (Baatwah et al., 2019). To perform this test, we first conduct a probit regression model with ACE as a dummy variable (dependent variable). We then calculate the inverse of the Inverse Mills Ratio (IMR), and in the second-stage regression, we run the OLS regression by including IMR as an additional explanatory variable. Table 6, Columns (1 and 2) report the regression results of the Heckman two-stage analysis. The results show that the coefficient of ACE has a significantly positive relationship with IR quality, confirming that there is no selection bias in our main results.

We employ the Instrumental Variable-Two Stage Least Squares (IV-2SLS) regression method to reduce the effect of reverse causality and simultaneity issues. First, we identify instrumental variables (e.g., the industry average of ACE (ACE^A) and one-year lagged values of ACE (ACE_{t-1}) as an exogenous instrument), following previous studies (Al-Jaifi et al., 2019). We justified using the ACE industry average as an instrument because ACE in a firm's industry could influence the ACE but might not influence the IR quality. In Table 6, we report statistics to support using our instrument variables. The under-identification test, represented by Anderson LM statistic, is statistically significant. The Cragg—Donald Wald F-statistic (weak identification test) is 310.596, exceeding the critical value (19.93) of the Stock—Yogo weak ID test at 10% maximal IV size. Further, the p-value of the overidentification test is insignificant. These outcomes indicate the validity of selected IVs (ACE^A and ACE_{t-1}). Results in Table 6 (Column 3 and 4) presents the IV-2SLS regression result. This result shows that the ACE is positively

Table 5. OLS regression results for alternative measures

Variables	Dependent variable = IR Quality			Dependent variable = IR quantity
	OLS with robust	SCC model	Individual AC attributes	Alternative IR measure
ACE	0.941*	0.941*		1.242**
	(1.941)	(2.323)		(2.030)
OWNF	−0.084***	−0.084***	−0.076***	−0.107***
	(−5.464)	(−6.457)	(−4.658)	(−5.043)
ACSIZE			1.858***	
			(3.659)	
ACINDEP			−1.932	
			(−0.717)	
ACFEXP			2.257	
			(1.410)	
ACMEET			−0.003	
			(−0.017)	
Constant	−3.061	−3.061	−4.713	−11.247*
	(−0.622)	(−1.094)	(−0.875)	(−1.881)
Control variables, year and industry included				
Observations	495	495	495	495
R-squared	0.481	0.481	0.493	0.484
F-Stat	26.43***	184.71***	16.21***	17.58***

Notes: t-statistics in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$. The variable's descriptions are provided in Table 2.

related to IRQ, which align with our main results. Thus, the results of the additional tests indicated that our model does not suffer from an endogeneity bias.

5. Discussion

The H1 proposes that ACE is positively related to IRQ and the study's results confirm H1. It can therefore be concluded that ACE tends to disclose more on IR information. One possible explanation is that the effective AC is a governance monitoring mechanism in firms, mitigating agency conflicts and addressing sustainability issues through IR disclosure (Pucheta-Martínez et al., 2021). This evidence is consistent with stakeholder-agency theory and aligns with prior research (Ahmed Haji & Anifowose, 2016; Wang et al., 2020), which suggests a greater commitment to the disclosure of IR information.

The H2 states that the ACE-IRQ relationship is adversely moderated by family ownership, and the study's results also assures H2. This evidence shows that the ownership structure exhibits a higher concentration of family ownership compared to the governance monitoring mechanisms, such as the ACs are much less effective in monitoring management behaviour, especially in non-financial disclosure. This could be justified that firms with family ownership usually appoint family directors to ensure family interests are served. Thus, they are not interested in disclosing more information through IR strategy. This evidence is in line with stakeholder-agency theory and aligns with studies (Alani & Makhoulouf, 2023), indicating that family ownership adversely affects the AC independence-CSR reporting relationship.

Table 6. Robustness analysis to control endogeneity issues

Variables	Two-stage Heckman model		2SLS model	
	First-Stage Probit	Second-Stage	First-Stage Probit	Second-Stage
ACEFF				1.040 (1.651)*
OWNF	0.006 (1.854)*	−0.109 (−4.958)***	0.003 (2.475)**	−0.088 (−4.920)***
IMR		−10.252 (−2.230)**		
ACE _{t-1}			0.780 (24.330)***	
ACE [^]			0.867 (4.490)***	
Constant	−2.492 (−2.739)***	17.487 (1.661)*	−2.643 (−3.938)***	1.050 (0.209)
Control variables, year and industry included				
Observations	495	495	373	373
Pseudo R ²	0.1651	–	–	–
R ²	–	0.481	0.736	0.487
Wald chi2(24)/ F-Stat	87.44***	27.98***	38.71***	353.51***
Endogeneity test	–	–	–	0.034
Under identification test	–	–	–	239.317 (p-value = 0.000)
Weak identification test	–	–	–	310.596
Over-identification test	–	–	–	1.198 (p-value = 0.2737)

Notes: z-statistics in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$. The variable's descriptions are provided in Table 2.

6. Conclusions

IR is considered an innovative framework for corporate reporting. In the Malaysian context, there is limited research addressing IRQ. To bridge this gap, our study focuses on a sample of Malaysian listed firms and aims to investigate the influence of four AC features (e.g., size, financial expertise, meetings, and independence) on IRQ. Furthermore, the moderating role of family ownership in this relationship is analysed. The results show that ACE increases IRQ, leading to more transparent disclosure. This positive effect is explained because the role of ACs becomes crucial in mitigating opportunistic behaviour that may arise among managers when making ESG decisions. This research is consistent with stakeholder-agency theory, which stresses the influential role that can be played by governance monitoring mechanisms (e.g., AC) in disclosing IRQ. Further, our analysis shows that the positive ACE-IRQ nexus is negatively moderated by family ownership. Furthermore, analysis of a sub-sample shows that the ACE—IRQ relationship is positive in firms that do not have family ownership but negative in those that do have family ownership. This means that AC in family firms is ineffective because the presence of larger family shareholdings could result in the exploitation of minority shareholders' interests to maximise their personal benefits, therefore discouraging IR disclosure. These results are robust across alternative measures (e.g., IR and ACE), alternative regression estimations (e.g., OLS with robust standard error and SCC) and controlling endogeneity issues.

Our research highlights some theoretical implications. Firstly, this study adds to the body of knowledge regarding the effects of ACE on IRQ in emerging economies. In academia, the reporting of IRQ in business is mostly unexplored in the sustainability literature, and addressing IRQ in business is still an emerging research topic (Vitolla et al., 2020). Additionally, there is a dearth of literature on the interaction between ACE and IRQ in developing countries and our research offers a first insight into the Malaysian context. Although Ahmed Haji and Anifowose (2016) and Wang et al. (2020) have investigated the impact of ACE on IRQ in South Africa, no prior research has explored this impact in Malaysian companies. Thus, our study fulfils a crucial research gap, examining how ACE collectively influences IRQ in Malaysia. Second, the findings refine the theoretical framework (i.e., stakeholder-agency theory) since ACE has a positive relationship with IRQ. This means the internal CG mechanisms (e.g., AC) play a critical role in supervising an organization's sustainability practices and ensuring the company's accountability to a diverse range of stakeholders. Third, as the first attempt, this study contributes to the literature on family ownership by introducing empirical evidence about the moderating effect on the ACE-IRQ relationship. This research, to our knowledge, is among the first to attempt to demonstrate the family involvement in ownership decreases the ACE-IRQ relationship.

Beyond the theoretical implications, our research also has several practical implications. First, our evidence may be useful for policymakers when regulating ACs' composition. Policymakers should consider that effective ACs can help enhance IRQ. The presence of family ownership in firms should not be encouraged by policymakers because its interaction with ACs leads to a lower IRQ. Second, firms should reinforce their internal governance mechanisms by establishing a robust governance framework and to guarantee that the company's decisions align with the interests of all shareholders. Specific measures can be taken, such as establishing AC with members with better financial expertise and more independence since ACE plays a critical role in improving IRQ. Finally, our evidence should encourage other scholars to shed new light on this topic by extending the analysis of how other AC characteristics affect IRQ.

By clarifying this study's limitations, we suggest future research directions. Firstly, although IR literature addresses different measures for measuring IR practices, we have measured IR with one of the most used indicators, IRQ. Future studies could use other measures of IR strategy (e.g., the quantity of IR) or investigate the categories of IRQ (e.g., integrated capital disclosures) to achieve a more holistic understanding of the evolution of the IR practice among Malaysian firms. Secondly, this research focuses only on IRQ's internal determinants, specifically ACE. Thus, future research could expand the investigation to explore other influencing factors, such as board sub-committees and sustainable CG, to provide a more comprehensive analysis. Finally, this study is limited to the Malaysian context, and thus these results are applicable primarily within this setting, limiting their generalizability. However, future studies could utilise international datasets to conduct comparative research in international contexts, enhancing the broader applicability of the findings.

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