

Board of Director's Diversity and Earnings Management: The Moderating Effect of the Board's Roles

Nuthawut Sabsombat¹

nuthawut.sabsombat@strath.ac.uk

Julia Smith¹

julia.smith@strath.ac.uk

Leilei Tang¹

leilei.tang@strath.ac.uk

30 November 2022

Abstract:

Purpose – This study aims to explore the influence of Board diversity on earnings management in two aspects: accruals earnings management (AEM) and real earnings management (REM). The study also examines the Board of director's roles – monitoring and advisory functions – as a moderator on the link between Board diversity and earnings management.

Design/methodology/approach – This paper uses fixed-effect regression analysis of a sample of 13522 firm-year observations in six developed countries around the world: Australia, Singapore, Hong Kong, Canada, the UK, and the US, from 2016-2020. In this study, absolute values of abnormal discretionary accruals are employed as a proxy for AEM in the cross-sectional modified version of Jones (1991) and Dechow & Dichev (2002). We also employ Roychowdhury (2006) 's empirical models as a proxy for REM, representing the manipulation of real activities.

¹ University of Strathclyde, 199 Cathedral Street, Glasgow, G4 0QU, UK

Findings – The findings indicate that Board diversity has a negative relationship with AEM, but a positive relationship with REM. In this regard, there is evidence that sample companies may switch between earnings management strategies, shifting from AEM to REM and employing them as *substitutes*. Additionally, the research confirms that Board monitoring and advisory roles can reduce earnings management. However, the negative link between Board diversity and AEM is less pronounced when two Board roles are stronger. The findings imply that 'the substitutive role', which balances Board diversity and Board roles in these effects, has more influence on AEM. In contrast, dual Board roles enhance the link between Board diversity and REM, but this relationship is not statistically significant. The results suggest that Board roles play a complementary function in improving earnings quality as measured by REM.

Originality/value - The authors add to the body of knowledge on accounting quality and corporate governance by pointing out how Board diversity is linked to better earnings quality and lower earnings management in publicly listed companies worldwide. Moreover, this paper adds to prior literature about the Board of directors and accounting quality by identifying additional substitutive and complementary aspects of the Board of directors' roles. In doing so, this study applies the multi-theoretical perspectives – human capital theory, agency theory, and resource dependence theory – to examine these effects.

Key words: Board of Directors; Board Diversity, Board's Roles; Earnings Management

1. Introduction

Over the past few decades, researchers have shown an increased interest in the Corporate Governance (CG) topic as we have learnt about many corporate collapses and scandals, such as Enron in the United States in 2001, Worldcom in the United States in 2002, Parmalat in Italy in 2003, AIG in the United States in 2005, Tyco in the United States in 2005, Lehman Brothers in the United States in

2008, and Satyam in India in 2009 (Banbhan et al., 2018). These scandals resulted in substantial issues and directly impacted the stock market, which influenced investors to suffer huge losses. Because of the significant issues stated above, all stakeholders, especially investors and shareholders, are more interested in and concerned about their investments. They expect companies to apply the CG mechanisms, which can help them monitor, evaluate, and report on the firm's transparent and honest information (Mertzanis et al., 2019). The Board of directors (Board) is the critical driver in applying CG practices in the business; this is why this topic has been studied in several CG disciplinary research papers (Wagana and Nzulwa, 2016).

The issue of Board diversity is also receiving much attention among scholars in developed and emerging countries since organisations increasingly operate in complicated and cross-cultural contexts. Moreover, working as a team – especially team leaders – becomes more critical in organisations because it can make great ideas and creativities, have diverse perspectives, as well as blend complementary strengths to drive business success. However, group work commonly involves many different people with different demographic and cognitive attributes or backgrounds, so understanding how diversity in the composition of company group leaders affects corporate outcomes would be interesting (Milliken and Martins, 1996).

To date, many researchers have been investigating the impact of Board diversity on several measures of corporate performance, such as financial performance, financial reporting quality, social and environmental reporting quality, external audit quality, internal audit quality, corporate finance, and corporate governance (Alhossini et al., 2020). However, previously published CG and Accounting research on the impact of Board diversity on corporate performance is inconsistent. Perhaps the inconsistencies are caused by focusing only on demographic or surface-level diversity - such as gender, age, ethnicity, and others

- rather than deep-level diversity, such as experience, education, and others (Hillman, 2015, Almutairi and Quttainah, 2019, Kent Baker et al., 2020). Thus, considering both surface- and deep-level dimensions could give us meaningful insight into the impact on Board and corporate outcomes.

Financial reporting is essential to all stakeholders, especially the bottom line in the statement of income. This is because financial users can use it to make decisions based on corporate income or earnings in several ways, such as management's assessment, stock pricing, or credit analysis (Menicucci, 2020). In other words, investors, shareholders, regulators and other stakeholders need to access actual corporate performance to make the best decision.

In the 1990s, researchers considered earnings quality, especially earnings management, worthy of scholarly attention. For example, during the 1990s, the US Securities and Exchange Commission (SEC) inspected the financial reporting process which had been used by managers and auditors (Menicucci, 2020). During the early 2000s, large corporate scandals and collapses emerged. Many researchers have studied earnings management since then to find solutions and prevent such issues. One of the most common ways that many countries around the world have responded is the issuing of effective CG mechanisms to increase the accounting quality, for example, the Cadbury Report (1992) in the UK, SOX (2002) in the US, ASX (2007) in Australia, and NZX (2007) in New Zealand (Banbhan et al., 2018).

Therefore, this paper aims to explore the impact of Board diversity on earnings management. Furthermore, this study develops combined characteristics of Board diversity, called the Board diversity index. This research also extends the literature on the dual roles of the Board – monitoring and advisory roles – by identifying these roles as moderating effects that may influence the relationship between Board diversity and earnings attributes.

This study differs from several relevant studies. First, the research extends to the deep-level diversity of directors, such as education, experience, and expertise, by applying human capital and social capital literature. Second, various Board diversities are examined in accordance with the predictions of agency theory, resource dependence theory, and multiple theoretical perspectives. Third, the moderating effect of the Board's roles – monitoring and advisory functions – is investigated to better understand the relationship between Board characteristics and earnings management. Last but not least, little is currently known about the impact of Board diversity on earnings management; this study examines this topic in many different dimensions. In other words, earnings management is also measured by separate models, accrual and real earnings management.

This study makes several theoretical contributions and practical implications. First, theoretically, this research finds that surface- and deep-level diversity in Board characteristics can explain earnings management as applied from multiple theoretical perspectives. Second, this study extends CG literature on the importance of the Board's roles, which is essential to balance the Board role and Board diversity to improve earnings quality. Third, the result provides empirical evidence that supports the qualitative characteristics of useful financial information according to the Conceptual Framework for Financial Reporting. In other words, this paper defines earnings management as measuring the level of reliability of accounting information; if earnings management is reduced, the quality of accounting earnings will be high.

For practical implications, first, regulators can formulate recommendations to target desirable Board characteristics specifically. Second, Board nomination committees can develop preferable Board attributes by considering the profiles of director candidates that suit the existing Board teams. For example, Board teams may consist of a mixture of long-term and short-term tenures and appoint directors specialising in different fields. Lastly, all stakeholders feel more trusted

and confident in the firm financial reporting quality which is monitored and advised by the diverse Board.

2. Theoretical and Hypothetical Development

Regarding theoretical frameworks for CG research, no single theory can explain a comprehensive understanding of how CG mechanisms affect corporate outcomes (Carpenter and Feroz, 1992). To date, most previous research has concentrated only on agency theory (Zona and Zattoni, 2007, Filatotchev and Boyd, 2009, Gull et al., 2018). It is used to explain the role of agents (managers) who usually make business decisions that rely on their interests which are at the expense of the principals (shareholders) (Jensen and Meckling, 1976).

However, agency theory cannot explain the holistic view of the business case as Eisenhardt (1989, p.71), for example, presumed that 'Agency theory presents a partial view of the world that, although it is valid, also ignores a good bit of the complexity of organisations. Additional perspectives can help to capture the greater complexity'. Therefore, this study applies multiple theoretical perspectives – such as human capital theory, agency theory, and resource dependence theory – to better interpret the roles of Board diversity in impacting earnings management (Adams et al., 2015, Kagzi and Guha, 2018a, Kolev et al., 2019, Khatib et al., 2020, Smith and Sarabi, 2020, Nguyen et al., 2020, Alhossini et al., 2020).

Becker (1962) defined human capital as the resources embedded in people and accumulated over time. In this regard, the cumulative human capital, in terms of education, skills and experience, can enhance cognitive and productive abilities benefiting the individual and organisation (Terjesen et al., 2009). Human capital is unique, so it cannot be impersonated by others (Nguyen et al., 2017). As a result, the human capital of directors creates competitiveness and brings back economic performance to the organisation.

Under CG research, firms seek linkages between valuable resources and structure membership on the Board of directors (Terjesen et al., 2009). It can be said that resource dependence theory complements agency theory. Daily et al. (2003) also suggest that researchers may get more fruitful results by concentrating on the help directors provide in bringing valuable resources to the company and in serving as a source of assistance and counsel for CEOs rather than merely on directors' ability or capacity to control executives.

To sum up, although each theory can provide different perspectives, they can complement each other in identifying the appropriate characteristics of the Board of directors that ultimately improve the quality of financial reporting.

Earnings Management

Earnings management can be defined as accounting information that distorts the real economic activities based on management's desire rather than presenting the actual company's performance (Schipper, 1989, Healy and Wahlen, 1999). It can be classified into two types: accruals earnings management (AEM) and real earnings management (REM). First, AEM is where managers use judgments and estimates within accounting choices based on accruals accounting, whether it be conservative accounting or aggressive accounting. Second, in real activities manipulation (REM), managers may choose real cash flow choices to distort accounting information from normal business operations.

Moreover, Fields et al. (2001), Braam (2015), Mnif and Ben Hamouda (2020) suggested that if managers are employing both AEM and REM to achieve the same goal, then studying one technique in isolation is likely to result in an underestimating of the overall level of earnings manipulation, hence producing inconclusive data. In accordance with this rationale, the highest benefit of AEM and REM can be achieved by integrating their use.

Both earnings management can affect reported earnings in a distorted manner because managers' discretions are beyond accounting policies and operating strategies resulting in altering financial reporting, which communicates a misleading actual firm performance to stakeholders. Dealing with this issue, implementing good CG mechanisms by having a Board of directors who monitors and advises on the financial reporting system would constrain managerial opportunism or the ability to manage earnings.

Board Diversity and Earnings Management

The main objective of CG is to improve the quality of companies' governance and to increase companies' responsibilities to maximise shareholders' and stakeholders' wealth (Haxhi and Aguilera, 2014). The Board of directors' characteristics play the most crucial role in monitoring and advising financial reporting processes. One of the most significant current discussions on the Board's attributes is about the Board of directors' diversity (The phrase 'Board diversity' will be used in this study). Milliken and Martins (1996, p.402) introduced the term "diversity" as a common word meaning 'variety' or a 'point or respect in which things differ'. Thus, board diversity may be defined as a variety in company board composition in regard to specific characteristics (Kagzi and Guha, 2018a). Similarly, Van der Walt and Ingley (2003) defined boardroom diversity as the mixture of human and social capital – such as race, skills, education, experience, and others – that arises from each director drawing on their governance mechanisms.

In this regard, diversity in gender, age, race, education, experience, and others can provide different views, making the boardroom have more helpful information and better monitoring and advisory, which enhance firm outcomes (Adams and Ferreira, 2009, Terjesen et al., 2009, Upadhyay et al., 2014, Kent Baker et al., 2020). On the other hand, some researchers have found the adverse

effects of Board diversity on firm outcomes. For example, the studies from social-psychological literature that understands the interaction and participation within the boardroom find that Board diversity is negatively related to the Board process, leading to less effective Board task performance and lower corporate performance (Yang, 2011, Walker et al., 2015, Martinez-Jimenez et al., 2020). It can be seen that previous research findings on the impact of Board diversity on corporate outcomes have been inconsistent and contradictory (Adams et al., 2015, Kent Baker et al., 2020). Therefore, this study intends to determine the extent to which Board diversity impacts financial reporting quality and whether the Board of directors' characteristics are supportive or discouraging to earnings management.

According to the literature, many studies support the positive effects of Board diversity – in terms of gender, age, education, tenure, and experience – on earnings quality, as was explained by the agency and resource dependence theories. It was found that Board diversity can constrain earnings management, producing higher earnings quality, for example, the work undertaken by Srinidhi et al. (2011), Kyaw et al. (2015), Abdullah and Ismail (2016), Strydom et al. (2016), Gull et al. (2018), Triki Damak (2018), Orazalin (2019), Ositadimma Jim et al. (2021).

Moreover, There is a large volume of published studies investigating the relationship between Board diversity and earnings management. However, much previous research focused only on specific attributes of Board diversity, called isolated board diversity, and ignored the combined effect of Board diversity for given outcomes. In support, Hoang et al. (2017) argue that isolated board structures' factors have had numerous influences on different outcomes. As a result, it is difficult to interpret the study results if each individual aspect of Board diversity is more likely to affect different outcomes. In other words, Board

diversity attributes – including gender, age, education, tenure, experience and expertise diversity – have either positive or negative impacts on earnings quality. Hence, several studies have applied combined characteristics of the Board of directors' diversity to see the overall picture of the boardroom's diversity on corporate outcomes, for example, (Hafsi and Turgut, 2012, Ben-Amar et al., 2013, Hoang et al., 2017, Ositadimma Jim et al., 2021). This study, therefore, draws a combined Board diversity index to investigate the comprehensive view of the relationship between Board diversity and earnings management. Based on the preceding discussion on theories together with the existing literature, the hypothesis in this study is proposed as below.

H1: *There is a negative relationship between the Board diversity index and earnings management.*

H1a: *There is a negative relationship between the Board diversity index and accruals earnings management.*

H1b: *There is a negative relationship between the Board diversity index and real earnings management.*

The Monitoring Role of the Board

Agency theory can be utilised to explain the emergence of the Board of directors and its monitoring role (Labelle et al., 2010). An agency problem occurs when delegating duties in operating a business is transferred from the principals or shareholders to the agents or managers (Jensen and Meckling, 1976). The theory assumes that the agents' interests are different and generally in conflict with the principals' interests. In this regard, the CG mechanism is introduced by having the Board of directors, a trustee, keep an eye on and supervise the management to ensure they follow the rules and protect the interests of the owners (shareholders) (Ositadimma Jim et al., 2021).

Regarding the monitoring role of the Board of directors, Board diversity ensures that Board members' financial interests are aligned with those of shareholders rather than managers (Labelle et al., 2010), as mentioned in the agency theory. In other words, the diversity in the boardroom can enhance the monitoring role

in a way that Board members perform their tasks that are representative of shareholders to protect the interests of a whole. Directors commonly perform the monitoring role to ensure whether managers' organisational management effectively protects shareholders' interests (Ositadimma Jim et al., 2021). In support, Hillman and Dalziel (2003) link Board capital – such as skills, experience, expertise, and knowledge on a board – to monitoring Board functions. Empirically, previous studies report mixed evidence on the relationship between Board monitoring and corporate outcomes. For example, Ntim (2013) finds a positive relationship between the presence of monitoring Board committees and market valuation. In support, Upadhyay et al. (2014) discover a robust positive association between the Board's monitoring role and firm performance. They also suggest that firms use monitoring committees to mitigate agency costs related to the size of Boards, meaning that the larger Boards tend to appoint more monitoring committees, leading to more effective monitoring. However, the intensity of Board monitoring may reduce the Board's advising performance. In this regard, they find evidence that intense Board monitoring lowers strategic advising performance regarding corporate acquisition and innovation. Moreover, intense monitoring may reduce the firm value, especially for firms with high demand for acquisitions, innovation, or complex operations. While other studies report no significant relationship between the Board's monitoring role and financial reporting quality, for example, Reeb and Upadhyay (2010), Osma and Noguera (2007), Hsu and Hu (2016).

As can be seen, a limited number of studies provide evidence on the effect of the Board's monitoring role on the relationship between Board diversity and earnings quality. Therefore, according to theoretical prediction and existing empirical evidence, this study expects that the monitoring role of the Board of directors can enhance the link between Board diversity and earnings quality, as below.

***H2:** The monitoring role of the Board of directors improves the effect of Board diversity on earnings management.*

***H2a:** The monitoring role of the Board of directors improves the effect of Board diversity on accruals earnings management.*

***H2b:** The monitoring role of the Board of directors improves the effect of Board diversity on real earnings management.*

The Advisory Role of the Board

Resource dependence theory is applied to explain the advisory role of the Board of directors. This theory is based on organisation-environment relations. The theory assumes that the environment provides threats and opportunities (resources) to the organisation (Ositadimma Jim et al., 2021). In other words, firms have to deal with these constraints and manage resources for their survival and growth. Therefore, resource dependence theorists consider the Board of directors as a connector between firms and the external environment, enabling firms to reduce dependence or gain resources (Pfeffer and Salancik, 2003, Hillman et al., 2009).

Regarding the advisory role of the Board of directors, the diversity of Board skills, knowledge, intelligence, experience, and perspectives can enhance Board effectiveness by providing their capabilities to the Board's decision-making (Labelle et al., 2010, Ositadimma Jim et al., 2021). In this regard, the Board of directors complements the top management team with helpful advice (Daily et al., 2003, Hillman et al., 2009). Additionally, Hillman and Dalziel (2003) define Board capital as the combined human and relational capital such as directors' expertise, experience, knowledge, reputations, skills, the network of ties to other firms and external contingencies. They suggest that the diversity in Board capital can provide the firm with valuable resources, turning into firm performance. This is to say that Board capital links to the provision of resources in terms of advice and counsel to managers (Hillman and Dalziel, 2003).

Empirically, few extant studies provide evidence on the relationship between the advisory Board and corporate outcomes. For instance, Reeb and Upadhyay

(2010) discover that a firm financial performance is positively associated with advisory committees. Hsu and Hu (2016) also find that advisory directors on corporate boards are positively related to earnings quality, which is measured by earnings persistence. Although some studies have been carried out on advisory roles regarding the benefit of advising the management team to improve firm performance and earnings quality, there is still very little research to date that examines the moderating effect of the Board's advisory role on Board diversity and earnings management. Therefore, according to the review theoretical lens and literature, the moderating effect of the Board's advisory role on the link between Board diversity and earnings management is proposed in this study below.

***H3:** The advisory role of the Board of directors improves the effect of Board diversity on earnings management.*

***H3a:** The advisory role of the Board of directors improves the effect of Board diversity on accruals earnings management.*

***H3b:** The advisory role of the Board of directors improves the effect of Board diversity on real earnings management.*

3. Data and methodology

3.1. Sample selection and data

This study uses secondary data, including Board characteristics, finance and accounting information. The data are obtained from BoardEx (WRDS), Datastream (Refinitiv), and S&P Capital IQ. The sample used in the research includes listed companies in six countries: Australia, Singapore, Hong Kong, Canada, the UK and the US, between 2016 and 2020. The sample is selected from all industries, except for the financial and utility industry, as these are subjected to different regulations from others. The firms in the sample are selected from the developed countries in each continent. Moreover, all of the countries in the sample apply one-tier board functions, which can be comparable to each other.

3.2. Measures

3.2.1 Estimation of earnings management

Earnings management is a dependent variable in this study. It can be classified into accrual earnings management and real earnings management. As the nature of this variable is not perfectly observable, we need to use proxy variables.

Accruals Earnings Management

The amount of accruals, which serves as a proxy for how much management discretion is used in reporting earnings, serves as all accrual-based measures of earning management. The total accruals are estimated on the cash flow approach as below:

$$TA_{i,j,t} = NI_{i,j,t} - CFO_{i,j,t} \quad (1)$$

Where $TA_{i,j,t}$ is total accruals items of firm i from a country j at time t ; $NI_{i,j,t}$ is net income of firm i from a country j in time t ; $CFO_{i,j,t}$ is cash flows from operations of firm i from a country j in year t .

After determining the overall accruals, they are divided into non-discretionary and discretionary parts. The purpose of non-discretionary accruals is to enhance the informational value of financial statements. Thus, discretionary accruals correspond to accruals earnings management. This study estimates three discretionary accruals earnings management measures as follows:

First, we follow Jones (1991) and Dechow et al. (1995), called modified Jones' model, to measure accruals earnings management (AEM1). We run the model by deducting the change in accounts receivable from the change in revenues;

$$\frac{TA_{i,j,t}}{A_{i,j,t-1}} = \alpha_1 \left(\frac{1}{A_{i,j,t-1}} \right) + \beta_1 \frac{\Delta REV_{i,j,t} - \Delta REC_{i,j,t}}{A_{i,j,t-1}} + \beta_2 \frac{PPE_{i,j,t}}{A_{i,j,t-1}} + \varepsilon_{i,j,t} \quad (2)$$

Where $A_{i,j,t-1}$ is total assets of firm i from a country j lagged by one year; $\Delta REV_{i,j,t}$ is the annual change in revenues of firm i from a country j in time t ; $\Delta REC_{i,j,t}$ is the change in accounts receivable of firm i from a country j at time t ; $PPE_{i,j,t}$ is gross properties plants and equipment of firm i from a country j at time t ; and $\varepsilon_{i,j,t}$ is the error term.

Second, we follow Kothari et al. (2005)'s model (AEM2), which is modified from the previous model. We also improve the AEM2 model, as suggested in the work of Raman and Shahrur (2008). In this regard, we consider a company with extraordinary financial performance, which could affect the effectiveness of the accruals model. As a result, the model incorporates the ratio of market value to book value and the return on assets to account for financial performance.

$$\frac{TA_{i,j,t}}{A_{i,j,t-1}} = \alpha_1 \left(\frac{1}{A_{i,j,t-1}} \right) + \beta_1 \frac{\Delta REV_{i,j,t} - \Delta REC_{i,j,t}}{A_{i,j,t-1}} + \beta_2 \frac{PPE_{i,j,t}}{A_{i,j,t-1}} + \beta_3 ROA_{i,j,t} + \beta_4 MTB_{i,j,t} + \varepsilon_{i,j,t} \quad (3)$$

Where $ROA_{i,j,t}$ is the return on assets of firm i from a country j in year t ; $MTB_{i,j,t}$ is the ratio of market to book of firm i from a country j in year t .

Third, we follow the accruals quality model (AEM3) developed by Dechow and Dichev (2002), and we modify the AEM3 model by including the firm's change in revenue and properties, plants and equipment (McNichols, 2002, Francis et al., 2005). In this model, the degree to which earnings are correlated with cash flows from operations is determined by a measure of the quality of the accruals. It can be said that this model is a combination of Jones (1991)'s model and Dechow and Dichev (2002)'s model.

$$\frac{TA_{i,j,t}}{A_{i,j,t-1}} = \alpha_1 + \beta_1 \frac{CFO_{i,j,t-1}}{A_{i,j,t-1}} + \beta_2 \frac{CFO_{i,j,t}}{A_{i,j,t-1}} + \beta_3 \frac{CFO_{i,j,t+1}}{A_{i,j,t-1}} + \beta_4 \Delta REV_{i,j,t} + \beta_5 PPE_{i,j,t} + \varepsilon_{i,j,t} \quad (4)$$

According to the three accrual-based models aforementioned, the value of $TA_{i,j,t}$ is the amount of total accruals determined by the activity of the business and the composition of the firm's assets. Therefore, the error term in those regressions, which is the difference between observed and estimated accruals as indicated in each equation, would become a component of discretionary accruals by managers. In other words, the residual value ($\varepsilon_{i,j,t}$) produced from each equation captures the discretionary or abnormal accruals.

Real Earnings Management

Real earnings management (REM) is described as the deviation from normal business activities to manipulate the financial report in order to achieve or conceal

financial goals. This study employs Roychowdhury (2006)'s empirical models to identify these phenomena. REM can be classified into the following three operational activities: sales, discretionary expenditure, and inventory production. First, according to Roychowdhury (2006), sales transactions can be manipulated by giving out unusual discounts or processing credit sales more quickly than usual. Such operating methods would thus result in higher sales volume in the current period but could also result in reduced cash flows from operations. Therefore, the first real earnings management is measured from the abnormally lower cash flow from operations for sales manipulation (ABCFO) as the following regression;

$$\frac{CFO_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \beta_1 \frac{SALE_{i,t}}{A_{i,t-1}} + \beta_2 \frac{\Delta SALE_{i,t}}{A_{i,t-1}} + \varepsilon_{i,t} \quad (5)$$

Where $SALE_{i,t}$ is firm i's sales in year t.

Second, there should be a higher quantity of reported earnings as a result of policies that limit discretionary spending on things like marketing, advertising, and research and development (R&D). Furthermore, some cash flow should be saved this year. Due to managers' attempts to postpone such expenses in order to increase current earnings, these strategies could, however, result in reduced cash flow in the future. The firm's long-term competitiveness could potentially be harmed. Thus, the second real earnings management is the measure of abnormally lower discretionary expenses for discretionary expenses manipulation (ABDIS) as the following regression;

$$\frac{DISEX_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \beta_1 \frac{SALE_{i,t-1}}{A_{i,t-1}} + \varepsilon_{i,t} \quad (6)$$

Where $DISEX_{i,t}$ is firm I's selling, general, administrative expenses (SG&A) in year t.

Third, a reduced cost of goods sold could result from overproduction, which would boost the operating margin. The fixed manufacturing costs would be mitigated by excessive inventories resulting from the company producing more than usual. In other words, companies would be able to have a lower cost of goods sold and a greater operating margin in the current period as a result of the

deflation in inventory cost per unit. Thus, the third real earnings management is the measure of the abnormally higher production cost for overproduction manipulation (ABPRO), as shown in the following regression;

$$\frac{PROD_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \beta_1 \frac{SALE_{i,t}}{A_{i,t-1}} + \beta_2 \frac{\Delta SALE_{i,t}}{A_{i,t-1}} + \beta_3 \frac{\Delta SALE_{i,t-1}}{A_{i,t-1}} + \varepsilon_{i,t} \quad (7)$$

Where $PROD_{i,t}$ is firm i's cost of goods sold plus a change in inventory in year t.

The same procedures used for accruals earnings management will be employed for real earnings management models. In other words, individual real activity manipulations will be captured by the residuals from models ABCFO, ABDIS and ABPRO.

In this study, we will use aggregate proxies to identify REM. Some studies explain that managers can employ one or more REM strategies in actual operations (Liao and Ouyang, 2019, Ghaleb et al., 2020b). Therefore, in order to capture all potential REM approaches that the firm may employ, the aggregate of individual REM will be used in this study as the following equation.

$$REM1 = (ABCFO \times -1) + (ABDIS \times -1) \quad (8)$$

$$REM2 = (ABDIS \times -1) + ABPRO \quad (9)$$

$$REM3 = (ABCFO \times -1) + (ABDIS \times -1) + ABPRO \quad (10)$$

Where REM1 is the sum of abnormal cash flow and abnormal discretionary expenses; REM2 is the sum of abnormal discretionary expenses and abnormal production; REM3 is the sum of three individual real earnings management.

According to the individual real earnings management aforementioned, their activities are expected to have a negative impact on cash flow from operations (ABCFO) and discretionary spending (ABDIS), but a positive impact on production costs (ABPRO). We, therefore, multiply ABCFO and ABDIS by a negative one so that they have a positive connection with real earnings management activities, in line with Cohen and Zarowin (2010), Ghaleb et al. (2020a).

3.2.2 Estimation of Board diversity

Board diversity is an independent variable. In this study, Board diversity is estimated using the Blau Index, according to Bear et al. (2010), Strydom et al. (2016), Hoang et al. (2017), Li and Wahid (2018), Almutairi and Quttainah (2019), Tee and Rassiah (2019), Tee (2019), An (2021), Hodgson et al. (2022). Additionally, we multiply the Blau Index by "categories / (categories – 1)" so that the value of the adjusted Blau Index is between 0 to 1, such that the value closer to 1 represents a higher Board diversity. The adjusted Blau Index is computed as the following equations;

Gender diversity

$$GEN_{i,j,t} = 1 - \left[\sum_{g=1}^n \left(\frac{\text{gender}_{i,j,t}}{\text{total number of directors}} \right)^2 \right] \times \frac{K}{K-1}, \quad (11)$$

Where $GEN_{i,j,t}$ is the adjusted-gender-Blau Index; $\text{gender}_{i,j,t}$ is the number of directors in each gender cohort (female and male) of firm i from a country j in year t ; K is categories – in this case, $K = 2$.

Age diversity

$$AGE_{i,j,t} = 1 - \left[\sum_{g=1}^n \left(\frac{\text{age}_{i,j,t}}{\text{total number of directors}} \right)^2 \right] \times \frac{K}{K-1}, \quad (12)$$

where $AGE_{i,j,t}$ is the adjusted-age-Blau Index; $\text{age}_{i,j,t}$ is the number of directors in each age cohort (less than 36 years, 36-45 years old, 46-55 years old, 56-65 years old and older than 65 years old) of firm i from a country j in year t ; K is categories – in this case, $K = 5$.

Educational level diversity

$$EDU_{i,j,t} = 1 - \left[\sum_{g=1}^n \left(\frac{\text{education}_{i,j,t}}{\text{total number of directors}} \right)^2 \right] \times \frac{K}{K-1}, \quad (13)$$

Where $EDU_{i,j,t}$ is the adjusted-educational-Blau Index; $\text{education}_{i,j,t}$ = the number of directors in each education cohort (below Bachelor's degree, Bachelor's degree, Master's degree and Doctoral degree) of firm i from a country j in year t ; K is categories – in this case, $K = 4$.

Tenure diversity from his/her experience

$$TEN_{i,j,t} = 1 - \left[\sum_{g=1}^n \left(\frac{\text{tenure}_{i,j,t}}{\text{total number of directors}} \right)^2 \times \frac{K}{K-1} \right], \quad (14)$$

Where $TEN_{i,j,t}$ is the adjusted-tenure-Blau Index; $\text{tenure}_{i,j,t}$ = the number of directors in each tenure cohort (less than 4 years, 4-6 years, 7-9 years, and more than 9 years) of firm i from a country j in year t ; K is categories – in this case, $K = 4$.

Expertise/experience diversity

$$EXP_{i,j,t} = 1 - \left[\sum_{g=1}^n \left(\frac{\text{exper}_{i,j,t}}{\text{total number of directors}} \right)^2 \times \frac{K}{K-1} \right], \quad (15)$$

Where $EXP_{i,j,t}$ is the adjusted-expertise/experience-Blau Index; $\text{exper}_{i,j,t}$ = the number of directors in each expertise/experience cohort (directors with expertise and/or experience in business management, finance/ accounting, law, art, science, industry, and others) of firm i from a country j in year t ; K is categories – in this case, $K = 7$.

Moreover, we develop the aggregate Board index, which combines the five Board diversity above-stated. This is consistent with the study done by Kagzi and Guha (2018b).

$$DIVERSITY_{i,j,t} = GEN_{i,j,t} + AGE_{i,j,t} + EDU_{i,j,t} + TEN_{i,j,t} + EXP_{i,j,t} \quad (16)$$

Where $SUMINDEX_{i,j,t}$ is the total Board diversity index of firm i from a country j in year t

3.2.3 Estimation of Board of director's roles

The Board of directors' roles is considered as the moderators in this study. Most research on CG has categorised the Board of director's roles into monitoring and advisory functions (Adams and Ferreira, 2007, Faleye et al., 2011, Upadhyay et al., 2014, Hsu and Hu, 2016, Mustafa et al., 2018). Additionally, to date, much of the current literature on the Board of directors measure Board's roles by the Board's committee. Thus, in this study, we have investigated the Board's roles in the aforementioned aspect as follows:

Board of director's roles measured by board committees

Regarding the Board's monitoring role by Board committees, many researchers, for example, Osma and Noguera (2007), Reeb and Upadhyay (2010), Faleye et al.

(2011), Ntim (2013), Upadhyay et al. (2014), have classified monitoring committees into three types: (i) audit, (ii) compensation, and (iii) nominating committees. In other words, the audit committee is responsible for monitoring the financial reporting processes, while the compensation committee is accountable for evaluating and approving the appropriate amount paid to executives. The nominating committee's responsibilities are in charge of recruiting the proper Board members and assessing top management's performance.

On the other hand, involving the Board's advisory role by advisory committees, Reeb and Upadhyay (2010), Zalata et al. (2019) have defined advisory committees as committees other than the monitoring committees. These include finance, investment, public issues, diversity, mergers and acquisitions, ethics, environment, and other advising-related committees.

Therefore, this study defines the Board's monitoring committee (MONIC) as audit, compensation, and nominating committees, while advisory committees (ADVIC) are those that are not monitoring committees.

Moreover, several control variables are included in the multivariate model of our investigation. In this regard, we have controlled for the effect of firm characteristics, including the firm's size, age, return on assets, and growth. We have also considered the impact of CG factors that may influence firms, including the firm's likelihood of bankruptcy. We also take into account the effect of accounting standards and auditing firms, two aspects of financial accounting that may have an impact on the quality of earnings. Furthermore, to account for industry-specific effects, we have incorporated industry dummies in the regression models. The model also includes country dummies to account for unobserved country heterogeneity. Additionally, year dummies are included in the model to account for variations in the macroeconomic environment during the research period in terms of temporal effects. Finally, to account for possible

heteroskedasticity and autocorrelation, the standard errors are robust and clustered within the company. For the definitions of the variables, please see Table 1.

/Table 1 here/

3.3 Regression model

There are three estimating methods: Pooled OLS, Fixed-Effect Model, and Random-Effect Model. The Hausman test is also used to evaluate the adequacy of the model choices. In addition, all explanatory variables are lagged by one year in order to avoid simultaneous problems (Bellemare et al., 2017). The effect of Board diversity on earnings management can be estimated through the following econometric models.

Model 1 The effect of Board diversity on earnings management

$$\begin{aligned}
 EM_{i,j,t} = & \beta_0 + \beta_1(DIVERSITY_{i,j,t-1}) + \beta_2(SIZE_{i,j,t-1}) + \beta_3(AGE_{i,j,t-1}) + \beta_4(ROA_{i,j,t-1}) \\
 & + \beta_5(GROWTH_{i,j,t-1}) + \beta_6(ZSCORE_{i,j,t-1}) + \beta_7(IFRS_{i,j,t-1}) \\
 & + \beta_8(BIG4_{i,j,t-1}) + Industry\ dummy + Year\ dummy \\
 & + Country\ dummy + \varepsilon_{i,j,t-1}
 \end{aligned} \tag{17}$$

Model 2 Moderating effects of the monitoring Board's role on the link between Board diversity and earnings management

$$\begin{aligned}
 EM_{i,j,t} = & \beta_0 + \beta_1(DIVERSITY_{i,j,t-1}) + \beta_2(MONIC_{i,j,t-1}) \\
 & + \beta_3(DIVERSITY_{i,j,t-1} \times MONIC_{i,j,t-1}) + \beta_4(SIZE_{i,j,t-1}) + \beta_5(AGE_{i,j,t-1}) \\
 & + \beta_6(ROA_{i,j,t-1}) + \beta_7(GROWTH_{i,j,t-1}) + \beta_8(ZSCORE_{i,j,t-1}) \\
 & + \beta_9(IFRS_{i,j,t-1}) + \beta_{10}(BIG4_{i,j,t-1}) + Industry\ dummy + Year\ dummy \\
 & + Country\ dummy + \varepsilon_{i,j,t-1}
 \end{aligned} \tag{18}$$

Model 3 Moderating effects of the advisory Board's role on the link between Board diversity and real earnings management

$$\begin{aligned}
 EM_{i,j,t} = & \beta_0 + \beta_1(DIVERSITY_{i,j,t-1}) + \beta_2(ADVIC_{i,j,t-1}) + \beta_3(DIVERSITY_{i,j,t-1} \times ADVIC_{i,j,t-1}) \\
 & + \beta_4(SIZE_{i,j,t-1}) + \beta_5(AGE_{i,j,t-1}) + \beta_6(ROA_{i,j,t-1}) + \beta_7(GROWTH_{i,j,t-1}) \\
 & + \beta_8(ZSCORE_{i,j,t-1}) + \beta_9(IFRS_{i,j,t-1}) + \beta_{10}(BIG4_{i,j,t-1}) \\
 & + Industry\ dummy + Year\ dummy + Country\ dummy + \varepsilon_{i,j,t-1} \quad (19)
 \end{aligned}$$

Please refer to Table 1 for a list of the variables' definitions.

4. Analysis and results

4.1 Descriptive statistical analysis

The descriptive statistics for the variables employed in this research are shown in Tables 2 - 4. This includes means, minimum, maximum and standard deviation. Additionally, to reduce the potential impact of outlier distortion, all continuous variables are winsorised² at the 1% and 99% percentiles.

/Table 2 here/

According to Table 2, the companies' absolute accruals earnings management have an average value between 0.1285 and 0.4834. It is encouraging to compare this figure with that found by Wan Mohammad and Wasiuzzaman (2019), Orazalin (2019), who found mean values of 0.290 and 0.326, respectively. What is surprising is that, on average, the US-listed companies engage the highest accruals earnings management compared to other sample countries.

² By replacing outliers (extreme data) with closer values, the winsorising strategy minimises the impact of outliers and reduces the bias in statistical estimation. In this study, all the observations with continuous values greater than 99 percentiles will be replaced with the value of 99 percentiles. And all observations with continuous values less than 1 percentile will be valued at 1 percentile.

For the real earnings management model, it was found that the average value of REM1 is negative, at -0.006. This suggests that sample companies generally engage in real earnings management designed to decrease earnings. As a result, the aggregate value of three individual real earnings management (REM3) is also negative at -0.007. This study supports evidence from previous research that found negative real earnings management (e.g. Liao and Ouyang (2019), Ben Amar and Sayadi (2022)). In contrast, the average value of REM2 is positive, meaning that most sampled companies try to increase earnings by overproduction in order to obtain a lower cost of goods sold. Moreover, it is somewhat surprising that, on average, the Canadian, Singaporean and UK-listed companies engage in all real earnings management activities by reducing earnings, as we can see from the negative average value of all three REMs.

/Table 3 here/

As shown in Table 3, the average aggregate Board diversity index for our sample ranges from 3.10 to 3.27 across six countries. In general, the sampled companies are more likely to have a diverse Board of directors, as a value closer to 5 (which is derived from five characteristics: gender, age, education, tenure, and expertise/experience) indicates a more diverse Board. The average result also shows that Canadian companies have the greatest levels of Board diversity at 3.27.

Considering the Board of director's roles in Table 3, the average monitoring committee is around three, with the highest average in Hong Kong companies being slightly above 3. However, it was found that the low average advisory committee which is below one, especially in UK companies that occupy only 0.38 advisory committees. This is justified by the fact that advisory committees are

not required by any regulation; rather, they may organise voluntarily inside each corporation.

/Table 4 here/

Table 4 presents descriptive statistics for control variables. The average log of market capitalisation is about 6, while the total sample's average age is around 41 years. It is interesting to see that almost all country samples have negative average values for return on assets, which averages out to -6 percent for the overall sample. Additionally, firm growth has a mean value of 20 percent and a range of 10 percent to 26 percent. The average Altman Z score is 2.25. This score means that the likelihood of a company going bankrupt increases as the value approaches zero. As indicated in Table 4, the Australian companies have the most stable financial positions, with the highest Altman Z score at 3.57. Table 4 also reveals that the majority of samples apply IFRS for accounting standards, with the exception of U.S.-based companies, which instead adopt US GAAP. The analysis also indicates that, on average, firms audited by the big four auditors make up roughly 71 percent of the sample companies.

4.2 Correlation analysis

/Table 5 here/

Table 5 provides the correlation coefficient between variables. Correlation results show that the Board diversity index is significantly and negatively correlated with accruals earnings management (AEM). In comparison, Board diversity is either negatively or positively correlated with real earnings management (REM). It's also intriguing to note the negative correlation between the Board's roles – including monitoring and advisory roles – and AEM.

Importantly, Table 5 also demonstrates that multicollinearity between the variables is not a significant issue because the coefficients are not higher than 0.70 (Gujarati, 2009). Additionally, in order to check for multicollinearity, the variance inflation factors (VIFs) are also calculated. There is multicollinearity when the VIF value is more than 10. (Hair et al., 2018). According to this study, all of the VIF values are below 3. Thus, there is no multicollinearity issue in this study.

4.3 Regression results

/Table 6 here/

According to three estimation approaches, the Pooled OLS method does not take into consideration whether the cross-section unit may be influenced by different individual factors or the individual-specific effect and how the time period that time-series data have been gathered for each individual may change. Thus, the Pooled OLS approach may not be the most appropriate or credible model. The Hausman test is then used to determine which of the fixed-effect and random-effect models most adequately explains the study results. After applying the Hausman test, it was found that all models in this study rely on fixed-effect regression.

The outcome of the fixed effect robust model, which uses clustered standard error to account for some assumption violations, is shown in Table 6. The first model (Model 1), which is related to the first hypothesis, shows an adjusted r-squared range of 0.31 to 0.85. This demonstrates that between 31 and 85 percent of earnings management of the sample's listed companies can be explained by the Board diversity variable and the control variables. Other (15 - 69%) are explained by variables not included in the study. It might be said that Board diversity and other control variables can explain the AEM models more extensively than the

REM models. In addition, Table 6 demonstrates that the diversity of a Board has a significant negative relationship with AEM, therefore supporting the first hypothesis. However, diversity on the Board has a significant positive effect on REM, which is the most striking outcome of the investigation. Therefore, hypothesis 1a is acceptable in this study, while hypothesis 1b is not.

This result may be explained by the fact that sample companies may switch between earnings management strategies, shifting from accruals earnings management to real earnings management. These results provide additional evidence for the notion of a *substitution* effect between AEM and REM, in accordance with Cohen et al. (2008), Cohen and Zarowin (2010), Ipino and Parbonetti (2016), Ferentinou and Anagnostopoulou (2016), Enomoto et al. (2018), Chang et al. (2018), Mnif and Ben Hamouda (2020).

/Table 7 here/

In this regard, we provide robustness tests by examining the possibility of a differential impact of Board diversity on AEM and REM. To analyse the trade-off between AEM and REM, we investigate the relationship between the ratio of REM to AEM and Board diversity. In accordance with Evans et al. (2014), Enomoto et al. (2018), we compute the ratio of REM to AEM and regress it on Board diversity. In particular, we replace the ratio for the earnings management variables in Equation 17. When there is a trade-off between AEM and REM as Board diversity increases, the coefficient on Board diversity should be significantly positive. As demonstrated in Table 7, Board diversity has a significantly positive coefficient. As a result, we may argue that Board diversity has a differential influence on AEM and REM, implying a shift from AEM to REM.

/Table 8 here/

Moreover, we add REM, as one of the predictor variables, into the AEM models in Equation 17. Table 8 displays the outcomes of such a model specification. The negative coefficients of REM indicate that real and accruals earnings management may be substituted in this study. Due to the difference in timing between AEM and REM, managers will likely adjust the degree of accruals manipulation to the level of real activities management. In other words, these two strategies of earnings management may be substituted, with the extent of real earnings management determining the extent of accruals manipulation (Cohen et al., 2008, Zang, 2011, Choi et al., 2018).

In reviewing the literature, Board diversity is possibly tied to the directors' unique human capital. The human capital theory is used to explain the notion that a variety in observable and unobservable characteristics of the Board of directors could be related to the accumulative human capital (Khatib et al., 2020). Carter et al. (2010) suggest that the human capital of directors is influenced by gender. As an example, Gull et al. (2018) find that female directors can reduce the level of earnings management. In support, Rojana and Yang (2019) also discover that firms with age-heterogenous boards decrease accrual earnings management. Ositadimma Jim et al. (2021) also discover that educational qualification diversity can enhance the earnings quality of listed Banks. Moreover, Becker (1962) discovers the role of an individual's stock of education, experience, and skills can be used to enhance an organisation. In support, Cohen et al. (2014) discover that the presence of industry expertise in the audit committee has a positive impact on the quality of financial reporting.

Moreover, Table 6 (baseline models) illustrates the significant relationship between control variables and earnings management. A firm's size and return on assets are statistically significant and negative with earnings management. In

other words, a larger company is less likely to engage in earnings management. This might be the case since large companies maintain their reputation and credibility and draw in various stakeholders. Additionally, the companies applying for IFRS seem less likely to adopt earnings management approaches. However, the study finds that earnings management opportunities increase with the length of a company's existence. Furthermore, firms with a lower likelihood of bankruptcy are less likely to engage in earnings management. Lastly, companies that have been audited by one of the Big Four auditing firms are less likely to engage in earnings management.

/Table 9 here/

Table 9 displays the second model (Model 2) in relation to the second hypothesis. Our findings suggest that Board diversity plays a key role in curbing the practices of accruals earnings management. Even when we take into account the interaction term, Board of directors' roles, the coefficient on the Board diversity index is negative and significant, as is to be expected. Contrary to our hypothesis, no evidence of the effect of Board diversity on real earnings management was found. As also illustrated in Table 9, the Board's monitoring function has a negatively significant relationship with earnings management, particularly in accruals models. This can be said that the amount of earnings management may be decreased as a result of the Board of director's monitoring responsibilities. In addition, accruals earnings management demonstrated that the moderator's role in Board monitoring revealed statistical differences. There is a significant difference in accruals earnings management when Board monitoring roles are functioning, as shown by the significant interactions of the Board monitoring role with Board diversity in accruals models. Although the interaction effects of Board diversity and Board monitoring functions are not statistically significant in

real earnings management models, these relationships are negatively related to earnings management. In other words, Board diversity and monitoring roles may reduce real earnings management. Unfortunately, the second hypothesis cannot be accepted based on the regression results, as the sign of interactions in accruals models is positive, and interactions have no significant effect on real earnings management. These results suggest that either Board diversity or Board's monitoring functions still have a substantial effect on earnings management. It might be said that they serve as substitute roles which will be discussed in the following paragraphs.

In reviewing the literature, these study results are consistent with agency theory which is the dominant CG theory and can be utilised to explain the emergence of the Board of directors and its monitoring role. The Board of directors, which serves as a trustee, monitors and controls the agents (managers) to make sure they follow the regulations and protect the interests of the owners (shareholders) (Jensen and Meckling, 1976, Ositadimma Jim et al., 2021). In this regard, the diversity in the boardroom can enhance the monitoring role in a way that Board members perform their tasks that are representative of shareholders to protect the interests of a whole. This finding agrees with scholars' view that Board diversity and monitoring roles can reduce earnings management. For example, a recent study by Zalata et al. (2019) demonstrates that women on corporate boards holding monitoring roles can reduce earnings management. Similarly, Faleye et al. (2011) find that Board monitoring is positively related to CEO turnover sensitivity and lower excess compensation, representing higher earnings quality. It can be seen that monitoring intensity can enhance board oversight performance.

/Table 10 here/

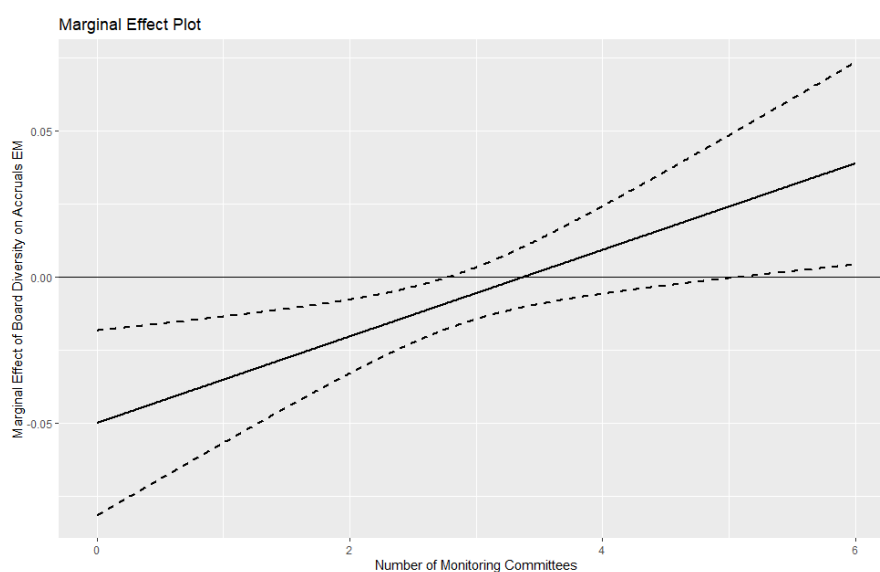
Regarding the third hypothesis – the advisory role of the Board – Table 10 demonstrates that Board diversity has a significant negative impact on accruals EM but a significant positive impact on Real EM. These findings are consistent with the first hypothesis. In addition, it has been revealed that the Board's advisory role has a negative impact on earnings management in almost all cases. Thus, a Board advisory function may also result in less earnings management. This is in line with resource dependence theory, which is applied to explain the advisory role of the Board of directors. Resource dependence theorists consider the Board of directors as a connector between firms and the external environment, enabling firms to reduce dependence or gain resources (Pfeffer and Salancik, 2003, Hillman et al., 2009). The diversity of Board skills, knowledge, intelligence, experience, and perspectives can enhance board effectiveness by providing their capabilities to the Board's decision-making (Labelle et al., 2010, Ositadimma Jim et al., 2021). In this regard, the Board of directors complements the top management team with helpful advice (Daily et al., 2003, Hillman et al., 2009). In support, Faleye et al. (2013) propose that advisory directors provide CEOs with their professional expertise and experience, resulting in better strategic outcomes, higher firm acquisition returns, better-quality corporate innovation, and greater firm value. In the same vein, Hsu and Hu (2016) find that advisory directors on corporate Boards are positively related to earnings quality. Taking into account the interaction effects between Board diversity and Board advisory roles, Table 10 demonstrates that the Board's advisory role has a negative impact on earnings management, despite the interaction effect having a significant positive impact on accruals EM but a negative impact on real EM. In other words, large advisory committees do not help the Board in decreasing accruals EM because of its increased diversity. In contrast, larger advisory committees with more diverse Boards can reduce real EM; however, we are

unable to discover evidence of this due to the interaction coefficient's insignificance. Therefore, the third hypothesis is unaccepted in this study.

4.4 Visualising the interaction effects

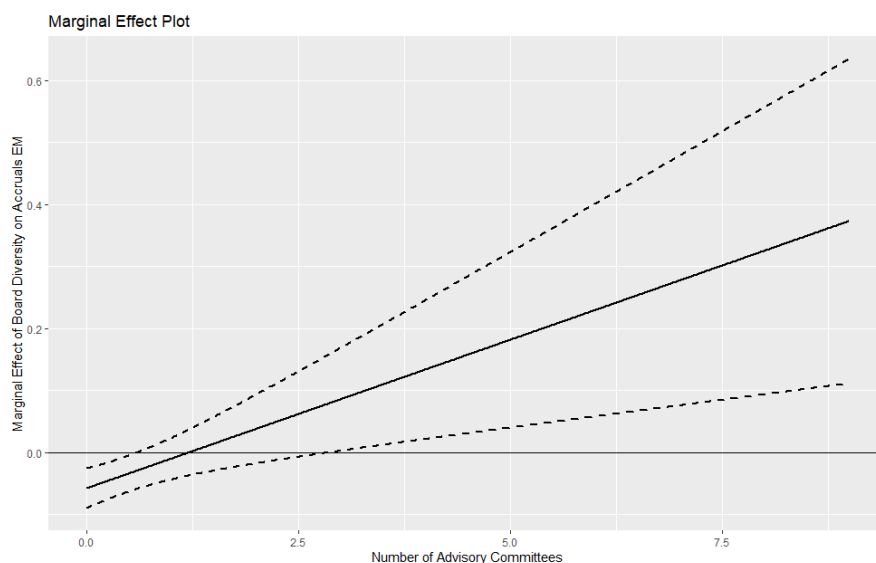
To further clarify the function of the interaction effect, visualisation is required to understand such an effect (Hayes, 2018). Thus, we develop a graph of the marginal effect of independent variables on the dependent variable at a particular value of the moderator. The graphical visualisation method can simplify the interpretation of interaction effects, hence eliminating the need for arbitrary categorisations (Lamina et al., 2012). Although the second and third hypotheses cannot be accepted in this study, the combination of findings provides some support for the conceptual premise that two alternative Board characteristics - Board diversity or Board roles – can be applied to reduce earnings manipulation. As shown in Figures 1 and 2, we can see that the negative link between Board diversity and AEM is less pronounced when the Board's roles are stronger.

Figure 1 Change in Marginal Effect of Board Diversity on AEM Across Different Board Monitoring Roles



This graph was created using AEM2, which gave outcomes similar to those of other AEMs.

Figure 2 Change in Marginal Effect of Board Diversity on AEM Across Different Board Advisory Roles



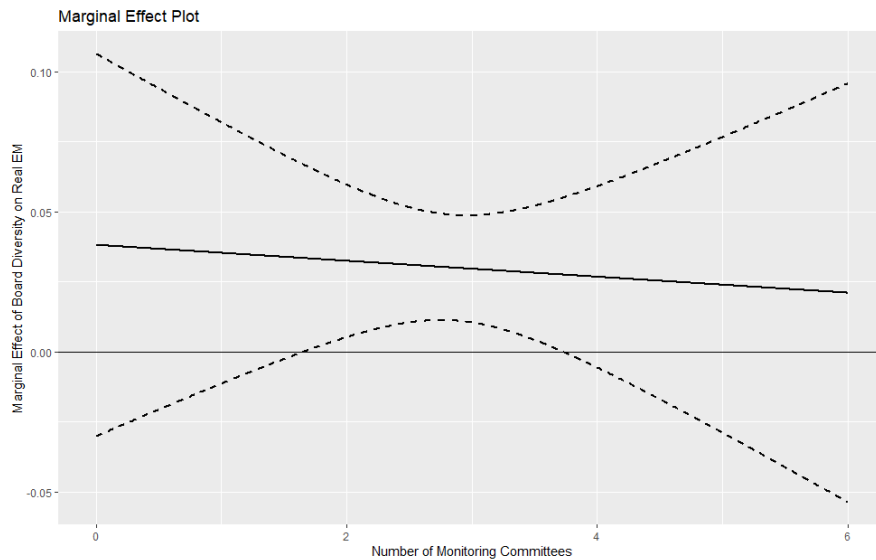
This graph was created using AEM3, which gave outcomes similar to those of other AEMs.

In this regard, Figures 1 to 2 show how the moderating effect seems to appear at a particular value of the Board's roles. This is a constructed characteristic when the interaction variable is made up of two continuous variables (Golder, 2006). According to this logic, Board diversity is only likely to be a constraint on AEM in situations when the Board's roles are minimal. In this instance, the roles of the Board and the diversity of the Board serve as *substitute* influences on AEM. Under AEM, the results may show that Board diversity changes their structures by serving as an inspector or advisor to management.

In contrast to AEM, the interaction effect between Board diversity and Board roles on REM is in the opposite direction. As can be seen from Figures 3 and 4, REM induced by a more diverse Board is mitigated by the increased roles of the Board, monitoring and advisory roles. As also demonstrated by the slope of the coefficient, Boards of directors with higher diversity are less influential when they can monitor and advise the management team more effectively. In other words, when the Board functions are larger, the positive relationship between Board diversity and real earnings management is less pronounced. Consequently, Board monitoring and advisory roles serve as a *complement* to a

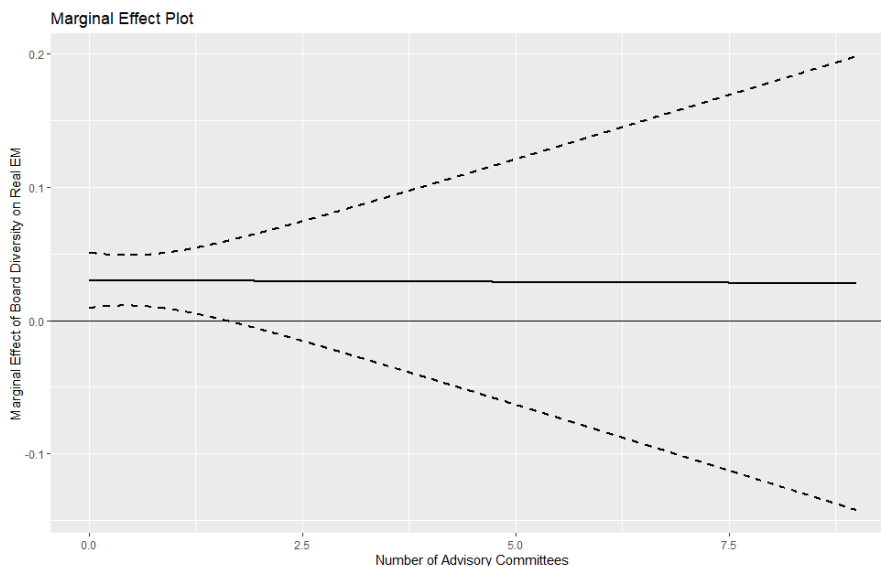
diverse Board in decreasing earnings management by managers. This finding is consistent with that of García-Sánchez et al. (2017), who suggest the complementary role of the institutional factors and the role of the Board of directors in positively influencing earnings quality.

Figure 3 Change in Marginal Effect of Board Diversity on REM Across Different Board Monitoring Roles



This graph was created using REM3, which gave outcomes similar to those of other REMs.

Figure 4 Change in Marginal Effect of Board Diversity on REM Across Different Board Advisory Roles



This graph was created using REM3, which gave outcomes similar to those of other REMs.

5. Conclusion

According to Model 1, the study reveals that the Board diversity of the sampled companies has a significant negative effect on accruals earnings management, but a significant positive effect on real earnings management. Based on this, the study concludes that Board diversity has an effect on the ways in which managers employ real activities manipulation and accrual-based earnings management as substitutes. Secondly, the outcomes of Model 2 demonstrate that the Board's monitoring function has a negative effect on both accruals and real earnings management. The study concludes that the Board's monitoring role improves the earnings quality of the listed companies. Thirdly, Model 3's findings indicate that the Board's advising role has a negative impact on accruals and real earnings management. As a result, the study comes to the conclusion that a Board advisory role enhances listed companies' earnings quality. Taking into account the interaction effect, the outcomes demonstrate that the interaction effects between Board diversity and two Board functions are positively linked with accruals earnings management. In other words, there are greater opportunities for managing accruals earnings with a more diverse Board and larger Board roles. Therefore, the Board of directors' advisory and monitoring roles weaken the link between Board diversity and accruals earnings management. Lastly, although Board diversity by itself may increase the level of real earnings management, when the complementary function of Board roles in these effects is considered, Board diversity has more influence on real earnings management. Therefore, Board monitoring and advising roles can strengthen the relationship between Board diversity and real earnings management.

There is a time limit for making recommendations for future research, so only five years of the study period are examined in this study due to the time constraints on data collecting. Therefore, a larger sample size should be used in a future study to obtain a more comprehensive picture of the impact of the

independent variables on the dependent variables. Although the Board roles were carried out as either advisory or monitoring functions, there is also a limitation on the moderating variable, which exhibits no discernible change in some sub-models. In order to determine if these Board roles will be able to strengthen the link between Board diversity and earnings quality, it is suggested that a study involving these Board roles should be conducted in the future. Finally, in the future, this study may be expanded to include a sample of companies from different countries, for example, in developing countries, and researchers could then reasonably compare the impact of Board diversity in two different settings.

References

- ABDULLAH, S. N. & ISMAIL, K. N. I. K. 2016. Women directors, family ownership and earnings management in Malaysia. *Asian Review of Accounting*, 24, 525-550.
- ADAMS, R. B., DE HAAN, J., TERJESEN, S. & VAN EES, H. 2015. Board Diversity: Moving the Field Forward. *Corporate Governance: An International Review*, 23, 77-82.
- ADAMS, R. B. & FERREIRA, D. 2007. A Theory of Friendly Boards. *The Journal of finance (New York)*, 62, 217-250.
- ADAMS, R. B. & FERREIRA, D. 2009. Women in the boardroom and their impact on governance and performance☆. *Journal of Financial Economics*, 94, 291-309.
- ALHOSSINI, M. A., NTIM, C. G. & ZALATA, A. 2020. Corporate Board Committees and Corporate Outcomes: An International Systematic Literature Review and Agenda for Future Research. *SSRN Electronic Journal*.
- ALMUTAIRI, A. R. & QUTTAINAH, M. A. 2019. Corporate governance and accounting conservatism in Islamic banks. *Thunderbird International Business Review*, 61, 745-764.
- AN, S. 2021. Board Diversity and Monitoring: An Investigation of Gender and Task-Related Diversity. *Public Performance & Management Review*, 1-26.
- BANBHAN, A., CHENG, X. & UD DIN, N. 2018. Financially Qualified Members in an Upper Echelon and Their Relationship with Corporate Sustainability: Evidence from an Emerging Economy. *Sustainability*, 10.
- BEAR, S., RAHMAN, N. & POST, C. 2010. The Impact of Board Diversity and Gender Composition on Corporate Social Responsibility and Firm Reputation. *Journal of Business Ethics*, 97, 207-221.
- BECKER, G. S. 1962. Investment in Human Capital: A Theoretical Analysis. *The Journal of political economy*, 70, 9-49.
- BELLEMARE, M. F., MASAKI, T. & PEPINSKY, T. B. 2017. Lagged Explanatory Variables and the Estimation of Causal Effect. *The Journal of Politics*, 79, 949-963.
- BEN-AMAR, W., FRANCOEUR, C., HAFSI, T. & LABELLE, R. 2013. What Makes Better Boards? A Closer Look at Diversity and Ownership: What Makes Better Boards? *British journal of management*, 24, 85-101.
- BEN AMAR, A. & SAYADI, N. 2022. Independent financial expert members on audit committees, earnings management and the role of female directors. *Journal of Accounting and Management Information Systems*, 21, 5-24.
- BRAAM, G. A. N., MONOMITA AND WEITZEL, UTZ AND LODH, SUMAN, 2015. Accrual-Based and Real Earnings Management and Political Connections. *International Journal of Accounting*, 50.

- CARPENTER, V. L. & FEROZ, E. H. 1992. GAAP as a symbol of legitimacy: New York State's decision to adopt generally accepted accounting principles. *Accounting, organizations and society*, 17, 613-643.
- CARTER, D. A., D'SOUZA, F., SIMKINS, B. J. & SIMPSON, W. G. 2010. The Gender and Ethnic Diversity of US Boards and Board Committees and Firm Financial Performance. *Corporate Governance: An International Review*, 18, 396-414.
- CHANG, S.-L., HWANG, L.-J., LI, C.-A. & JHOU, C.-T. 2018. Managerial Overconfidence and Earnings Management. *International journal of organizational innovation*, 10, 189-205.
- CHOI, A., CHOI, J. H. & SOHN, B. C. 2018. The Joint Effect of Audit Quality and Legal Regimes on the Use of Real Earnings Management: International Evidence. *Contemporary Accounting Research*, 35, 2225-2257.
- COHEN, D. A., DEY, A. & LYS, T. Z. 2008. Real and accrual-based earnings management in the pre- and post-sarbanes-oxley periods. *The Accounting review*, 83, 757-787.
- COHEN, D. A. & ZAROWIN, P. 2010. Accrual-based and real earnings management activities around seasoned equity offerings. *Journal of accounting & economics*, 50, 2-19.
- COHEN, J. R., HOITASH, U., KRISHNAMOORTHY, G. & WRIGHT, A. M. 2014. The Effect of Audit Committee Industry Expertise on Monitoring the Financial Reporting Process. *The Accounting Review*, 89, 243-273.
- DAILY, C. M., DALTON, D. R. & CANNELLA JR, A. A. 2003. Corporate governance: Decades of dialogue and data. *The Academy of Management review*, 28, 371-382.
- DECHOW, P. M. & DICHEV, I. D. 2002. The Quality of Accruals and Earnings: The Role of Accrual Estimation Errors. *The Accounting review*, 77, 35-59.
- DECHOW, P. M., SLOAN, R. G. & SWEENEY, A. P. 1995. Detecting Earnings Management. *The Accounting review*, 70, 193-225.
- EISENHARDT, K. M. 1989. Agency Theory: An Assessment and Review. *The Academy of Management review*, 14, 57-74.
- ENOMOTO, M., KIMURA, F. & YAMAGUCHI, T. 2018. A cross-country study on the relationship between financial development and earnings management. *Journal of International Financial Management & Accounting*, 29, 166-194.
- EVANS, M. E., HOUSTON, R. W., PETERS, M. F. & PRATT, J. H. 2014. Reporting Regulatory Environments and Earnings Management: U.S. and Non-U.S. Firms Using U.S. GAAP or IFRS. *The Accounting Review*, 90, 1969-1994.
- FALEYE, O., HOITASH, R. & HOITASH, U. 2011. The costs of intense board monitoring. *Journal of Financial Economics*, 101, 160-181.
- FALEYE, O., HOITASH, R. & HOITASH, U. 2013. Advisory Directors. Available at SSRN: <https://ssrn.com/abstract=1866166> or <http://dx.doi.org/10.2139/ssrn.1866166>.

- FERENTINO, A. C. & ANAGNOSTOPOULOU, S. C. 2016. Accrual-based and real earnings management before and after IFRS adoption: The case of Greece. *Journal of Applied Accounting Research*, 17, 2-23.
- FIELDS, T. D., LYS, T. Z. & VINCENT, L. 2001. Empirical research on accounting choice. *Journal of accounting & economics*, 31, 255-307.
- FILATOTCHEV, I. & BOYD, B. K. 2009. Taking Stock of Corporate Governance Research While Looking to the Future. *Corporate governance : an international review*, 17, 257-265.
- FRANCIS, J., LAFOND, R., OLSSON, P. & SCHIPPER, K. 2005. The market pricing of accruals quality. *Journal of accounting & economics*, 39, 295-327.
- GARCÍA-SÁNCHEZ, I.-M., MARTÍNEZ-FERRERO, J. & GARCÍA-MECA, E. 2017. Gender diversity, financial expertise and its effects on accounting quality. *Management Decision*, 55, 347-382.
- GHALEB, B. A. A., AL-DUAI, S. D. & HASHED, A. A. 2020a. Audit Committee Chair's Legal Expertise and Real Activities Manipulation: Empirical Evidence from Malaysian Energy and Utilities Sectors. *International Journal of Energy Economics and Policy*, 11, 65-73.
- GHALEB, B. A. A., KAMARDIN, H., TABASH, M. I. & SHAFIULLAH, M. 2020b. Family ownership concentration and real earnings management: Empirical evidence from an emerging market. *Cogent Economics & Finance*, 8, 1-17.
- GOLDER, M. 2006. Presidential Coattails and Legislative Fragmentation. *American journal of political science*, 50, 34-48.
- GUJARATI, D. N. 2009. *Basic econometrics*, Boston, Boston : McGraw-Hill.
- GULL, A. A., NEKHILI, M., NAGATI, H. & CHTIOUI, T. 2018. Beyond gender diversity: How specific attributes of female directors affect earnings management. *The British Accounting Review*, 50, 255-274.
- HAFSI, T. & TURGUT, G. 2012. Boardroom Diversity and its Effect on Social Performance: Conceptualization and Empirical Evidence. *Journal of Business Ethics*, 112, 463-479.
- HAIR, J. F., BABIN, B. J. & ANDERSON, R. E. 2018. *Multivariate Data Analysis*, Mason, OH, Mason, OH: Cengage.
- HAXHI, I. & AGUILERA, R. 2014. Haxhi I., & Aguilera, R. V. 2014. Corporate governance through codes, In C. Cooper (Ed.) *Wiley Encyclopedia of Management* 3rd Edition, Volume 6, International Management, Wiley-Blackwell.
- HAYES, A. F. 2018. *Introduction to mediation, moderation, and conditional process analysis [internet resource] : a regression-based approach*, New York : Guilford Press.
- HEALY, P. M. & WAHLEN, J. M. 1999. A Review of the Earnings Management Literature and Its Implications for Standard Setting. *Accounting horizons*, 13, 365-383.

- HILLMAN, A. J. 2015. Board Diversity: Beginning to Unpeel the Onion. *Corporate Governance: An International Review*, 23, 104-107.
- HILLMAN, A. J. & DALZIEL, T. 2003. Boards of Directors and Firm Performance: Integrating Agency and Resource Dependence Perspectives. *The Academy of Management review*, 28, 383-396.
- HILLMAN, A. J., WITHERS, M. C. & COLLINS, B. J. 2009. Resource Dependence Theory: A Review. *Journal of Management*, 35, 1404-1427.
- HOANG, T. C., ABEYSEKERA, I. & MA, S. 2017. The Effect of Board Diversity on Earnings Quality: An Empirical Study of Listed Firms in Vietnam. *Australian accounting review*, 27, 146-163.
- HODGSON, A., INLAKORN, S., LHAOPADCHAN, S. & SABSOMBAT, N. 2022. Diversity in Diversity: The Demand for and Profitability of Sub-boards in Thai Listed Corporations. *International Journal of Business*, 27, 1-28.
- HSU, P.-H. & HU, X. 2016. Advisory Board and Earnings Persistence. *Journal of Accounting, Auditing & Finance*, 31, 134-157.
- IPINO, E. & PARBONETTI, A. 2016. Mandatory IFRS adoption: the trade-off between accrual-based and real earnings management. *Accounting and Business Research*, 47, 91-121.
- JENSEN, M. C. & MECKLING, W. H. 1976. Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure *Journal of Financial Economics*, 3, 305-360.
- JONES, J. J. 1991. Earnings Management During Import Relief Investigations. *Journal of accounting research*, 29, 193-228.
- KAGZI, M. & GUHA, M. 2018a. Board demographic diversity: a review of literature. *Journal of Strategy and Management*, 11, 33-51.
- KAGZI, M. & GUHA, M. 2018b. Does board demographic diversity influence firm performance? Evidence from Indian-knowledge intensive firms. *Benchmarking: An International Journal*, 25, 1028-1058.
- KENT BAKER, H., PANDEY, N., KUMAR, S. & HALDAR, A. 2020. A bibliometric analysis of board diversity: Current status, development, and future research directions. *Journal of Business Research*, 108, 232-246.
- KHATIB, S. F. A., ABDULLAH, D. F., ELAMER, A. A. & ABUEID, R. 2020. Nudging toward diversity in the boardroom: A systematic literature review of board diversity of financial institutions. *Business Strategy and the Environment*.
- KOLEV, K. D., WANGROW, D. B., BARKER, V. L. & SCHEPKER, D. J. 2019. Board Committees in Corporate Governance: A Cross-Disciplinary Review and Agenda for the Future. *Journal of Management Studies*.
- KOTHARI, S. P., LEONE, A. J. & WASLEY, C. E. 2005. Performance matched discretionary accrual measures. *Journal of accounting & economics*, 39, 163-197.

- KYAW, K., OLUGBODE, M. & PETRACCI, B. 2015. Does gender diverse board mean less earnings management? *Finance Research Letters*, 14, 135-141.
- LABELLE, R., MAKNI GARGOURI, R. & FRANCOEUR, C. 2010. Ethics, Diversity Management, and Financial Reporting Quality. *Journal of business ethics*, 93, 335–355.
- LAMINA, C., STURM, G., KOLLERITS, B. & KRONENBERG, F. 2012. Visualizing interaction effects: a proposal for presentation and interpretation. *J Clin Epidemiol*, 65, 855-62.
- LI, N. & WAHID, A. S. 2018. Director Tenure Diversity and Board Monitoring Effectiveness. *Contemporary Accounting Research*, 35, 1363-1394.
- LIAO, Q. & OUYANG, B. 2019. Shareholder litigation risk and real earnings management: a causal inference. *Review of Accounting & Finance*, 18, 557-588.
- MARTINEZ-JIMENEZ, R., HERNÁNDEZ-ORTIZ, M. J. & CABRERA FERNÁNDEZ, A. I. 2020. Gender diversity influence on board effectiveness and business performance. *Corporate Governance: The International Journal of Business in Society*, 20, 307-323.
- MCNICHOLS, M. F. 2002. Discussion of the quality of accruals and earnings: The role of accrual estimation errors. *The Accounting review*, 77, 61-69.
- MENICUCCI, E. 2020. *Earnings Quality [internet resource] : Definitions, Measures, and Financial Reporting*, Cham : Springer International Publishing.
- MERTZANIS, C., BALNTAS, V. & PANTAZOPOULOS, T. 2019. Internal auditor perceptions of corporate governance in Greece after the crisis. *Qualitative Research in Accounting & Management*, 17, 201-227.
- MILLIKEN, F. J. & MARTINS, L. L. 1996. Searching for Common Threads: Understanding the Multiple Effects of Diversity in Organizational Groups. *The Academy of Management review*, 21, 402-433.
- MNIF, Y. & BEN HAMOUDA, A. 2020. Audit quality and the trade-off between real and accrual earnings management in the oil and gas industry: the GCC evidence. *Journal of Applied Accounting Research*, 22, 223-251.
- MUSTAFA, A. S., CHE-AHMAD, A. & CHANDREN, S. 2018. Board diversity, audit committee characteristics and audit quality: The moderating role of control-ownership wedge. *Business and Economic Horizons*, 14, 587-614.
- NGUYEN, T., NGUYEN, A., LOCKE, S., REDDY, K. & MURRAY, L. 2017. Does the human capital of board directors add value to firms? Evidence from an Asian market. *Cogent Economics & Finance*, 5.
- NGUYEN, T. H. H., NTIM, C. G. & MALAGILA, J. K. 2020. Women on corporate boards and corporate financial and non-financial performance: A systematic literature review and future research agenda. *International Review of Financial Analysis*, 71.

- NTIM, C. G. 2013. Monitoring board committee structure and market valuation in large publicly listed South African corporations. *International Journal of Managerial and Financial Accounting*, 5.
- ORAZALIN, N. 2019. Board gender diversity, corporate governance, and earnings management. *Gender in Management: An International Journal*, 35, 37-60.
- OSITADIMMA JIM, O., JOSHUA, O., SARATU, J.-S. & SAMUEL ENIOLA, A. 2021. Board Diversity and Earnings Quality of Listed Deposit Money Banks in Nigeria. *Journal of Finance and Accounting*, 9, 11-31.
- OSMA, B. G. & NOGUER, B. G.-D.-A. 2007. The Effect of the Board Composition and its Monitoring Committees on Earnings Management: evidence from Spain. *Corporate governance : an international review*, 15, 1413-1428.
- PFEFFER, J. & SALANCIK, G. R. 2003. *The external control of organizations: a resource dependence perspective*, Stanford, CA: Stanford University Press.
- RAMAN, K. & SHAHRUR, H. 2008. Relationship-Specific Investments and Earnings Management: Evidence on Corporate Suppliers and Customers. *The Accounting Review*, 83, 1041-1081.
- REEB, D. & UPADHYAY, A. 2010. Subordinate board structures. *Journal of Corporate Finance*, 16, 469-486.
- ROJANA, K. & YANG, Q. 2019. The Characteristics of Top Management and Firm's Earnings Management: The Evidence from Thailand. *Copernican journal of finance & accounting*, 8, 49-74.
- ROYCHOWDHURY, S. 2006. Earnings management through real activities manipulation. *Journal of accounting & economics*, 42, 335-370.
- SCHIPPER, K. 1989. Commentary on Earnings Management. *Accounting Horizons*, 3, 91-102.
- SMITH, M. & SARABI, Y. 2020. "What do interlocks do" revisited – a bibliometric analysis. *Management Research Review*, ahead-of-print.
- SRINIDHI, B. I. N., GUL, F. A. & TSUI, J. 2011. Female Directors and Earnings Quality*. *Contemporary Accounting Research*, 28, 1610-1644.
- STRYDOM, M., AU YONG, H. H. & RANKIN, M. 2016. A few good (wo)men? Gender diversity on Australian boards. *Australian Journal of Management*, 42, 404-427.
- TEE, C. M. 2019. Political connections, the cost of debt and board attributes: evidence from Malaysia. *Managerial Finance*, 45, 842-855.
- TEE, C. M. & RASSIAH, P. 2019. Ethnic board diversity, earnings quality and institutional investors: evidence from Malaysian corporate boards. *Accounting & Finance*, 60, 4257-4290.

- TERJESEN, S., SEALY, R. & SINGH, V. 2009. Women Directors on Corporate Boards: A Review and Research Agenda. *Corporate Governance: An International Review*, 17, 320-337.
- TRIKI DAMAK, S. 2018. Gender diverse board and earnings management: evidence from French listed companies. *Sustainability Accounting, Management and Policy Journal*, 9, 289-312.
- UPADHYAY, A. D., BHARGAVA, R. & FAIRCLOTH, S. D. 2014. Board structure and role of monitoring committees. *Journal of Business Research*, 67, 1486-1492.
- VAN DER WALT, N. & INGLEBY, C. 2003. Board Dynamics and the Influence of Professional Background, Gender and Ethnic Diversity of Directors. *Corporate governance : an international review*, 11, 218-234.
- WAGANA, D. M. & NZULWA, J. D. 2016. Corporate Governance, Board Gender Diversity And Corporate Performance: A Critical Review Of Literature. *European Scientific Journal, ESJ*, 12.
- WALKER, A., MACHOLD, S. & AHMED, P. K. 2015. Diversity and Conflict in Boards of Directors. *International Studies of Management & Organization*, 45, 25-42.
- WAN MOHAMMAD, W. M. & WASIUZZAMAN, S. 2019. Effect of audit committee independence, board ethnicity and family ownership on earnings management in Malaysia. *Journal of Accounting in Emerging Economies*, 10, 74-99.
- YANG, Y. 2011. Effects of Cognitive and Affective Conflict Between Hotel's Top Managers on Firm Performance in China. *Journal of China Tourism Research*, 7, 42-61.
- ZALATA, A. M., NTIM, C. G., CHOUDHRY, T., HASSANEIN, A. & ELZAHAR, H. 2019. Female directors and managerial opportunism: Monitoring versus advisory female directors. *The Leadership Quarterly*, 30.
- ZANG, A. Y. 2011. Evidence on the Trade-Off between Real Activities Manipulation and Accrual-Based Earnings Management. *The Accounting Review*, 87, 675-703.
- ZONA, F. & ZATTONI, A. 2007. Beyond the Black Box of Demography: board processes and task effectiveness within Italian firms. *Corporate governance : an international review*, 15, 852-864.

Appendices

Table 1 List and definition of variables

Variables	Definition
<i>Dependent variable</i>	
EM	Earnings management
- AEM	- Accrual earnings management by <ul style="list-style-type: none"> • Modified Jones model (Dechow et al., 1995) • Modified performance-matched model (Raman and Shahrur, 2008) • Modified accrual quality model (McNichols, 2002, Francis et al., 2005)
- REM	- Real earnings management by Roychowdhury (2006), Liao and Ouyang (2019), Ghaleb et al. (2020b) <ul style="list-style-type: none"> • REM1 <ul style="list-style-type: none"> • Aggregate REM is computed by the sum of abnormal cash flow and abnormal discretionary expenses • REM2 <ul style="list-style-type: none"> • Aggregate REM is computed by the sum of abnormal discretionary expenses and abnormal production • REM3 <ul style="list-style-type: none"> • Aggregate REM is computed by the sum of abnormal cash flow, abnormal discretionary expenses and abnormal production
<i>Experimental variables</i>	
DIVERSITY	Aggregate diversity index consists of five individual indices: gender, age, education, tenure, and experience/expertise
<i>Moderators</i>	
MONIC	Boards' monitoring role: Monitoring Committee
ADVIC	Boards' advisory role: Advisory Committee
<i>Control variables</i>	
SIZE	Firm's size (log of market capitalisation)
AGE	Firm age (the number of years of existence)
ROA	Return on Assets
GROWTH	Firm's growth (annual percentage in sales)
ZSCORE	Altman Z-score
IFRS	Accounting Standard (dummy variable; 1 if the firm applies IFRS; otherwise, 0)
BIG4	Big4 auditor (dummy variable; 1 if the firm uses one of the big FOUR audit firms as the auditor; otherwise, 0)
ε	Error term

Table 2 Descriptive statistics of Accruals Earnings Management (Dependent Variables)

Country	N Obs	Firms	AEM1				AEM2				AEM3			
			Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
AU	303	115	0.1254	0.2047	0	1.6085	0.1250	0.2045	0	1.6088	0.4207	0.7492	0	6.8798
CA	931	301	0.1156	0.1947	0	1.6085	0.1157	0.1947	0	1.6088	0.4434	0.7976	0	6.8798
HK	1155	355	0.0898	0.1089	0	1.0557	0.0896	0.1089	0	1.0560	0.4323	0.5434	0	6.8798
SN	519	165	0.1018	0.1742	0	1.5068	0.1016	0.1742	0	1.5073	0.3816	0.3558	0	2.3629
UK	1360	447	0.1157	0.1901	0	1.6085	0.1157	0.1903	0	1.6088	0.4363	0.7098	0	6.8798
US	9254	2697	0.1381	0.2526	0	1.6085	0.1382	0.2526	0	1.6088	0.5085	0.9107	0	6.8798
Pooled Sample	13522	4080	0.1285	0.2308	0	1.6085	0.1285	0.2308	0	1.6088	0.4834	0.8402	0	6.8798

Country	N Obs	Firms	REM1				REM2				REM3			
			Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
AU	303	115	0.016	0.208	-1.635	0.817	-0.001	0.148	-0.897	0.487	0.019	0.232	-1.788	0.887
CA	931	301	-0.007	0.191	-1.592	1.192	-0.004	0.125	-0.770	0.898	-0.006	0.216	-1.689	1.536
HK	1155	355	0.008	0.139	-0.991	1.356	-0.004	0.102	-0.554	0.769	0.008	0.190	-0.962	1.701
SN	519	165	-0.028	0.202	-1.157	0.411	-0.001	0.072	-0.399	0.576	-0.030	0.214	-1.175	0.434
UK	1360	447	-0.010	0.177	-1.190	1.289	-0.006	0.151	-1.000	0.898	-0.011	0.209	-1.315	1.330
US	9254	2697	-0.007	0.248	-1.796	2.017	0.006	0.159	-1.000	0.898	-0.007	0.278	-2.145	1.965
Pooled Sample	13522	4080	-0.006	0.228	-1.796	2.017	0.003	0.149	-1.000	0.898	-0.007	0.258	-2.145	1.965

Table 3 Descriptive Statistics of Board Diversity (Independent Variable and Moderators)

Country	Aggregate Board Diversity				Monitoring Committees				Advisory Committees			
	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
AU	3.1234	0.7582	1.1526	4.5811	2.01	0.78	0	5	0.99	1.09	0	6
CA	3.2668	0.6044	1.3802	4.4770	2.49	0.69	1	6	1.09	1.07	0	9
HK	3.1016	0.5239	0.7778	4.5986	3.15	0.57	1	5	0.46	0.71	0	5
SN	3.1366	0.5843	1.5821	4.4856	2.82	0.72	1	5	0.51	0.89	0	4
UK	3.2485	0.6866	0.7292	4.4458	2.87	0.61	1	5	0.38	0.74	0	5
US	3.2128	0.6242	0	4.5316	2.91	0.56	0	6	0.55	0.84	0	5
Pooled Sample	3.2057	0.6247	0	4.5986	2.87	0.62	0	6	0.57	0.86	0	9

Table 4 Descriptive Statistics of Control Variables

Country	SIZE		AGE		ROA		GROWTH		ZSCORE		IFRS		BIG4	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
AU	5.27	2.60	38.69	39.81	-0.05	0.21	0.26	1.02	3.57	10.03	0.95	0.21	0.72	0.45
CA	5.76	2.30	37.25	35.48	-0.04	0.21	0.14	0.64	1.82	5.43	0.82	0.38	0.83	0.37
HK	6.53	1.85	32.48	36.36	0.02	0.06	0.22	0.81	3.24	6.00	0.90	0.29	0.76	0.42
SN	5.87	2.08	34.77	33.64	0.02	0.08	0.10	0.53	2.39	5.13	0.97	0.16	0.79	0.41
UK	5.62	2.81	54.41	53.65	-0.02	0.21	0.19	0.76	3.56	6.46	0.99	0.12	0.66	0.47
US	6.27	2.59	40.75	34.06	-0.08	0.28	0.20	0.79	1.92	8.61	0.00	0.06	0.69	0.46
Pooled Sample	6.15	2.54	40.90	37.26	-0.06	0.25	0.20	0.78	2.25	7.98	0.29	0.46	0.71	0.45

Table 5 Pearson Correlation Matrix

	DIVERSITY	MONIC	ADVIC	SIZE	AGE	ROA	GROWTH	ZSCORE	FIRS	BIG4
DIVERSITY	1									
MONIC	0.104	1								
ADVIC	0.259	-0.071	1							
SIZE	0.428	0.173	0.287	1						
AGE	0.281	0.020	0.200	0.256	1					
ROA	0.250	0.024	0.151	0.407	0.207	1				
GROWTH	-0.079	-0.003	-0.044	-0.030	-0.088	-0.053	1			
ZSCORE	0.082	0.037	0.014	0.283	0.036	0.376	0.024	1		
FIRS	-0.015	-0.086	0.017	-0.074	0.016	0.117	-0.015	0.059	1	
BIG4	0.308	0.086	0.194	0.536	0.162	0.291	-0.031	0.137	0.056	1
AEM1	-0.215	-0.052	-0.103	-0.379	-0.121	-0.385	0.055	-0.197	-0.058	-0.234
AEM2	-0.215	-0.052	-0.103	-0.379	-0.121	-0.385	0.055	-0.197	-0.059	-0.234
AEM3	-0.147	-0.043	-0.084	-0.209	-0.089	-0.432	0.023	-0.144	-0.041	-0.160
REM1	0.077	0.007	0.026	0.078	0.049	0.018	-0.050	0.000	0.005	0.011
REM2	-0.027	0.009	-0.023	0.020	-0.024	0.050	0.040	0.042	-0.031	0.000
REM3	0.069	0.004	0.024	0.075	0.046	0.020	-0.049	0.002	0.005	0.018

***Bold** text indicates significance at the 10% level or higher.

Table 6 The Link between Board Diversity and Earnings Management

Variables	Expected Sign	Dependent Variables					
		AEM1	AEM2	AEM3	REM1	REM2	REM3
Constant		0.016 (0.119)	0.017 (0.119)	0.003 (0.395)	-0.074 (0.223)	0.096 (0.148)	-0.065 (0.257)
<i>Independent Variables</i>							
DIVERSITY	(-)	-0.008* (0.004)	-0.008* (0.004)	-0.036** (0.015)	0.031*** (0.008)	0.000 (0.006)	0.030*** (0.010)
<i>Control Variables</i>							
SIZE		-0.008*** (0.002)	-0.008*** (0.002)	-0.028*** (0.007)	-0.029*** (0.004)	0.009*** (0.003)	-0.029*** (0.004)
AGE		0.000 (0.000)	0.000 (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.000 (0.000)	0.001*** (0.000)
ROA		-0.060*** (0.012)	-0.060*** (0.012)	-0.650*** (0.039)	-0.107*** (0.022)	0.337*** (0.014)	-0.123*** (0.025)
GROWTH		0.000 (0.002)	0.000 (0.002)	0.012** (0.006)	-0.005* (0.003)	0.000 (0.002)	-0.005 (0.004)
ZSCORE		-0.002*** (0.000)	-0.002*** (0.000)	0.001 (0.001)	-0.000 (0.001)	-0.000 (0.000)	-0.001 (0.001)
IFRS		-0.069** (0.028)	-0.070** (0.028)	0.276*** (0.094)	-0.220*** (0.053)	0.047 (0.035)	-0.259*** (0.061)
BIG4		-0.009 (0.010)	-0.009 (0.010)	0.115*** (0.032)	-0.154*** (0.018)	-0.006 (0.012)	-0.136*** (0.021)
Year Dummy		Yes	Yes	Yes	Yes	Yes	Yes
Country Dummy		Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummy		Yes	Yes	Yes	Yes	Yes	Yes
Observations		13522	13522	13522	13522	13522	13522
R-Squared		0.815	0.815	0.847	0.340	0.318	0.313
Durbin-Watson		2.403	2.402	2.347	2.187	2.190	2.162

Standard errors are clustered at firm and year-level and are reported in parentheses. All regressions include year-country-industry fixed effects. We also control for between-company variation. All explanatory variables are lagged by one year. Significance at 10%, 5%, and 1% level is represented by *, **, and ***, respectively.

Table 7 The trade-off between Accruals and Real Earnings Management by using ratio of REM to AEM

Variables	Expected Sign	Dependent Variables		
		REM3 / AEM1	REM3 / AEM2	REM3 / AEM3
Constant		0.483 (7.041)	0.478 (7.126)	-0.052 (1.920)
<i>Independent Variables</i>				
DIVERSITY	(+)	0.125 (0.263)	0.083 (0.266)	0.139* (0.072)
<i>Control Variables</i>				
SIZE		0.122 (0.122)	0.126 (0.124)	0.012 (0.033)
AGE		0.018*** (0.005)	0.019*** (0.005)	0.004*** (0.001)
ROA		-3.088*** (0.688)	-3.248*** (0.696)	-0.624*** (0.188)
GROWTH		-0.106 (0.100)	-0.123 (0.101)	-0.040 (0.027)
ZSCORE		-0.031* (0.018)	-0.027 (0.018)	-0.010** (0.005)
IFRS		-0.718 (1.677)	-0.680 (1.698)	-0.338 (0.457)
BIG4		-0.051 (0.565)	-0.180 (0.571)	-0.338** (0.154)
Year Dummy		Yes	Yes	Yes
Country Dummy		Yes	Yes	Yes
Industry Dummy		Yes	Yes	Yes
Observations		13522	13522	13522
R-Squared		0.284	0.284	0.322
Durbin-Watson		2.370	2.368	2.461

Standard errors are clustered at firm and year-level and are reported in parentheses. All regressions include year-country-industry fixed effects. We also control for between-company variation. All explanatory variables are lagged by one year. Significance at 10%, 5%, and 1% level is represented by *, **, and ***, respectively.

Table 8 The trade-off between Accruals and Real Earnings Management by adding REM into AEM model.

Variables	Expected Sign	Dependent Variables (AEM3)		
		REM1	REM2	REM3
Constant		-0.012 (0.393)	0.018 (0.395)	-0.005 (0.394)
DIVERSITY	(-)	-0.030** (0.015)	-0.036** (0.015)	-0.033** (0.015)
REM1/ REM2/ REM3	(-)	-0.198*** (0.018)	-0.164*** (0.027)	-0.124*** (0.016)
SIZE		-0.034*** (0.007)	-0.026*** (0.007)	-0.031*** (0.007)
AGE		-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
ROA		-0.671*** (0.038)	-0.595*** (0.040)	-0.665*** (0.039)
GROWTH		0.011* (0.006)	0.012** (0.006)	0.011** (0.006)
ZSCORE		0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
IFRS		0.232** (0.094)	0.284*** (0.094)	0.244*** (0.094)
BIG4		0.084*** (0.032)	0.114*** (0.032)	0.098*** (0.032)
Year Dummy		Yes	Yes	Yes
Country Dummy		Yes	Yes	Yes
Industry Dummy		Yes	Yes	Yes
Observations		13522	13522	13522
R-Squared		0.849	0.848	0.848
Durbin-Watson		2.366	2.343	2.360

Standard errors are clustered at firm and year-level and are reported in parentheses. All regressions include year-country-industry fixed effects. We also control for between-company variation. All explanatory variables are lagged by one year. Significance at 10%, 5%, and 1% level is represented by *, **, and ***, respectively.

Table 9 The Moderating Effect of the Monitoring Board's roles on the Link between Board Diversity and Earnings Management

Variables	Expected Sign	Dependent Variables					
		AEM1	AEM2	AEM3	REM1	REM2	REM3
Constant		0.177 (0.131)	0.177 (0.131)	0.149 (0.433)	-0.057 (0.244)	0.018 (0.162)	-0.038 (0.282)
<i>Independent Variables</i>							
DIVERSITY	(-)	-0.050*** (0.016)	-0.050*** (0.016)	-0.057 (0.053)	0.037 (0.030)	0.020 (0.020)	0.038 (0.035)
<i>Moderators</i>							
MONIC	(-)	-0.055*** (0.018)	-0.055*** (0.018)	-0.050 (0.061)	-0.005 (0.034)	0.027 (0.023)	-0.009 (0.039)
<i>Interaction</i>							
DIVERSITY*MONIC		0.015*** (0.005)	0.015*** (0.005)	0.007 (0.018)	-0.002 (0.010)	-0.007 (0.007)	-0.003 (0.012)
<i>Control Variables</i>							
SIZE		-0.008*** (0.002)	-0.008*** (0.002)	-0.027*** (0.007)	-0.029*** (0.004)	0.009*** (0.003)	-0.028*** (0.004)
AGE		0.000 (0.000)	0.000 (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.000 (0.000)	0.001*** (0.000)
ROA		-0.061*** (0.012)	-0.061*** (0.012)	-0.650*** (0.039)	-0.107*** (0.022)	0.338*** (0.015)	-0.123*** (0.025)
GROWTH		0.001 (0.002)	0.001 (0.002)	0.012** (0.006)	-0.005* (0.003)	0.000 (0.002)	-0.006 (0.004)
ZSCORE		-0.002*** (0.000)	-0.002*** (0.000)	0.001 (0.001)	-0.000 (0.001)	-0.000 (0.000)	-0.001 (0.001)
IFRS		-0.069** (0.028)	-0.070** (0.028)	0.275*** (0.094)	-0.221*** (0.053)	0.047 (0.035)	-0.260*** (0.061)
BIG4		-0.010 (0.010)	-0.009 (0.010)	0.115*** (0.032)	-0.154*** (0.018)	-0.006 (0.012)	-0.136*** (0.021)
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations		13522	13522	13522	13522	13522	13522
R-Squared		0.815	0.815	0.847	0.341	0.318	0.313
Durbin-Watson		2.404	2.403	2.346	2.187	2.189	2.162

Standard errors are clustered at firm and year-level and are reported in parentheses. All regressions include year-country-industry fixed effects. We also control for between-company variation. All explanatory variables are lagged by one year. Significance at 10%, 5%, and 1% level is represented by *, **, and ***, respectively.

Table 10 The Moderating Effect of the Advisory Board's roles on the Link between Board Diversity and Earnings Management

Variables	Expected Sign	Dependent Variables					
		AEM1	AEM2	AEM3	REM1	REM2	REM3
Constant		0.021 (0.120)	0.022 (0.120)	0.050 (0.395)	-0.074 (0.223)	0.095 (0.149)	-0.065 (0.257)
<i>Independent Variables</i>							
DIVERSITY	(-)	-0.010** (0.005)	-0.010** (0.005)	-0.058*** (0.016)	0.030*** (0.009)	0.001 (0.006)	0.030*** (0.011)
<i>Moderators</i>							
ADVIC	(-)	-0.013 (0.016)	-0.014 (0.016)	-0.155*** (0.054)	-0.002 (0.031)	0.003 (0.020)	-0.001 (0.035)
<i>Interaction</i>							
DIVERSITY*ADVIC		0.005 (0.005)	0.005 (0.005)	0.048*** (0.015)	-0.001 (0.009)	-0.001 (0.006)	-0.001 (0.010)
<i>Control Variables</i>							
SIZE		-0.008*** (0.002)	-0.008*** (0.002)	-0.027*** (0.007)	-0.029*** (0.004)	0.009*** (0.003)	-0.029*** (0.004)
AGE		0.000 (0.000)	0.000 (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.000 (0.000)	0.001*** (0.000)
ROA		-0.060*** (0.012)	-0.060*** (0.012)	-0.650*** (0.039)	-0.107*** (0.022)	0.337*** (0.015)	-0.123*** (0.025)
GROWTH		0.001 (0.002)	0.001 (0.002)	0.011** (0.006)	-0.005* (0.003)	0.000 (0.002)	-0.005 (0.004)
ZSCORE		-0.002*** (0.000)	-0.002*** (0.000)	0.001 (0.001)	-0.000 (0.001)	-0.000 (0.000)	-0.001 (0.001)
IFRS		-0.069** (0.028)	-0.070** (0.028)	0.273*** (0.094)	-0.220*** (0.053)	0.047 (0.035)	-0.259*** (0.061)
BIG4		-0.009 (0.010)	-0.009 (0.010)	0.113*** (0.032)	-0.154*** (0.018)	-0.006 (0.012)	-0.136*** (0.021)
Year Dummy		Yes	Yes	Yes	Yes	Yes	Yes
Country Dummy		Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummy		Yes	Yes	Yes	Yes	Yes	Yes
Observations		13522	13522	13522	13522	13522	13522
R-Squared		0.815	0.815	0.847	0.340	0.318	0.313
Durbin-Watson		2.403	2.403	2.347	2.187	2.190	2.162

Standard errors are clustered at firm and year-level and are reported in parentheses. All regressions include year-country-industry fixed effects. We also control for between-company variation. All explanatory variables are lagged by one year. Significance at 10%, 5%, and 1% level is represented by *, **, and ***, respectively.