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Impactful women directors and earnings management

Mujeeb Saif Mohsen Al-Absy^{1*}

Abstract: A board with high equality is expected to play a significant role in corporate governance. This study aims to examine the influence of impactful women directors on constraining the level of earnings management (EM). Impactful women director is a new concept examined by the study, where women directors on board must be serving in the audit committee (AC). Having women on the board who also serves on the AC will strengthen the role and power of women directors in mitigating EM. The study covers companies with the lowest positive return on assets. Based on the regression, the results of the study seem to be in line with the theories of agency and resource dependence. There is a significant negative relationship between the impactful women directors and the level of EM, accrual, and real earnings management. Having at least one female director who also serves on the AC enhances the effectiveness of the board and then, significantly constrains EM. Likewise, having at least two female directors and at least one of them serving on the AC could improve their participation in decision-making and effectively monitor the managers' behavior toward engaging in EM. The study is very useful for policymakers, stakeholders, researchers, and society. Firms should appoint more women directors on board and at the same time appoint at least one of them at the AC to strengthen their role in monitoring and supervising the management.

Subjects: Financial Accounting; Corporate Governance; Corporate Social Responsibility & Business Ethics

Keywords: Corporate governance; board of directors; audit committee; women directors; earnings management

1. Introduction

The global economies have been significantly affected due to the financial scandals witnessed globally. These financial scandals as well as many cases of fraud, worldwide and in Malaysia, emphasized the matter of earning management (EM) practices (Abdullah & Ismail, 2016; Ahmed, 2013; Ghazali et al., 2015; Mnif & Cherif, 2020; Moradi et al., 2012; Teh et al., 2017; Vladu, 2015). Previous studies argued that one of the major reasons for these scandals are usually EM practices (Kazemian & Sanusi, 2015; Magrath & Weld, 2002; Rezaee, 2005) where EM has a substantial and favorable link with fraud (Hasnan et al., 2013; Perols & Lougee, 2011; Rahman et al., 2016; Sulaiman et al., 2014).

In fact, each company's ultimate objective is to maximize the wealth of its owners (Gharaibeh & Qader, 2017). However, for some reasons and based on agency theory, managers engage in EM when they do not fulfill their duties. Hence, regulators, shareholders, investors, financial

communities, and researchers become more mindful of the need to focus more on companies' financial reports (Abdullah & Ismail, 2016; Rezaee, 2005). In the field of accounting, EM remains a prevalent topic (Ayedh et al., 2019; Teh et al., 2017; Vladu, 2015) and needs to be further studied (Ahmed, 2013; Nia et al., 2015; Teh et al., 2017).

Besides, there is a need for security laws and strong regulations to be developed by the government to prevent EM practice (Liu & Wang, 2017). According to the agency hypothesis, corporate governance (CG) mechanisms such as the board of directors (BOD), ownership, and audit committee (AC), among others, help reduce agency concerns in which managers seek their interests rather than the interests of the shareholders. CG's mechanisms are tasked with monitoring how businesses run and have the authority to affect how corporations make decisions (Mahdi et al., 2023). Although attention and efforts have moved considerably towards the CG, there is a need for more actions to strengthening the role of CG.

One of the most important mechanisms of CG is the women directors. Gender diversity has gained increasing attention in recent years as a component of board composition (Damak, 2018). Of late, the number of female directors on boards is being increased voluntarily across countries due to the perceived value of the participation of women on the board (Abdullah et al., 2016; Srinidhi et al., 2011). Countries, e.g., Israel and France, have enacted legislation requiring 50% female presence on boards, respectively. Followed by less percentage where the countries of Norway and Spain have enacted legislation requiring 40% female presence on boards, respectively. Malaysia has required all companies to have at minimum 30% women on their boards and Sweden has enacted legislation requiring 25% female presence on boards (Burke & Vinnicombe, 2008; Gavius et al., 2012; Staubo, 2010). Although this move to empower women in business is a positive one, it's crucial to consider whether or not female directors are valuable additions to corporate boards (Chatterjee & Nag, 2022), such as reducing EM.

Research on the effect of women on the board on the practice of EM is not been extensively examined (Gavius et al., 2012; Mnif & Cherif, 2020); varied (Hili & Affess, 2012; Kyaw et al., 2015; Orazalin, 2020); and inconclusive (Abdullah & Ismail, 2016; Gull et al., 2018; Ismail & Abdullah, 2013; Lakhal et al., 2015; Mnif & Cherif, 2020; Orazalin, 2020). Therefore, there is a need for more investigation (Gull et al., 2018) as most studies have been done in developed countries which are different from developing countries (Abdullah & Ismail, 2016). Regarding women's representation in the AC, although the investigations of their effect on EM have grown (Thiruvadi & Huang, 2011), there is limited knowledge of their impact on the AC's effectiveness (Salleh et al., 2012). Likewise, there is a limited number of research on the effect of women's representation in the AC on EM (Salleh & Haat, 2013); besides, the results are inconsistent and inconclusive (Abdullah & Ismail, 2016; Salleh et al., 2012; Sun et al., 2011), and warrant further research (Sun et al., 2011).

It is argued that women top managers can only contribute to significant improvements in CG if their proportion is substantially greater, or more than a critical value, e.g., three or 30% (Du et al., 2016). Previous studies have confirmed the need of increasing the representation of women on the board. In countries where gender equality is high, a gender-varied board mitigates EM (Kyaw et al., 2015). When female directors achieve a critical number and are supported by women in leadership positions, they become more influential (Arnaboldi et al., 2021). The lack of female directors does not assist to mitigate EM because their voice is weaker (Abdullah & Ismail, 2012, 2016). Therefore, examining the influence of impactful women directors on constraining the level of EM will explain the literature's inconclusive findings and will fill the gap in the literature.

Hence, the current study contributes to the literature in different expects. First, it extends the previous studies by introducing a new concept of gender diversity, namely impactful women directors. The study provides evidence of the influence of impactful women directors on constraining of the level of EM. Second, the study introduces new two measurements for gender diversity, called impactful women directors. For example, (i) a dummy variable equal "1" if the board has at

least one female director who also serve on the AC and “0”, otherwise; and (ii) a dummy variable equal “1” if the board has at least two female directors and at least one of them serves on the AC, and “0”, otherwise.

The new measurements could provide evidence for the argument of Abdullah and Ismail (2016) that Malaysia’s policy of requesting that listed companies nominate women to their boards by itself is not enough. To boost financial reporting efficiency, Malaysia’s regulators should also request companies to nominate women to the AC. Further, appointing at least one or more women on the board and at the same time appointing at least one of them in AC could enhance their capacity and give them more power in making a decision and then mitigating the level EM.

Lastly, the study helps the policy maker of developing countries to re-evaluate the effectiveness of gender diversity, where the role of women seems to be not crucial in improving the quality of the financial report, and specifically in mitigating EM. Most previous studies have documented that the low number/percentage of women on corporate boards has made them less impactful and less effective (Abdullah et al., 2016; Gavius et al., 2012; Gul et al., 2007; Lakhal et al., 2015; Srinidhi et al., 2011; Upadhyay & Zeng, 2014; Yusoff et al., 2013). Hence, introducing new two measurements for impactful women directors with empirical evidence may will helps the policymakers to take decisions regarding the representation of women on the board and its committees.

This paper is structured as follows: Section 2 presents the literature review of previous studies in terms of gender diversity and EM. Section 3 is for theoretical background and hypotheses development. Section 4 presents the methodology of the study in terms of sample selection, measurement of variables, and regression Models. Section 5 introduces the descriptive statistical, and diagnostic tests and the results of regression, which is followed by Section 6 which provides an additional analysis of the data to assure that results are robust. Finally, Section 7 presents a conclusion of the study.

2. Literature review

The participation of female directors is perceived to add creditable value to the firms, as they have independence, quality, ethics, reputation, and monitoring decision-making. This has led to regulating the legislation for a certain percentage of female representation on the board. This is because female directors often have equivalent and additional education and competence qualities, integrity, and the capability to detect the manipulation of earnings in comparison to male equivalents (Lakhal et al., 2015; Singh et al., 2008). A high proportion of female directors on a board will ensure that women hold more decision-making positions through stringent oversight of chief executive officers, to reduce the agency problem and reduce the conflict of interest between manager and shareholder (Adams & Ferreira, 2009).

Female directors are more autonomous and can contribute more to the board’s oversight duty than male members (Bøhren & Staubo, 2016). Women are more inquisitive and like to look for more queries (Carter et al., 2003). They participate and contribute more in meetings with the board (Adams & Ferreira, 2009). Furthermore, female directors give a variety of viewpoints at board meetings (Mathisen et al., 2013). Based on the study of Y. Chen et al. (2016) which consist of 4,267 firm-year observations during the period of from 2004 to 2013, female board directors have a significant role in minimize internal control issues. With regard to performance, several studies found that female directors have a significant role in increasing the firm value and performance (Adams & Ferreira, 2009; Campbell & Mínguez-Vera, 2008; Dang et al., 2013; El-Khatib & Joy, 2021; Getachew, 2014; Y. Liu et al., 2014). Female directors are strongly connected with greater earnings quality (Srinidhi et al., 2011).

Regarding the effect of women on the board on EM, the literature is scarce (Gavius et al., 2012), with mixed results (Hili & Affess, 2012; Kyaw et al., 2015). In developed countries, previous studies had found that the presence of female directors on the board plays a major role in reducing the

activities of earnings manipulation (Gavious et al., 2012; Gul et al., 2007; Gull et al., 2018; Kyaw et al., 2015; Lakhal et al., 2015) while other studies, e.g., Arun et al. (2015) found opposite results where the presence of women directors seems to increase the attitude of the manager to manipulate earnings. In developing countries, the results indicate that female directors do not play a significant role in mitigating EM, e.g., the study by Moradi et al. (2012) and Arioglu (2020). According to Biswas et al. (2022), there is a positive association between the gender diversity of boards and EM. These studies which are inconsistent with the agency theory, have justified that since women's presence on board was limited, their real impact on EM was limited (Arun et al., 2015; Moradi et al., 2012). However, some other studies, e.g., Githaiga et al. (2022) and Orazalin (2020) found that gender diversity reduce EM.

In the context of Malaysia, earlier studies have found that having more women on the board play a significant role in monitoring the managers and reducing EM, such as Ismail and Abdullah (2013); while others have not found any relationship (Abdullah & Ismail, 2012; Abdullah et al., 2016). On the other side, a study of Buniamin et al. (2012) has released that having more women on the board is significantly related to greater EM which is against the agency and resource dependence theories and has been criticized by (Abdullah & Ismail, 2016), as the results cannot be generalized because it has some shortcomings as the period selected is only one year (2008) and included limited control variables (leverage and cash flow). Further, the study ignores other variables related to governance and firm-specific that have been used for many studies and this may affect the results.

Regarding women's representation on the AC, there are only a few research studies on their effect in mitigating EM (Salleh & Haat, 2013). Moreover, the previous results are inconsistent and inconclusive (Ismail & Abdullah, 2013; Sun et al., 2011). In developed countries, the majority of previous studies were in consist with theories of agency and resource dependence which show that females in the AC are significantly related to lower EM (Gul et al., 2007; Zalata et al., 2018). Similarly, the study of Gul et al. (2007); Zalata et al. (2018) found the same results. However, other studies such as Sun et al. (2011) failed to get the influence of females in the AC on EM.

Thiruvadi and Huang (2011) used three measurements for the gender variables, i.e., the percentage of female directors; the number of female directors; and dummy variable; "1" if there is a female director in AC, and "0", otherwise". However, all these measurements show a significant relationship with lower EM. Likewise, Gavious et al. (2012) found that the proportion of women present in the AC has a significant influence on lower EM practice. Gul et al. (2007) discovered a significantly negative association between the level of EM and the presence of at least one female director in the AC. In contrast, Sun et al. (2011) found that the proportion of female directors in the AC has an insignificant relationship with EM. However, they justified the insignificant relationship by arguing that either the ethical beliefs among male and female directors in the AC are the same or female directors have difficulties in influencing the other directors of the committee.

In the context of Malaysia, the results are mixed. Salleh et al. (2012) and Ismail and Abdullah (2013) found a significant association between the proportion of female directors in the AC and lower EM. This is supported by resource dependency and agency theories. However, others did not find any significant relationship. The reason for the insignificant relationship, for example, in the study conducted by Abdullah and Ismail (2012), is the low number of firms that have women in their AC. Although they used "1" if at least one female director is in the AC, and "0", otherwise, as a measurement of female diversity, only 17% of the sample firms have women in their AC.

Abdullah and Ismail (2016) extended their previous study by increasing the firm sample to 2,412 and the period to cover four years, i.e., 2008 to 2011. They used several measurements for women in the AC (dummy variable, percentage, and total number) and a different measurement for EM (MJM by Kothari et al. (2005)). However, they did not find any evidence of a relationship between

the presence of women in the AC and the level of EM. Also, Salleh and Haat (2013) found that the percentage of female directors in the AC is insignificantly associated with EM. Their justification is that due to the small number of female directors in the AC, they face difficulties in constraining EM. Further, the study ignores the importance of control variables that may affect the results, such as firm size.

3. Hypothesis development

Female directors on the board are increasingly perceived to be valuable (Srinidhi et al., 2011), with the capacity to allocate more effort to monitoring (Adams & Ferreira, 2009); and increasing boardroom efficiency (Mathisen et al., 2013). Further, female directors seem to be more independent (Bøhren & Staubo, 2016). Accordingly, the presence of women on the board could help to minimize conflict of interest among managers and shareholders (Fama & Jensen, 1983), introduced by agency theory.

Indeed, board composition is an essential tool that facilitates to connect of outdoor resources with firms that will add value to a firm (Al-Absy, Almaamari et al., 2020), as suggested by resource dependence theory and requested by the society (Boyd, 1990). Over the last decade, society has increased pressure on boards to choose female directors (Lückerath-Rovers, 2009), as female directors have a significant role in increasing the firm value and performance (Abdullah et al., 2016; Adams & Ferreira, 2009; Campbell & Mínguez-Vera, 2008; Carter et al., 2003; Dang et al., 2013; El-Khatib & Joy, 2021; Getachew, 2014; Y. Liu et al., 2014).

Regarding EM, several studies have found a significantly negative relationship between women on the board and EM, which is consistent with the agency and resource dependence theories, such as in developed countries (Gavious et al., 2012; Gul et al., 2007; Gull et al., 2018; Kyaw et al., 2015; Lakhal et al., 2015); and Malaysia (Ismail & Abdullah, 2013). On the other hand, other studies are inconsistent with the agency and resource dependence theories in that women on the board have a significantly positive association with EM, such as in developed countries (Arun et al., 2015); and Malaysia (Buniamin et al., 2012). Meanwhile, Other investigations have shown no link between female board members and EM, such as in Malaysia (Abdullah & Ismail, 2012; Abdullah et al., 2016); and other developing countries (Moradi et al., 2012).

Regarding the representation of female directors in AC, it is argued that they enhance the AC's monitoring role in mitigating EM and improving financial reporting quality as introduced by the agency and resource dependence theories. Most studies in developed countries and Malaysia, as well, have discovered a substantial role for women's presence in the AC in mitigating and reducing the activities of EM (Gavious et al., 2012; Gul et al., 2007; Ismail & Abdullah, 2013; Salleh et al., 2012; Thiruvadi & Huang, 2011; Zalata et al., 2018). On the other side, some studies have shown no significant role played by the women appointed in the AC toward mitigating and reducing EM (Abdullah & Ismail, 2012; Abdullah et al., 2016; Salleh & Haat, 2013; Sun et al., 2011).

The inconsistent results with agency and resource dependence theories may be because developing countries (e.g., Malaysia) have a low percentage of women on the corporate board (Yusoff et al., 2013), which their voice becomes weaker (Abdullah & Ismail, 2012) and does not give them more power in mitigating EM (Abdullah & Ismail, 2012; Abdullah et al., 2016). The study by Abdullah and Ismail (2016) discovered that the percentage of firms that have female directors is 43% which is low. Further, 69% of these firms have only one female director (Abdullah & Ismail, 2016). Even though the study expanded the sample (2,412 firm-year observations), period (2008 to 2011) and included many metrics for female directors, the results demonstrate that EM is not considerably reduced.

Furthermore, the inconsistent results with agency and resource dependence theories may be due to those regulators, including in Malaysia, having encouraged firms to appoint women on the board while there is no specific requirement on women in the AC. This may explain the low number

of women in the AC. In the Malaysian context, the low number of women in the AC may be the primary reason for the unexpected results in minimizing EM (Salleh & Haat, 2013), as there is a limited number of research on the effect of women in the AC on EM (Salleh & Haat, 2013). Thus, the current study expected that appointing at least one or more women in the board and at least one of them serve in AC could enhance their capacity and power in mitigating EM. Based on the theories and supporting previous studies that the increase of women in the AC may reduce EM, the following hypotheses are presented:

H₁: There is a negative relationship between impactful women directors and accrual earnings management.

H₂: There is a negative relationship between impactful women directors and real earnings management.

4. Methodology

4.1. Sample selection

It argued that firms with profits close to zero were more likely to engage in EM practice as the insider directors were mostly motivated not to disclose negative income (Huynh & Nguyen, 2019). Hence, the smaller negative income (before manipulation) could be converted into a smaller positive income (Roychowdhury, 2006; Yuliana et al., 2015). Several studies in EM have concentrated on the companies with the lowest positive return on assets (ROA) such as Roychowdhury (2006) and Yuliana et al. (2015). Firms are more likely to maintain their positive (non-negative) earnings (Burgstahler & Dichev, 1997; Ozili, 2019), by reducing the high earnings in good years and increasing the low earnings in bad years (Ozili & Outa, 2017) to generate stable earnings over time (Ozili, 2019).

To begin, this study eliminated firms in the industry of financial services, close-end funds, SPAC, and REIT (45 firms), as well as firms with no ROA data available (79 firms). Then, from the remaining firms of 675, the firm with negative earnings in one or more years was excluded and then the firm's average ROA was obtained by summing the ROA for 2013, 2014, and 2015 and dividing by three (number of years). The averages were then sorted in ascending order to select the 300 companies with the lowest positive ROA (Al-Absy et al., 2021; Al-Absy, 2020; Al-Absy et al., 2018, 2019a, 2019b, 2020). However, during data collection for the entire variables included in the study, a further 12 companies were excluded because of missing data or because they belong to sectors with less than six observations that were required in the calculation of EM (Subramanyam, 1996). The final sample thus contains 864 company observations.

4.2. Measurement of earnings management

The study used two measurements of EM. First, it applied the Jones Model as a proxy for accrual earnings management (AEM) as in line with previous studies of El-Helaly et al. (2018), Ferramosca and Allegrini (2018), Klein (2002), B. Liu et al. (2018), and Sun et al. (2011), and Sun et al. (2014); and the Malaysian studies of Ishak et al. (2011) and Saleh et al. (2005, 2007). To get the coefficient value of α_1 , α_2 , α_3 and ε_{it} , a cross-sectional analytic tool employing OLS regression was used for three years, using seven sectors with a particular industry and year effects by using equation 1, where, TA is the total accruals (net income minus cash flows from operations), A_{it-1} is total assets in the past year, ΔREV is the change in revenues, PPE is Gross property, plant, and equipment and ε_{it} is an error term.

$$\frac{TA_{it}}{A_{it-1}} = \alpha_1 \left(\frac{1}{A_{it-1}} \right) + \alpha_2 \left(\frac{\Delta REV_{it}}{A_{it-1}} \right) + \alpha_3 \left(\frac{PPE_{it}}{A_{it-1}} \right) + \varepsilon_{it} \quad (1)$$

Therefore, the coefficient value of α_1 , α_2 , α_3 , and ε_{it} estimated by equation 1 was used in equation 2 to estimate the nondiscretionary accrual (NDA).

$$NDA = \alpha_1 \left(\frac{1}{A_{it-1}} \right) + \alpha_2 \left(\frac{\Delta REV_{it}}{A_{it-1}} \right) + \alpha_3 \left(\frac{PPE_{it}}{A_{it-1}} \right) + \varepsilon_{it} \quad (2)$$

Lastly, the level of discretionary accruals (DA) was extracted from the following equation:

$$DA = \frac{TA_{it}}{A_{it-1}} - NDA \quad (3)$$

It is known that DA can either be income-decreasing (negative values) or income-increasing (positive values). However, this study focused only on the value that have been managed. Thus, this study used the absolute values of DA (ignoring the sign of the value), to estimate the AEM as used by previous studies such as Mohammad et al. (2016) and Abdullah and Ismail (2016).

Second, the study applied abnormal levels of cash flow from operations (ABCFO) as a proxy of real earnings management (REM). Hence, OLS regression was applied for three years, using seven sectors with specific industry and year effect, to calculate the coefficient value of α_1 , θ_1 and θ_2 from equation 4, where, CFO_{it} is cash flow from operations, A_{it-1} is the total assets of the last period, S_t is the sales and ΔS_{it} is the change of sales.

The study uses the proxy of ABCFO because the items of this proxy, e.g., total assets of the last period, the sales of the period, and the change of sales, are also integrated into the other proxies of REM, abnormal levels of production costs and the abnormal levels of discretionary expenses. Furthermore, the items of advertising and R&D that are used in proxy of abnormal levels of discretionary expenses (ABDISEXP) is not available in most annual report of companies, hence, previous studies replaced the value with zero (Nia et al., 2017).

$$\frac{CFO_{it}}{A_{it-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{it-1}} \right) + \theta_1 \left(\frac{S_{it}}{A_{it-1}} \right) + \theta_2 \left(\frac{\Delta S_{it}}{A_{it-1}} \right) + \varepsilon_{it}, \quad (4)$$

As a result, the estimated coefficients of α_1 , θ_1 and θ_2 were derived in equation 4 and then applied in the following equation to calculate the normal levels of operational cash flow (NCFO).

$$NCFO = \alpha_0 + \alpha_1 \left(\frac{1}{A_{it-1}} \right) + \theta_1 \left(\frac{S_{it}}{A_{it-1}} \right) + \theta_2 \left(\frac{\Delta S_{it}}{A_{it-1}} \right) + \varepsilon_{it}, \quad (5)$$

Lastly, ABCFO was calculated by subtracting NCFO from the actual cash flow from operations as per the following equation:

$$ABCFO = \frac{CFO_{it}}{A_{it-1}} - NCFO \quad (6)$$

To be consistent with AEM, the absolute value should be used (X. Chen et al., 2011). Therefore, following the most recent studies that have used the absolute value for REM's proxies (Chang et al., 2015; Francis et al., 2016; Kwon et al., 2017; Liu & Wang, 2017; Xu & Ji, 2016), the current study employed the absolute value of ABCFO to reflect the level of REM.

4.3. Measurement empirical model

Regressions are run to examine the influence of impactful women directors on constraining of the level of EM, AEM and REM (ABCFO). Model 1 is related to AEM (Hypothesis 1) and Model 2 is related to REM (Hypothesis 2). Each Model is run separately for each measurement of impactful women directors (IWD); (i) IWD1:1, a dummy variable equal "1" if the board has at least one female director who also serves on the AC and "0", otherwise; and (ii) IWD2:1, a dummy variable equal "1" if the board has at least two female directors and at least one of them serve on the AC, and "0", otherwise. To control the relationship, several variables related to CG and company-specific characteristics have been included. Table 1 shows the measurement information for all variables. Hence, the following two models are applied:

Table 1. Variables' operationalization

Acronym	Measurement and resource
AEM	Absolute value of DA using Jones Model.
ABCFO	Absolute value of abnormal levels of cash flow from operations, introduced by Roychowdhury (2006).
IWD1:1	Dummy variable equal "1" if the board has at least one female director who also serves on the AC and "0", otherwise
IWD2:1	Dummy variable equals "1" if the board has at least two female directors and at least one of them serves on the AC, and "0", otherwise
BIND	The percentage of independent directors on the board.
BSIZE	The number of board directors.
BMEET	The number of board meetings held per year.
ACIND	The percentage of independent directors in AC
ACSIZE	The number of AC's directors.
ACMEET	The number of AC meetings held per year.
ACAE	Proportion of AC's accounting expertise
OC	Percentage of shares owned by the top five shareholders.
BIG4	1 if the company's annual report has been audited by a Big4 firm, 0 otherwise.
FSIZE	Total assets' natural log value.
LEV	Total debt/total assets.
ROA	Net income/total assets.
NCFO	"1" if cash flow from operations is negative, and "0", if otherwise

$$AEM = \beta_0 + \beta_1 IWD + \beta_2 BIND + \beta_3 BSIZE + \beta_4 BMEET + \beta_5 ACIND + \beta_6 ACSIZE + \beta_7 ACMEET + \beta_8 ACAE + \beta_9 OC + \beta_{10} BIG4 + \beta_{11} FSIZE + \beta_{12} LEV + \beta_{14} ROA + \beta_{13} NCFO + \varepsilon \text{ (Model1)}$$

$$ABCFO = \beta_0 + \beta_1 IWD + \beta_2 BIND + \beta_3 BSIZE + \beta_4 BMEET + \beta_5 ACIND + \beta_6 ACSIZE + \beta_7 ACMEET + \beta_8 ACAE + \beta_9 OC + \beta_{10} BIG4 + \beta_{11} FSIZE + \beta_{12} LEV + \beta_{14} ROA + \beta_{13} NCFO + \varepsilon \text{ (Model2)}$$

5. Analysis and results

5.1. Descriptive statistics

Table 2 exhibitions the descriptive statistics value of variables used in the study, e.g., mean, stander deviation, minimum, and maximum. The mean value of the absolute DA using the Jones Model and ABCFO is 0.048 and 0.050, respectively. Regarding impactful women director, 220 of company observations (25.46%) has at least one female director who also serves on the AC while 94 of company observations (10.88%) has at least two female directors and at least one of them serves on the AC. This shows that female director who also serve on the AC is reasonably low. Upon further scrutinizing the data, it is found that the majority of company observation (53.59%) has at least one female director, however, not all of them are willing to appoint at least one of them to serve on the AC. Hence, regulators should enforce company to follow the policy of appointing the women on the board. Besides, the regulators also should formulate a policy on the presence of women in the AC (Abdullah & Ismail, 2016).

Regarding the control variables of CG's characteristics, the percentage of independent directors on the board is approximately 47%. This means that half of the board of directors is independent

Table 2. Descriptive statistics

A. Continuous Variables

Variables	Mean	SD.	Min.	Max.	Skewness	Kurtosis
AEM	0.048	0.045	0.001	0.216	1.566	5.402
ABCFO	0.050	0.045	0.001	0.226	1.584	5.663
BIND	0.474	0.122	0.222	1.000	0.704	3.327
BSIZE	7.418	1.909	4.000	17.000	0.985	4.840
BMEET	5.459	1.616	3.000	10.000	1.455	4.661
ACIND	0.900	0.145	0.667	1.000	-0.805	1.737
ACSIZE	3.244	0.502	3.000	6.000	2.173	8.194
ACMEET	5.039	1.146	3.000	10.000	1.838	7.793
ACAE	0.429	0.192	0.000	1.000	1.106	4.101
OC	0.546	0.159	0.141	0.948	-0.083	2.318
FSIZE (lnAsset)	13.485	1.571	10.098	18.579	0.796	3.497
LEV (%)	20.775	15.162	0.000	68.560	0.422	2.475
ROA (%)	4.412	2.510	0.010	15.160	0.657	3.574
B. Dummy Variables	Yes (1)		No			
	Freq.	Percent	Freq.	Percent		
IWD1:1	220	25.46	644	74.54		
IWD2:1	94	10.88	770	89.12		
BIG4	459	53.13	405	46.88		
NCFO	198	22.92	666	77.08		

Definitions of the acronym were presented in Table 1. Numbers of AEM, ABCFO, BMEET and ACMEET presented after winsorizes extreme observations

and does not have any relationship with either, the managers or shareholders of the company. In terms of board size, results show that the average number of directors on the company board is 7.42 members, which they met on average 5.46 times per year. Concerning the AC's characteristics, the study shows that members of the committee are almost independent whereas on average 90% of directors are independent. Further, 43% of those directors on the committee have accounting experience. In terms of AC's size, the average number of directors in the committee is 3.24 members which they met, on average, 5 times a year. Some other variables of governance are also presented in the table, e.g., ownership concentration. On average, 54.60 percent of shares are owned by the top five shareholders. Table 2 shows that 53.13 % of listed companies were audited by the big four audit firms.

5.2. Diagnostic tests

This study tested the fitness of the sample data with statistical assumptions. To remove the outliers, the study winsorizes the extreme observations of AEM, ABCFO, and ACMEET in the bottom and top 1%; and BMEET in the bottom and top 5%. To check for normality assumption, skewness and kurtosis are used (see, Table 2) which show no significant violation in the dataset of individual variables as the value of kurtosis is between ± 10 ; and skewness between ± 3 . In addition, the study used Pearson's correlation for checking the multicollinearity issue. As a result, Table 3 shows the value of correlation where none of them exceeds ± 0.80 . This means that there is no evidence of severe multicollinearity problems.

Regarding the heteroscedasticity problem, Breusch-Pagan/Cook-Weisberg test shows that all the study models suffer from heteroscedasticity problems. Concerning the autocorrelation problem, the Durbin-Watson test shows no issue in the sample data. Consequently, the study applied the

Table 3. Pearson correlation analysis

Variables	AEM	ABCFO	IWD1:1	IWD2:1	BIND	BSIZE	BMEET	ACIND	
AEM	1								
ABCFO	0.771***	1							
IWD1:1	-0.059*	-0.062*	1						
IWD2:1	-0.056*	-0.068**	0.598***	1					
BIND	0.055	0.026	-0.053	-0.014	1				
BSIZE	-0.082**	-0.048	0.075**	0.116***	-0.322***	1			
BMEET	0.050	0.010	0.113***	0.066**	0.066**	0.200***	1		
ACIND	0.092***	0.072**	-0.136***	-0.009	0.408***	0.098***	-0.080**	1	
ACSIZE	-0.067**	-0.058*	0.076**	0.082**	0.201***	0.306***	0.271***	-0.078**	
ACMEET	-0.003	-0.043	0.087**	0.040	0.036	0.142***	0.586***	0.005	
ACAE	0.042	0.061*	0.020	0.026	-0.038	-0.026	-0.016	0.073**	
OC	-0.055	-0.019	0.112***	0.031	-0.089***	0.048	0.145***	-0.125***	
BIG4	-0.075**	-0.092***	0.144***	0.105***	0.037	0.122***	0.155***	-0.080**	
FSIZE	-0.113***	-0.121***	0.105***	0.132***	-0.017	0.363***	0.349***	-0.126***	
LEV	0.054	-0.004	-0.130***	-0.013	-0.111***	0.141***	0.080**	0.035	
ROA	0.051	0.112***	-0.015	-0.028	-0.058*	0.082*	0.004	-0.057*	
NCFO	0.317***	0.358***	-0.028	-0.040	0.018	-0.055	0.041	0.123***	
Variables	ACSIZE	ACMEET	ACAE	OC	BIG4	LFSIZE	LEV	ROA	NCFO
AEM									
ABCFO									
IWD1:1									
IWD2:1									
BIND									
BSIZE									
BMEET									
ACIND									
ACSIZE	1								
ACMEET	0.136***	1							
ACAE	-0.146***	0.020	1						
OC	0.086**	0.071**	-0.010	1					
BIG4	0.203***	0.109***	0.035	0.093***	1				
FSIZE	0.273***	0.299***	-0.024	0.094***	0.468***	1			
LEV	-0.009	0.128***	0.000	-0.081**	0.126***	0.343***	1		
ROA	-0.002	-0.049	0.011	0.002	0.021	0.045	-0.096***	1	
NCFO	-0.035	-0.012	0.030	-0.082**	-0.122***	-0.112***	0.124***	-0.082**	1

Definitions of the acronym were presented in Table 1.

*, **, and *** are significant at 10%, 5%, and 1% levels, respectively.

feasible generalized least squares (FGLS) regression. Further, option “panels (heteroskedastic)” was added to the regression to solve the existence of the heteroscedasticity issue (see, Podestà, 2002; StataCorp, 2015), in determining the level of the relationship (Sakawa & Watanabel, 2017, 2018).

5.3. Regression results and discussion

Table 4 shows a significant negative relationship between the impactful women directors and the level of EM, AEM, and ABCFO. Having at least one female director who also serves on the AC could enhance the effectiveness of the board and then, significantly constrain the level of AEM and ABCFO. Likewise, having at least two female directors and at least one of them serving on the AC strengthens their power on the board and ensues greater engagement in decision-making by carefully tracking senior management to match themselves with shareholders’ interests. Hence, these results support the agency and resource dependence theories as well as the hypothesis of the study. It also supports the argument of Abdullah and Ismail (2016) that Malaysia’s policy of requesting listed companies to nominate women to their boards by itself is not enough. To boost financial reporting efficiency, Malaysia’s regulators, among others, should also request companies to nominate women to the AC. By doing that, the role of women directors in mitigating EM will be significant and impactful.

Inconsistent results in the previous studies are may due to the low level of the representation of women on the board and AC. Some previous studies have found a significantly negative relationship between women on the board and EM (Gavious et al., 2012; Githaiga et al., 2022; Gul et al., 2007; Gull et al., 2018; Ismail & Abdullah, 2013; Kyaw et al., 2015; Lakhal et al., 2015; Orazalin, 2020). On the other hand, other studies found a significantly positive association between women on the board and EM (Arun et al., 2015; Biswas et al., 2022; Buniamin et al., 2012). Meanwhile, other investigations have shown no link between female board members and EM (Abdullah & Ismail, 2012; Abdullah et al., 2016; Arioglu, 2020; Moradi et al., 2012).

6. Robustness tests

6.1. Including year and industry dummy variables

This study re-estimated Model 1 and Model 2 by using a dummy variable to represent the years and industry effects (Sakawa & Watanabel, 2017, 2018; Su et al., 2008). It is been found that the business cycle could affect the results (Baatwah et al., 2015) as well as the differences across industries. The findings seen in Table 5 are similar to the prior released in models 1 and 2 of Table 4.

6.2. Using different measurements

To provide reliable results, the study also uses a diverse proxy for EM (Al-Absy, Ismail et al., 2020). Table 6 displays the results of re-estimate Model 1 and Model 2 by using: (i) the absolute value of DA using the MJM by Dechow et al. (1995), as a measurement of AEM; and (ii) the aggregate three proxies of REM introduced by Roychowdhury (2006) as a measurement of REM. Regarding AEM Model, the results for Model 1 are similar to the previous result of Model 1 (using Jones’s model) shown in Table 4. Concerning REM Model, the results for Model 2 of Table 6, in terms of IWD2:1, are similar with previous results of Model 2 shown in Table 4 (using ABCFO). However, it is inconsistent in terms of IWD1:1. The reason is that constraining all practice of REM could happen if there are at least two female directors and at least one of them serve on the AC. However, having at least one female director who also serves on the AC could not be able to significantly constrain all practice of REM.

6.3. Using different regression estimator

The study re-runs Models 1 and 2 by using different regression estimator, namely, Panel-Corrected Standard Errors (PCSE) instead of using FGLS regression to re-examine the relationship. The findings seen in Table 7 are similar to the previous model 1 and 2 results are presented in Table 4.

Table 4. Regression result of the main model using FGLS

Variables	AEM (Model 1)		ABCFO (Model 2)	
	Regression 1	Regression 2	Regression 1	Regression 2
IWD1:1	−0.00355** (0.00165)		−0.00612*** (0.00151)	
IWD2:1	− (0.00200)	−0.00517*** (0.00200)	− (0.00200)	−0.00640*** (0.00239)
BIND	0.00747 (0.00880)	0.00670 (0.00873)	−0.00115 (0.00861)	0.00421 (0.00872)
BSIZE	−0.000505 (0.000480)	−0.000425 (0.000477)	−0.000254 (0.000457)	0.000230 (0.000507)
BMEET	0.00322*** (0.000553)	0.00327*** (0.000531)	0.00156*** (0.000504)	0.00104* (0.000592)
ACIND	0.0132** (0.00603)	0.0161*** (0.00591)	0.00646 (0.00640)	0.00682 (0.00650)
ACSIZE	−0.00358** (0.00149)	−0.00334** (0.00146)	−0.00153 (0.00153)	−0.00113 (0.00160)
ACMEET	−0.00131* (0.000669)	−0.00137** (0.000652)	−0.000270 (0.000630)	−0.000339 (0.000686)
ACAE	0.0123*** (0.00288)	0.0123*** (0.00293)	0.0156*** (0.00333)	0.0159*** (0.00334)
OC	−0.00496 (0.00469)	−0.00692 (0.00485)	0.000714 (0.00410)	0.00293 (0.00422)
BIG4	−0.00167 (0.00162)	−0.00128 (0.00162)	−0.00120 (0.00154)	−0.00119 (0.00154)
FSIZE	−0.00204*** (0.000430)	−0.00214*** (0.000402)	−0.00148*** (0.000474)	−0.00173*** (0.000488)
LEV	0.000157*** (5.80e-05)	0.000180*** (5.23e-05)	−0.000105* (5.48e-05)	−7.80e-05 (5.53e-05)
ROA	0.00175*** (0.000327)	0.00176*** (0.000329)	0.00261*** (0.000281)	0.00270*** (0.000288)
NCFO	0.0274*** (0.00223)	0.0275*** (0.00223)	0.0374*** (0.00193)	0.0380*** (0.00195)
Constant	0.0404*** (0.00853)	0.0382*** (0.00849)	0.0364*** (0.00751)	0.0320*** (0.00745)
Wald chi2	421.69	478.31	737.25	580.05
Sig	0.0000	0.0000	0.0000	0.0000
R-squared	0.1308	0.1307	0.1639	0.1637
Observations	864	864	864	864

Definitions of the acronym were presented in Table 1. Robust standard errors presented in parentheses. *, **, and *** are significant at 10%, 5%, and 1% levels, respectively. R-squared was extracted from OLS regression

7. Conclusions

The board of directors plays an essential role in improving financial reporting and mitigating EM. Gender diversity is one of the most important CG mechanisms where most regulators have formulated a policy for the representation of women on the board. Regulators have requested companies to achieve a specific percentage of the representation of women on the BOD. Even though the percentage of representation of female directors on boards is being increased across

Table 5. Regression result of the main models using FGLS with including year and industry dummy variables

Variables	AEM (Model 1)		ABCFO (Model 2)	
	Regression 1	Regression 2	Regression 1	Regression 2
IWD1:1	−0.00330*		−0.00631***	
	(0.00169)		(0.00161)	
IWD2:1		−0.00431**		−0.00633***
		(0.00202)		(0.00236)
BIND	0.00557	0.00640	−0.00110	0.00286
	(0.00893)	(0.00885)	(0.00893)	(0.00905)
BSIZE	−0.000286	−0.000226	−0.000143	0.000218
	(0.000494)	(0.000495)	(0.000480)	(0.000518)
BMEET	0.00339***	0.00330***	0.00145**	0.00104*
	(0.000567)	(0.000562)	(0.000595)	(0.000623)
ACIND	0.0137**	0.0166***	0.00495	0.00602
	(0.00617)	(0.00610)	(0.00652)	(0.00659)
ACSIZE	−0.00375***	−0.00350**	−0.00146	−0.000991
	(0.00144)	(0.00143)	(0.00155)	(0.00161)
ACMEET	−0.00116	−0.00128*	−0.000199	−0.000271
	(0.000738)	(0.000735)	(0.000696)	(0.000724)
ACAE	0.0105***	0.0102***	0.0150***	0.0155***
	(0.00319)	(0.00325)	(0.00343)	(0.00347)
OC	−0.00409	−0.00553	0.00154	0.00291
	(0.00490)	(0.00503)	(0.00422)	(0.00431)
BIG4	−0.000913	−0.000556	−0.00131	−0.00162
	(0.00171)	(0.00174)	(0.00163)	(0.00164)
FSIZE	−0.00232***	−0.00248***	−0.00145***	−0.00157***
	(0.000479)	(0.000489)	(0.000513)	(0.000522)
LEV	0.000148**	0.000182***	−0.000107*	−8.19e-05
	(5.89e-05)	(5.52e-05)	(5.50e-05)	(5.51e-05)
ROA	0.00163***	0.00171***	0.00252***	0.00264***
	(0.000333)	(0.000337)	(0.000298)	(0.000298)
NCFO	0.0275***	0.0275***	0.0373***	0.0379***
	(0.00235)	(0.00235)	(0.00198)	(0.00198)
Constant	0.0411***	0.0396***	0.0374***	0.0316***
	(0.00881)	(0.00891)	(0.00792)	(0.00774)
Year dummy	Included	Included	Included	Included
Industry dummy	Included	Included	Included	Included
Wald chi2	419.80	455.01	563.76	539.45
Sig	0.0000	0.0000	0.0000	0.0000
R-squared	0.1338	0.1337	0.1671	0.1669
Observations	864	864	864	864

Definitions of the acronym were presented in Table 1. Robust standard errors are presented in parentheses. *, **, and *** are significant at 10%, 5%, and 1% levels, respectively. R-squared was extracted from OLS regression. Year and industry dummy variables were included in all regressions.

Table 6. Regression Result of the Main Models Using FGLS and Different Measurements

Variables	Model 1: MJM by Dechow et al. (1995)		Model 2: Roychowdhury (2006)'proxies	
	Regression 1	Regression 2	Regression 1	Regression 2
IWD1:1	−0.00445*** (0.00171)		0.00654 (0.00482)	
IWD2:1		−0.00598*** (0.00231)		−0.0100* (0.00538)
BIND	−0.00493 (0.00884)	−0.00380 (0.00891)	0.0768*** (0.0239)	0.0777*** (0.0242)
BSIZE	−0.00108** (0.000488)	−0.00102** (0.000492)	0.00237 (0.00154)	0.00236 (0.00155)
BMEET	0.00253*** (0.000605)	0.00235*** (0.000606)	0.00207 (0.00166)	0.00251 (0.00173)
ACIND	0.0210*** (0.00597)	0.0223*** (0.00600)	−0.0239 (0.0173)	−0.0240 (0.0174)
ACSIZE	−0.00234 (0.00154)	−0.00187 (0.00157)	−0.0157*** (0.00457)	−0.0152*** (0.00457)
ACMEET	−0.000243 (0.000769)	−0.000218 (0.000761)	−0.00262 (0.00169)	−0.00368* (0.00190)
ACAE	0.00772*** (0.00290)	0.00899*** (0.00293)	0.0150 (0.0107)	0.0139 (0.0105)
OC	−0.00375 (0.00491)	−0.00560 (0.00502)	0.0823*** (0.0128)	0.0881*** (0.0120)
BIG4	−0.00297* (0.00168)	−0.00273 (0.00167)	0.00289 (0.00500)	0.00397 (0.00496)
FSIZE	−0.00233*** (0.000484)	−0.00254*** (0.000463)	−0.0158*** (0.00151)	−0.0157*** (0.00153)
LEV	0.000183*** (5.95e-05)	0.000215*** (5.49e-05)	0.000501*** (0.000134)	0.000416*** (0.000132)
ROA	0.00189*** (0.000336)	0.00201*** (0.000336)	0.00284*** (0.000826)	0.00282*** (0.000817)
NCFO	0.0291*** (0.00247)	0.0292*** (0.00246)	0.0447*** (0.00448)	0.0443*** (0.00442)
Constant	0.0428*** (0.00822)	0.0412*** (0.00828)	0.258*** (0.0220)	0.259*** (0.0235)
Wald chi2	430.86	410.54	980.22	645.08
Sig	0.0000	0.0000	0.0000	0.0000
R-squared	0.1380	0.1377	0.0953	0.0952
Observations	864	864	864	864

Definitions of the acronym were presented in Table 1. Robust standard errors presented in parentheses. *, **, and *** are significant at 10%, 5%, and 1% levels, respectively. R-squared was extracted from OLS regression.

countries, the argument on the influence of women directors on the performance and financial quality of companies is still ongoing. Further, up to now, the regulators have not formulated any policy on the presence of women in the AC.

Table 7. Regression result of the main models using panels corrected standard errors

Variables	AEM (Model 1)		ABCFO (Model 2)	
	Regression 1	Regression 2	Regression 1	Regression 2
IWD1:1	−0.00286* (0.00156)		−0.00449** (0.00225)	
IWD2:1		−0.00367** (0.00182)		−0.00573** (0.00284)
BIND	0.0116 (0.00949)	0.0116 (0.00951)	0.0113 (0.0113)	0.0113 (0.0113)
BSIZE	−0.000971 (0.000942)	−0.000971 (0.000950)	0.000151 (0.000760)	0.000150 (0.000777)
BMEET	0.00295*** (0.000941)	0.00293*** (0.000949)	0.00144 (0.00105)	0.00142 (0.00105)
ACIND	0.0111 (0.00731)	0.0122* (0.00731)	0.00250 (0.00566)	0.00416 (0.00507)
ACSIZE	−0.00349 (0.00283)	−0.00342 (0.00283)	−0.00281 (0.00258)	−0.00269 (0.00255)
ACMEET	−0.000864 (0.000888)	−0.000930 (0.000900)	−0.00132 (0.000868)	−0.00142 (0.000892)
ACAE	0.00566 (0.00694)	0.00569 (0.00694)	0.0108* (0.00642)	0.0109* (0.00629)
OC	−0.00430 (0.00507)	−0.00473 (0.00492)	0.00665** (0.00286)	0.00597** (0.00275)
BIG4	0.000420 (0.00193)	0.000249 (0.00186)	−0.00106 (0.00193)	−0.00133 (0.00179)
FSIZE	−0.00292*** (0.000595)	−0.00289*** (0.000611)	−0.00218*** (0.000533)	−0.00214*** (0.000581)
LEV	0.000174* (8.93e-05)	0.000184** (8.83e-05)	−2.49e-05 (9.38e-05)	−9.41e-06 (8.78e-05)
ROA	0.00162** (0.000782)	0.00162** (0.000770)	0.00256*** (0.000842)	0.00256*** (0.000829)
NCFO	0.0311*** (0.00787)	0.0309*** (0.00783)	0.0380*** (0.00698)	0.0378*** (0.00690)
Constant	0.0608*** (0.0122)	0.0594*** (0.0122)	0.0523*** (0.0159)	0.0501*** (0.0161)
Wald chi2	88.64	112.62	213.02	102.37
Sig	0.0000	0.0000	0.0000	0.0000
R-squared	0.1308	0.1307	0.1639	0.1637
Observations	864	864	864	864

Definitions of the acronym were presented in Table 1. Robust standard errors are presented in parentheses. *, **, and *** are significant at 10%, 5%, and 1% levels, respectively.

Women directors in the AC may enhance the monitoring role of the AC in mitigating EM and improving financial reporting quality. Therefore, the study expects that putting together women on the board and AC will increase their power and effectiveness in monitoring EM. Appointing at least one or more women on the board and at least one of them serving in AC could enhance their capacity and power in mitigating EM. Hence, the purpose of this study was to investigate the impact of impactful female directors on the level of EM.

The results of the study show a significant negative relationship between impactful women directors and the level of EM, namely AEM and REM (measured by abnormal levels of cash flow from operations). Having at least one female director who also serves on the AC has significantly constrained EM. Equally, having at least two female directors and at least one of them serving on the AC have effectively monitored the managers' behavior toward engaging in EM.

The study is very useful for policymakers, stakeholders, researchers, and society. It introduces new measurements for gender diversity, called impactful women directors: (i) a dummy variable equal "1" if the board has at least one female director who also serve on the AC and "0", otherwise; and (ii) a dummy variable equal to "1" if the board has at least two female directors and at least one of them serves on the AC, and "0", otherwise. The study suggests that firms have to appoint more women directors on the board and at the same time appoint at least one of them in the AC to strengthen the role of women directors in monitoring and supervising the management.

The study recommends that future studies focus more on the effect of female directors' attributes, whether on board or AC, toward reducing EM. There is a need for more studies to search for new measurements of gender diversity. Moreover, future studies could explore the factors that strengthen the impactful of women directors and hence, enhance women directors' capabilities in mitigating EM.

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