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Board-diversity, audit committee characteristics and earnings management: Family versus non-family controlled firms

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This study examines the impact of board diversity, audit committee attributes, and the interaction of family ownership on earnings manipulation. The study employs the Caylor and Roy Chowdhury models to quantify accrual and real earnings management, respectively, in a developing country setting. Data was collected from non-financial organization operating in Bangladesh during the period from 2011 to 2019. Furthermore, depending on 10% or more ownership, a chosen sample was split into family and non-family managed enterprises. The findings of the research suggest that board size and audit committee meetings can reduce accrual earnings management, but the independent director in the boardroom increase real-earnings management. Moreover, the corporate governance index (CGI) decreases accrual earnings management. Interestingly, board diversity and audit committee characteristics effectively curb earnings management in family companies more than in non-family enterprises. Family ownership strengthens the impact of board diversity and audit committee characteristics on earnings management. Finally, the findings of the study are resilient when considered for endogeneity and other diagnostic checks. The study's findings also add to the corporate governance literature by revealing the impact of board diversity and audit committee characteristics on earnings management in a developing country setting. The application of the Caylor model to measure accrual earnings management and a comparative analysis of family and non-family enterprises in this regard are limited and the first study in the context of Bangladesh.

Key words: Board and audit committee characteristics, earnings management, non-financial organization, family and non-family firms, Bangladesh stock exchanges.

INTRODUCTION

Earnings manipulation is a deliberate strategy business leaders use to gain financial benefits from the commercial center (Almasarwah, 2015). Sometimes, executives take part in unscrupulous earnings treatment for their own gains and generate some expected affluence for the organization (Bergstresser and Philippon, 2006). It might happen for various reasons, including shaky corporate governance and control frameworks. Indeed, effective

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corporate governance mechanisms may help a company develop the quality of its commercial transactions and decrease earnings management. On the other hand, poor corporate governance increases the chances of mismanagement, dishonesty, and unprofessional behavior in the company (Leventis and Dimitropoulos, 2012; Almasarwah, 2015). According to Cadbury (1992), corporate governance is a complex structure for managing a company. Moreover, Hamzah and Zulkafli (2014) shows that company governance may be used to prevent insider expropriation. It also uses a systematic way of protecting shareholders' wealth (La Porta et al., 2000). Moreover, corporate governance mechanisms augment the right to entry to external capital and endure economic shocks (Hashim and Amrah, 2016). Consistent with these backgrounds, whether corporate governance mechanism (board diversity, audit Committee characteristics) does have any relationship with earnings management has been an issue of the extreme contest and a center of many former pieces of research. Unlike research conducted in this regard, but tends to limit the measures and methodologies. Most of the studies have used one or two corporate governance characteristics and related them to accrual and real earnings management in a different economy, particularly in developed economies (Bouaziz et al., 2020; Gull et al., 2018).

In reality, testing single elements of corporate governance discretely on earnings management led to the partial representation of the relationship, also demonstrates mixed results (Almasarwah, 2015). Moreover, (Fields et al., 2001) stated that only a particular earnings management system would not correspond to the overall effects of earnings management activities.

This study was motivated to link board diversity and audit committee characteristics with earnings management for two reasons. First, most previous studies on the Bangladeshi economy focused on other influencing factors of earnings management, such as; business group affiliation (Muttakin et al., 2017), CSR disclosures (Muttakin et al., 2015), enterprise resource planning systems (Sarkar, 2018), highly volatile revenue and operating profit (Ahmed and Azim, 2015), firm-specific determinants (Habib, 2005). In contrast, there is little study on the relationship between corporate board and audit committee characteristics in a developing country. So this study contributes to the existing literature by addressing the developing country's economy. Moreover, because of the regulated corporate governance framework, most studies in this area centered on the industrialized economy (Bouaziz et al., 2020; Gull et al., 2018). Therefore, studying the rising economy, especially in Bangladesh, is crucial because a lot of investment and development projects have been seen in this country; this, in turn, increases investors attraction of.

Furthermore, several pieces of research on accrual earnings management employ the Jones model and the Modified Jones Model proposed by Dechow et al. (1998) (Lemma et al., 2018; Bhuiyan, 2015), as well as Beneish Model (Khan and Akter, 2017); cross-sectional Jones' (1991) model (Haque and Imam, 2014); the standardized cross-sectional model (Imam and Jaber, 2014); discretionary accruals (Muttakin et al., 2017) to quantify accrual earnings management. However, the application of the Caylor (2010) model is rare in literature; thus, it was addressed to measure accrual earnings management in the study. Furthermore, while many earlier studies concentrated on accrual earnings management strategies, this study employs both accrual and real-activity-based earnings management.

Secondly, "around the globe, family companies have significant and common business characteristics" (Bunkanwanicha et al., 2013); however, whether family ownership makes any difference to the reporting practice of the firms is still a contentious issue. Research shows that family firms are omnipresent in many emerging and advanced countries (Khanna and Rivkin, 2001). Family firms manipulate ownership and management to acquire family aims and plans (Chrisman et al., 2013). Moreover, firms also utilize company resources to execute their agendas that might have unusual pressures on the affluence of the stockholders (Chrisman et al., 2013); it might lead to misunderstanding between family and non-family shareholders Madison et al. (2016). Furthermore, family firms accept strategies conducive to their benefits, influencing minority shareholders (Yeh and Woidtke, 2005). Previous studies demonstrate that family-oriented firms are virtually managed and operated by close relatives; thus, corporate governance negatively affects managerial aspects and corporate financial reporting (Prencipe and Bar-Yosef, 2011). However, no study has illustrates a comparative analysis regarding the impact of board diversity and audit committee characteristics on earnings management in family and non-family firms. In addition, family businesses are more prone to deviate from corporate governance best practices (Arcot and Bruno, 2012). Evidence demonstrates that 58.42% of respondents in a study considering the ability to guarantee good governance in Bangladesh under a family-based culture feel it is not achievable (Hasan et al., 2014). To what extent these are wide-ranging and applicable to ensure reasonable control in the corporate financial reporting of Bangladesh is still a question of controversy. Therefore, Bangladesh is a rising market with leading family enterprises, low institutional attachments, a feeble legal structure, and fewer inducements for institutional shareholders to monitor firms' fiscal decisions. Earnings manipulation provides a more encouraging setting to study the consequence of corporate governance, that is, board-diversity and audit committee characteristics on earnings management in family and non-family organizations.

The study examines the association between board diversity and audit committee features with earnings

management based on the data from an emerging economy. Bangladesh, the 39th biggest economy in the world, features a GDP of more than US$300 billion. Given the recent infrastructure developments and GDP growth, Bangladesh has received the attention of foreign investors in various sectors. Effective corporate governance, including accurate financial management, ensures foreign investment. In Bangladesh, non-financial firms are required to adhere to corporate governance guidelines to ensure transparency of financial activities. Studies show that compliance with corporate governance in Bangladesh is very poor. The reasons behind it are violations of shareholders' rights, "absence of law enforcement mechanisms, lack of obligation on the part of boards of directors, lack of commitment to regulatory frameworks, weak enforcement and monitoring systems, and lack of transparency and disclosure" (Okpara, 2011), as well as a large portion of shares occupied by family members (Hasan et al., 2014). The World Bank (2009) reports that Bangladesh's capital market is not as developed as expected, and economic monitoring and enforcement are below standard (Siddiqui, 2010). In addition, export-oriented organizations are the mainstay of the country's economy (Islam and Deegan, 2008).

A recent report by the Bank of Bangladesh shows that the capital market has seen several regulations and administrative headways, such as stock exchanges, central depository, stock dealer/stockbroker, merchant banker, portfolio manager, and corporate governance amendments (Amit, 2016). As a result, earning manipulation is not unlikely in Bangladesh as a report demonstrates that 85.71% of food and allied industries have significantly higher manipulation-score; at least for one year during a five-year period (Khan and Akter, 2017).

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Board size and earnings management

Board size consists of individuals who play fundamental decision-making rules in an organization. They have the legal authority to care for the well-being of shareholders in both financial and non-financial areas of the organization and oversee the managers' duties and obligations. Research shows that efficient boards can limit agency problems and satisfy managers and shareholders by increasing the consciousness of accountants to ensure the quality of financial reporting (Liu and Fong, 2010; Alves, 2011). A variety of experimental studies, on the other hand, suggest that having a high number of board members leads to inferior performance since each member is dependent on others; therefore, managers hold the organization's authoritative power (Core and Guay, 1999). Consequently, managers show control over the financial statement's preparation

and disclosure.

Similarly, Talbi et al. (2015) stated that big boards are more prone to distort financial statements in family-owned businesses by reducing discretionary spending to boost revenue. Several studies demonstrates negative relationship between board size and earnings management, for example, Peasnell et al. (2005) study on the UK sample; an empirical study on the Indian sample (Sarkar et al., 2008; Ahmed et al., 2006) a study on the economy of New Zealand; (Abed et al., 2012) a study on Jordanian non-financial firms. In contrast, some studies demonstrate board size positively affects earnings management (Ball and Shivakumar, 2008). The above views and findings proved that the relationship between board size and earnings management is still a debatable research question (Ghosh et al., 2010). Given these opposing predictions and findings, and the present status of the board-size structure of Bangladeshi firms leads the author to propose the hypothesis as follows:

H1: There is a negative association between board size and earnings management.

Independent board of director and earnings management

Previous literature shows that independent board members are one of the most powerful regulating variables in earnings management (Xie et al., 2003). Yet, the relationship between independent directors and managerial activities is complex, and many arguments exist. The first view holds that a significant portion of independent directors on the board can supplement the board's independence and controlling power, limiting managers' opportunities and authoritative strength but increasing their competence. Eventually, reducing the gap between managers and shareholders, and equity holders can maximize their interests and minimize an organization's fraudulent acts (Kelton and Yang, 2008).

Similarly, resource dependence theory supports the above view (Kesner and Johnson, 1990). The second view contends that family-oriented firms are virtually managed and operated by close relatives; thus, independent directors have low managerial aspects (Prencipe and Bar-Yosef, 2011). Besides this, personal relationship and previous service attachment with the organization affects independent directors negatively like; prompt and unnecessary action (Goodstein et al., 1994); undue review (Baysinger and Butler, 1985); the problem of absolute freedom of work (Demb and Neubauer, 1992). Several studies are consistent with the views that the board's supremacy of independent directors (in the case of number) is more sustainable and functional in overlooking managerial activities. However, Haniffa and Cooke (2002) demonstrated that the presence of independent directors leads to quality report.

Consequently, they found that there is a negative association between independent directors and earnings management. On the other hand, the study of Sarkar et al. (2008) and Osma and Noguer (2007) illustrated those more independent directors on the board lead to more earnings management practices. Hence, the diversified views and findings regarding this phenomenon lead to the following hypothesis:

H2: There is a negative relationship between independent board members and earnings management.

Gender-diverse boards and earnings management

Gender diversity has long been a topic of discussion among business boards of directors. However, Norway is the first country to mandate a portion of a female director but has seen affirmative development of laws and regulations for female representation in several nations, including Belgium, France, Iceland, Italy, Norway, Spain, and the Netherlands (Groysberg and Bell, 2013). It was evident that the thinking power, workability, and typical behavior of males and females are different; however, to deal with the organization's financial aspects, females tend to support others while men concentrate on profitability and career development. Moreover, to record revenue expenditure, guys are more likely than ladies to violate corporate and accounting guidelines to maximize profit (Betz et al., 1989). Similarly, research evidence demonstrates that women involved in earnings management are comparatively lower than men due to their interest in professionalism (Srinidhi et al., 2011). Based on moral standards and consciousness, some studies pointed out that usually, female accountants show greater accountability than their male counterparts (Bernardi and Arnold, 1997). They offer reluctance to augment economic returns through unethical ways due to immense loathing for taking risks (Kaplan et al., 2009). Furthermore, girls are more flexible and sensitive than boys in making economic decisions (Byrnes et al., 1999).

In contrast, Harakeh et al. (2019) illustrated that female director may involve in manipulation by compromising quality to supplement financial benefits and professional status. Consistent with the above views, research evidence shows a negative association between gender-diverse boards and earnings management (Peni and Vahamaa, 2010). Similarly, Gul et al. (2011) pointed out that if a company falls upon the risk of earnings management, qualified female directors can handle this phenomenon by using a conservative approach. Based on the above discussion, it is crystal clear that female directors on the boards might be remunerative for a company to handle earnings management. Thus, the hypothesis was proposed as follows:

H3: There is a positive association between gender-diverse boards and earnings management.

Board meeting and earnings management

To deal with official concerns, board members must participate in the regular board meeting (Obigbemi et al., 2016); hence the firm must incur meeting arranging expenses. Therefore, the frequency of board meetings is still a matter of intense debate among researchers and policymakers (Vafeas, 1999). Depending on the type of corporate governance, research sample, and period, some believe that board meetings affect earnings management (Almasarwah, 2015).

According to Vafeas (1999), if a company has a board meeting violating corporate governance norms, it may face earnings management. In contrast, Gulzar (2011) show that increasing board meeting participation strengthens board members' oversight and effectiveness, which reduces an organization's fraudulent actions.

On the other hand, according to Almasarwah (2015), if a firm can provide a good corporate governance environment and qualified board members, repeated board meetings will reduce earnings manipulation. A recent empirical study on the Shanghai and Shenzhen stock exchange firms shows a significant positive relationship between board meeting and earnings management due to weak corporate governance (Gulzar, 2011). Similarly, Obigbemi et al. (2016) show the precise relationship between board meeting and earnings management, indicating that having more board meetings intensifies earnings management. Given these various arguments and evidence about the relationship between board meetings and earnings management, the author propose the following hypothesis:

H4: There is a negative relationship between number of board meeting and earnings management.

Audit committee member and earnings management

The audit committee's principal goal is to guarantee that a company's financial reporting is transparent. However, depending on the number of non-executive directors in the team, the committee might be small, medium, or large (Alkdai and Hanefah, 2012). Indeed, the audit committee structure is practically different across the world. For example, UK Corporate Governance Guidelines dictate that a company's audit committee should include two or three non-executive directors (Song and Windram, 2004). The study of Hamdan et al. (2013) shows that Jordan Audit Committee consists of three non-executive directors. Similarly, Bangladesh Corporate Governance Code 2018 is consistent with the Jordan Code (2012).

Furthermore, Xie et al. (2003) suggest that audit teams with highly experienced individuals can better monitor, assess, and avoid fraud and mistakes since they can deal with all facets of accounting and finance.

In contrast, the small audit committee may become prejudiced and lose its independence (Habbash, 2010).

Table 1. Description of study samples.

Panel A; Sample	
Selected companies	198
Number of company-year	1782
Less: Firm-year lack of information	720
Total sample (Firm-year)	1062

Panel B: Industry-wise allocation	
Various sectors	No. of Firm-year
Cement industry	63
Ceramics industry	45
Engineering industry	144
Textile industry	288
Food industry	81
Power industry	108
Pharmaceuticals	180
IT	36
Services & Real Estate	36
Telecommunication	9
Tannery	18
Miscellaneous	36
Paper and printing	18
Total	1062

Panel A contains a sample that was finally considered for the study, Panel B explains sector-wise representatives.

Consistently, Prior literature stated diversified results on the relationship between audit committee size and earnings management in various economic settings. For example, an empirical study on Malaysian firms (Haniffa et al., 2006) and (Al-Haddad and Whittington, 2019) on Jordan-listed organizations reveals positive effects of audit committee size on earnings management.

In contrast, a study conducted by Xie et al. (2003) in the USA and (Baxter and Cotter, 2009) on Australian firms found no association between earnings management and audit committee size. Based on the preceding rationale and findings, it was concluded that this topic's findings are not fixed and that additional research is required to generalize the findings. As a consequence, the following hypothesis was suggested:

H5: There is a negative relationship between audit committee size and earnings management.

Audit committee meeting and earnings management

To ensure the quality of audit procedures and management approaches, the audit committee should maintain regular communication with all entity parties (Habbash, 2010) and hold meetings to resolve any potential conflicts (Klein, 2002; Almasarwah, 2015).

However, many audit committee meetings may foster professionalism and a healthy balance of relationships across a firm's bodies and gear up in-house control mechanisms for optimal performance (Jenny and Lois, 2007). Similarly, Abbott et al. (2000) showed that having at least two meetings per year is sufficient to prevent cash theft, misappropriation of commodities, and accounting manipulations. Due to variances in audit committee power and diverse economic situations, past research has produced conflicting conclusions relating to the frequency of audit committee meetings and an organization's fraudulent activities. While a study of Malaysian organizations (Saleh et al., 2007) discovered a positive relationship between audit committee meetings and earnings management because more audit committee meetings increase meeting operating costs, so companies engage in earnings management to offset these extra costs. Others stated a negative association between the quantity of audit committee gathering and earnings manipulation (Baxter and Cotter, 2009 (Australian); Bedard et al., 2004 (USA); Eriabie and Odia, 2016; Abbas, 2020 (Nigeria); Almasarwah, 2015 (Jordan). Previous research has clearly shown that mixed evidence exists in numerous economic circumstances regarding this issue. The result shows that the audit committee meeting will impact on earnings management. Thus, the hypothesis is as follows:

H6: There is a negative relationship between audit committee meeting and earnings management.

METHODOLOGY

Sample

The examination is primarily based on secondary data. The total sample of this investigation is described in Table 1. From 2011 to 2019, all data were gathered from annual reports of registered non-financial organizations in Bangladesh.

The study period began in 2011 because of the discrepancy in necessary data for all proxies. Bangladesh has 586 listed companies, with 198 being non-financial enterprises (dse.com.bd). Financial organizations were omitted from this analysis due to the nature of transactions, differing regulations (Umer et al., 2020), and unique capital structure (Lim et al., 2007). The authors' research initially included 1782 firm-year observations, but they eliminated 720 firm-year views due to incomplete information and the absence of annual reports for some businesses founded after 2011. Finally, for empirical analysis, 41 family-oriented firms (376 firm-year observations) and 77 non-family-oriented firms (686 firm-year data) were selected from thirteen industries: cement, ceramics, textiles, tanning, paper and printing, pharmaceuticals, service, and real estate, food, engineering, power, miscellaneous, and information technology. To provide a trustworthy and accurate study, all data were carefully gathered from yearly reports.

Variable measurement: Independent variable

According to prior studies, the author quantifies independent variables. First of all, board size is measured by taking the number

of board members listed in the annual report at the end of each year (Peasnell et al., 2005). Secondly, the author assesses independent directors by looking at the number of independent directors on the board after each year, according to Sarkar et al. (2008). Thirdly, female directors in the boardroom are calculated by considering the number of female directors on the board after each year (Peni and Vahamaa, 2010). Then board meetings was measured by addressing the definite quantity of yearly board meetings held by the board each year (Obigbemi et al., 2016). Audit committee size is also evaluated by taking the number of audit members in the boardroom (Saleh et al., 2007); moreover, audit committee meeting indicates the frequency of meetings the audit committee holds (Xie et al., 2003). Furthermore, the family dummy is measured by taking a dummy variable equal to 1 if any board member occupied 10% or more shares otherwise zero (Kuan et al., 2011).

Measurement of accrual-based earnings management

The Caylor (2010)'s model is employed to determine accrual earnings management in this study. Managerial discretion over revenue recognition, such as income on credit, emphasizes the Caylor (2010)'s model. Caylor (2010) frames his research around three triple earnings intentions (which he refers to as benchmarks), such as avoiding thrashing, earnings reductions, and unenthusiastic earnings shocks. The model is based on real-world company actions like softening client credit restrictions. It utilizes gross accounts receivable rather than net accounts receivable since anomalous increases in net accounts receivable might indicate changes in the allowance for bad debt. The Caylor (2010)'s model based on gross accounts receivable implies that gross accounts receivable are connected to current period sales, as accounts receivable represent sales accrued in the current period. Caylor's model (Caylor, 2010) constructs the following equation to examine this factor:

$$\Delta \text{ Gross Account Receivable}_{i,t}/Asset_{i,t-1} = \beta_0 + \beta_1(1/ASSET_{i,t-1}) + \beta_2(\Delta SALES_{i,t}/Asset_{i,t-1}) + \beta_3(\Delta CFO_{i,t+1}/ASSET_{i,t-1}) + \varepsilon_{i,t} \ldots\ldots \quad (1)$$

Where; Δ Gross Account Receivable $_{i,t}$ = gross accounts receivables change for firm (i) during year t; $Asset_{i\,t-1}$ is the beginning of year total assets; $\Delta SALES_{i,t}$ is the change in sales during year t; ΔCFO_{t+1} is the change in cash flow from operations during year t + 1.

Measurement of real-activity based earnings management

To increase or decrease recorded earnings, managers bring about this type of activity by controlling cash flow from operating activities, production, and discretionary expenses (Roychowdhury, 2006). Initially, sales management involves swelling sales through various incentives like; discounts, after-sales service, and several credit facilities, consequently lowering cash flows due to irregular margin reduction. On the other hand, overproduction increases manufacturing costs; thus, reducing discretionary expenses amplifies operating cash flows (Lemma et al., 2018).

Previous studies use abnormal cash flows, production costs, and discretionary expenses as proxies for natural earnings management (Lemma et al., 2018). Abnormal indicates the differences between actual and expected outcomes of cash flow, production cost, and discretionary expenses (Lemma et al., 2018). Consistent with previous studies (Roychowdhury, 2006; Lemma et al., 2018), we also measure cash flow from operating activities, production cost, and discretionary cost, according to Dechow et al. (1998)'s model. The study calculates natural earnings management by the following equations.

The first model is used to compute abnormal cash flow from operating activities (R_CFO) by netting in service money flow less than every company's predictable networking cash flow (every year). The first model is as follows:

$$CFO_{i,t}/ASSET_{i,t-1} = \beta_1(1/ASSET_{i,t-1}) + \beta_2(SALES_{i,t}/Asset_{i\,t-1}) + \beta_3(\Delta SALES_{i,t}/ASSET_{i,t-1}) + \varepsilon_{i,t} \quad (2)$$

Where CFO stands for net operating cash flow and asset denotes a single period lagged value of the total asset, and $\Delta SALES$ refers to the overall sales value changes. The following model is applied to calculate production cost and regressed for each firm:

$$PROD_{i,t}/ASSET_{i,t-1} = \beta_1(1/ASSET_{i,t-1}) + \beta_2(SALES_{i,t}/Asset_{i,t-1}) + \beta_3(\Delta SALES_{i,t}/ASSET_{i,t-1}) + \beta_4(\Delta SALES_{i,t-1}/ASSET_{i,t-1}) + \varepsilon_{i,t} \quad (3)$$

PROD indicates the sum of the cost of merchandise sold and changes in stocks; at last, abnormal production cost (R_PROD) is estimated by comparing the evaluated estimation of manufacturing costs from the sum of the cost of items sold and the adjustment in stock for each firm. As indicated by the accompanying model, the discretionary expense was measured utilizing the following model:

$$DISC \text{ Expense}_{i,t}/ASSET_{i,t-1} = \beta_1(1/ASSET_{i,t-1}) + \beta_2(SALES_{i,t-1}/Asset_{,t-1}) + \varepsilon_{i,t} \quad (4)$$

DISC refers to research and development, selling, and administrative expenses in the profits and loss statement. Then, abnormal discretionary expenditures (R_DISC) are estimated by taking the differences between the predicted value of discretionary cost and other in-service items expenses. According to the above three models, the author generate an overall measure of earnings management for each firm.

$$\text{Real Earnings Management (REM)} = \sum CFO_{i,t}/ASSET_{i,t-1} + PROD_{i,t}/ASSET_{i,t-1} + DISC \text{ Expense}_{i,t}/ASSET_{i,t-1} \quad (5)$$

Research model

Accrual earnings management model

Model-6 $(AEM_{i,t}) = \beta_0 + \beta_1 BS_{i,t} + \beta_2 IND_{i,t} + \beta_3 FMLD_{i,t} + \beta_4 BDM_{i,t} + \beta_5 ACM_{i,t} + \beta_6 ACMT_{i,t} + \sum_{n=1}^{12} Yncontrolvariables + \varepsilon_{i,t}$

Model-7 $(AEM_{i,t}) = \beta_0 + \beta_1 CGI_{i,t} + \sum_{n=1}^{12} Yncontrolvariables + \varepsilon_{i,t}$

Model-8 $(AEM_{i,t}) = \beta_0 + \beta_1 BS_{i,t} + \beta_2 IND_{i,t} + \beta_3 FMLD_{i,t} + \beta_4 BDM_{i,t} + \beta_5 ACM_{i,t} + \beta_6 ACMT_{i,t} + \beta_7 FamilyDummy_{i,t} + \beta_8 FamilyDummy \times BS +$

$\beta_9 FamilyDummy \times IND + \beta_{10} FamilyDummy \times FMLD + \beta_{11} Family\ Dummy \times BDM + \beta_{12} FamilyDummy \times ACM + \beta_{13} FamilyDummy \times ACMT + \sum_{n=1}^{12} Yncontrolvariables + \varepsilon_{i,t}$

Model-9 (AEM$_{i,t}$) $= \beta_0 + \beta_1 CGI_{i,t} + \beta_2 FamilyDummy_{i,t} + \beta_3 FamilyDummy \times CGI_{i,t} + \sum_{n=1}^{12} Yncontrolvariables + \varepsilon_{i,t}$

Real earnings management model

Model-10 (REM$_{i,t}$) $= \beta_0 + \beta_1 BS_{i,t} + \beta_2 IND_{i,t} + \beta_3 FMLD_{i,t} + \beta_4 BDM_{i,t} + \beta_5 ACM_{i,t} + \beta_6 ACMT_{i,t} + \sum_{n=1}^{12} Yncontrolvariables + \varepsilon_{i,t}$

Model-11 (REM$_{i,t}$) $= \beta_0 + \beta_1 CGI_{i,t} + \sum_{n=1}^{12} Yncontrolvariables + \varepsilon_{i,t}$

Model-12 (REM$_{i,t}$) $= \beta_0 + \beta_1 BS_{i,t} + \beta_2 IND_{i,t} + \beta_3 FMLD_{i,t} + \beta_4 BDM_{i,t} + \beta_5 ACM_{i,t} + \beta_6 ACMT_{i,t} + \beta_7 Family\ Dummy_{i,t} + \beta_8 Family\ Dummy \times BS + \beta_9 Family\ Dummy \times IND + \beta_{10} Family\ Dummy \times FMLD + \beta_{11} Family\ Dummy \times BDM + \beta_{12} Family\ Dummy \times ACM + \beta_{13} Family\ Dummy \times ACMT + \sum_{n=1}^{12} Yncontrolvariables + \varepsilon_{i,t}$

Model-13 (REM$_{i,t}$) $= \beta_0 + \beta_1 CGI_{i,t} + \beta_2 FamilyDummy_{i,t} + \beta_3 FamilyDummy \times CGI_{i,t} + \sum_{n=1}^{12} Yncontrolvariables + \varepsilon_{i,t}$

The variables of interest are board-diversity, such as; board size (BS), independent director on the board(IND), female director (FMLD), board meeting (BDM), audit committee characteristics, such as; audit committee size (ACM), and audit committee meeting (ACMT). The variables for the analysis were decided based on literature and theoretical background.

However, variables already proven in the literature are related to the outcome. Before selecting the variables, diagnostic checking was used, such as multicollinearity, heteroscedasticity, and endogeneity. The results of these tests are shown in Tables 8 to 10 However, based on the evidence of empirical estimation, the study will finalize decisions on the hypothesis, for instance, if any variable shows a statistically positive or negative relationship. Then it can be concluded that board of director and audit committee characteristic is positively or negatively associated with earnings management. Practically a company may use various earnings management techniques as a proxy (Zang, 2012), use a mix of accrual and real-activity-based earnings management, or choose one method over the others for expected earnings (Laksmana and Yang, 2014). Similarly, Fields et al. (2001) stated that only a single earnings management system would not correspond to the overall effects of earnings management activities. However, to address this issue, the accrual earnings management model was used (e.g., model 6, 7, 8, 9) and real-earning management shown above (e.g., model 10, 11, 12, 13).

The models also include some independent variables as control variables because previous studies stated these factors might affect the relationship between corporate governance mechanism and earnings management. For example, many studies used firm size as a control variable due to diversified results (Sellami and Slimi, 2016). However, the more prominent firm experienced some extra power to choose accounting techniques and operating systems (Bouaziz et al., 2020). Consistently Barton and Simko (2002) demonstrated a positive relationship between the size of the firms and earnings management. In contrast, a range of studies depicted that large firms usually have up-to-date internal control systems; as a result, they are less likely to incur earnings management (Chandra and Wimelda, 2018).

Moreover, this study also use some other factors as previous studies found ambiguous results regarding these variables; first of all, firm financial leverage (Kordestani and Mohammadi, 2016; Lemma et al., 2018); secondly, return on assets (Alzoubi, 2018; Lopes, 2018). The third is the market-to-book ratio (El-Guindy and Basuony, 2018). Then, the average operating cycle, according to Kordestani and Mohammadi was measured (2016). After that, the-author also gauges product market power Datta et al. (2013).

Finally, loss dummy and external financing was measured according to financial statement (Zhang et al., 2020); debt maturity structure (Lemma et al., 2018); managerial ownership (Sumantri et

al., 2021); lagged total accruals (Muttakin et al., 2015); tobin's Q (Muttakin et al., 2017). Further, the composite corporate governance index was used to evaluate the relationship with earning management. Because the individual characteristic of corporate governance is likely to demonstrate ambiguous results, for example, large board size and audit committee may increase or decrease the monitoring power of the firms (Al-Haddad and Whittington, 2019). According to Al-Haddad and Whittington (2019), the composite score of corporate governance was measured by adding the score of all individual board diversity and audit committee attributes and then dividing by the total number of characteristics for all firms throughout the sample years. However, the variable definitions are shown in Appendix 1, sketch the data and disclose descriptive statistics next.

RESULTS AND DISCUSSION

Descriptive statistics and uni-variate results

Table 2 summarizes the results for all samples. According to the findings, the average variations in the family and non-family subsamples are minor. Real- earnings management have mean values of 0.40 in family enterprises, 0.51 in non-family firms, and 0.47 in the overall sample. These findings are congruent with Lemma et al. (2018), who found that average discretionary accruals and real-earnings management for these nations are about 0.45 to 0.50, based on 41 countries from 1995 to 2016. However, because of the time difference and sample size, the results are not consistent with some other studies (Klein, 2002) in the US study; (Abed et al., 2012) study on Jordanian firms; (Muttakin et al., 2017) and study on Bangladesh. However, the mean value of accrual earnings management measured by the Caylor (2010)'s model is 0.04, 0.03, and 0.04, respectively. According to this research, the average board size in family businesses is 8.556, 7.769 in non-family businesses, and in the entire sample, it is 8.05. According to the findings, the average board size in family businesses is larger. Several previous research reveals average board size higher than our findings. For example, Ghosh et al. (2010) found the average board size to be 9.27, Xie et al. (2003) found

Table 2. Descriptive statistics results.

Variables	Family oriented firms (N=376)					Non-Family oriented Firms (N=686)					Entire sample (N=1062)				
	MEAN	MEDIAN	STND.D	MIN	MAX	MEAN	MEDIAN	STND.D	MIN	MAX	MEAN	MEDIAN	STND.D	MIN	MAX
AEM	0.04	0.02	0.09	0.00	1.36	0.03	0.02	0.05	0.00	5.36	0.04	0.02	0.07	0.00	5.36
REM	0.40	0.21	0.70	0.00	5.63	0.51	0.18	0.67	0.00	2.01	0.47	0.20	0.41	0.00	5.63.01
BS	8.56	8	2.63	4	16	7.77	7	2.74	3	20	8.05	2.72	3	3	20
IND	1.7	2	0.9	0	5	1.67	2	0.85	0	5	1.68	0.87	0	0	5
FMLD	1.35	1	1.27	0	5	1.08	1	1.05	0	5	1.18	1.14	0	0	5
BDM	8.7	7	5.25	1	37	9.38	8	5.8	1	44	9.13	5.61	1	1	44
ACM	3.67	4	0.82	2	6	3.69	4	0.94	1	8	3.75	0.24	0	1	8
ACMT	4	4	2.51	1	24	3.76	4	1.85	1	14	4	0.19	0	1	24
MNGO	0.61	0.6	0.13	0.05	1	0.25	0.3	0.17	0	1	0.05	0.22	0	0	1
LD	0.03	0	0.18	0	1	0.07	0	0.25	0	1	3.44	1.55	-0.72	0	1
PMP	0.13	0.12	0.15	-1.07	0.55	0.17	0.15	0.19	-1.61	0.92	3.68	0.9	1	-1.61	0.92
LEV	0.11	0.06	0.14	0	0.94	0.12	0.08	0.14	0	2.18	3.85	2.11	1	0	2.18
ROA	0.05	0.04	0.07	-0.14	0.44	0.09	0.05	0.91	-2.96	23.54	0.38	0.23	0	-2.96	23.54
MBR	0.32	0.26	0.21	0.02	0.99	0.41	0.4	0.31	-4.11	0.98	0.05	0.22	0	-4.11	0.99
EXTF	-2.43	0.32	37	-616.16	3.69	-0.47	0.31	6.22	-68.06	1.58	0.16	0.18	-1.62	-616	3.69
TQ	0.46	0.44	0.22	0.09	1	0.55	0.55	0.45	-3.57	9.87	0.11	0.14	0	-3.57	9.87
DSTR	0.42	0.41	0.25	0.01	1.6	0.33	0.31	0.19	0	1.23	0.08	0.73	-2.97	0.01	1.6
SIZE	7.6	7.57	1.16	3.3	10.54	7.42	7.31	1.54	3.15	11.86	0.38	0.28	-4.11	3.15	11.9
AOC	-3.55	2.07	21.61	-158.8	5.16	-22.27	2.11	76.85	-534	3.18	-1.45	24.77	-616.17	-534	5.16
LTAC	-295.99	-194.25	327.12	-1112.7	3.73	-327.2	-188.38	361.11	-1197.3	4.01	0.52	0.39	-3.57	-1197	4.01

Table shows the descriptive statistics of the variables used in this study. Here we divided the result according to family and non-family oriented firms.

12.48, and Yermack (1996) found 12.25. The outcome is in good agreement with the findings of Alghamdi and Ali (2012); Almasarwah, (2015) and Haniffa et al. (2006).

The data also show that the greatest and lowest numbers of independent directors on the board are 5 and 0. However, in family businesses, the average independent directors are 1.699, whereas, in non-family businesses, it is 1.665. The whole sample indicates 1.679, which is consistent with Bangladeshi Governance Principles (e.g., corporate governance code,

2018). Compared to non-family enterprises and the overall sample, the average female director is greatest in family firms. This outcome is in line with Harakeh et al. (2019). The frequency of board meetings is another important feature of the corporate governance literature. However, descriptive statistics show that the average session is 8.702 in family firms, 9.381 in non-family firms, and 9.13 in the entire sample, which is higher than the findings of Almasarwah (2015) in Jordan, Anglin et al (2013) in Canada and Gulzar (2011) in China, which were 6, 8.01, and

7.90, respectively. The number of audit committee members in the company and the number of audit committee meetings in a year are two other essential characteristics of corporate governance in the literature. Evidence shows that the average number of audit committee members is 3.69. According to Bangladesh's corporate governance standards, every publicly traded company must have three audit members. As a result, most firms follow Bangladesh's corporate governance requirements. These findings are lower than those discovered in the United States (Xie et al., 2003)

but higher than those in Saudi Arabia (Habbash, 2010), which found mean values of 3.58, and Jordan (Almasarwah, 2015), which found 2.75.

The audit committee meeting is also a targeted variable of the study. Bangladeshi corporate governance regulations stipulate that every audit committee must have at least four meetings each financial year. However, the findings suggest that family enterprises have an average audit committee meeting of 4.003, whereas non-family firms have an average audit committee meeting of 3.758. As a result, family businesses follow governance guidelines and agree with the findings of Almasarwah (2015).

The relationships between dependent, independent, and control variables are shown in Table 3. Overall, the variables do not exhibit any multicolinearity. Multicolinearity issues, on the other hand, may develop as a result of a high degree of linkage between the variables, notably if the correlation coefficients are more than 0.8 (Almasarwah, 2015; Alghamdi and Ali, 2012). At a 1% level of significance, both accrual and natural earnings management were positively and substantially associated, implying that managers of listed family and non-family oriented non-financial enterprises in Bangladesh use both earning management to reap their intended benefits. A substantial relationship exists between audit committee size, audit committee meeting, and accrual earnings management, as well as a significant relationship between board size, board meeting, audit committee size, and real-earnings management, shown in Table 3. The researcher employs regression analysis to investigate the link further because the univariate test only gives a limited picture of the relationship.

Regression analysis: board-diversity, audit committee characteristics and earnings management

Table 4 shows the regression findings for overall earnings management (the dependent variable) as a function of the independent factors and a few additional control variables. The first two columns show the findings of the relationship between accrual-earnings management, as assessed by the Caylor (2010)'s model, and real-earnings management, as measured by the Roychowdhury (2006) model, including all individual proxies of board characteristics and audit committee attributes. Evidence shows that the coefficient of board size is strongly adversely linked with accrual earnings management, implying that a big board limits managers' ability to prevent thrashing, avoid earnings declines, and avoid negative earnings shocks. Moreover, the negative connection implies that having a large board (more than seven members) leads to better performance since they may share their diverse knowledge and govern different aspects of the business by segmenting the division. As a result, managers have limited control over profit and loss.

While this finding supports our hypothesis, it differs from the published outcomes (Almasarwah, 2015; Ball and Shivakumar, 2008).

As shown in Table 4, the IND coefficient has no statistically significant relationship with accrual-earnings management but is positive and statistically significant at the 1% level with real earnings management. This result is consistent with the outcomes of Sun and Liu (2016) and Al-Haddad and Whittington (2019) and suggests that more independent directors in the board may trigger real-activity manipulation by empowering managers to supplement a company's profit reducing production costs. The evidence further shows that female directors on the board, frequency of board meetings, and audit committee size have no significant association with earnings management.

Table 4 further reveals that audit committee sessions and real earnings management have no relevant association. Nonetheless, the audit committee meeting coefficient is inversely linked with accrual earnings management (at a 1% level), implying that more audit committee meetings may reduce financial reporting manipulation. Because many audit committee meetings may improve professionalism and balance of association among the firm's bodies and gear up in-house control mechanisms for optimal performance (Jenny and Lois, 2007), this discovery lends credence to the idea.

Further analysis finds that the family dummy has a significant negative association with real-earnings management and a positive link with accrual earnings management, showing that a board member's ownership dominance negatively influences natural earnings management. It might occur due to a greater emphasis on reducing unusual manufacturing costs, aberrant cash flow from operations, and unusual discretionary accruals. Furthermore, the corporate governance index has a considerable negative impact on accrual earnings management. According to Ewert and Wagenhofer (2005), strong governance standards are likely to reduce earnings manipulation to signal to stakeholders. This conclusion is in line with Hamzah and Zulkafli (2014) and Jensen et al. (2014), who portray corporate governance as a strategy for preventing insider expropriation. The study used a range of control variables, and all variables have a relationship with earnings management. Still, some of the variables have a significant relationship, for example; Managerial ownership (MNGO), Product market power (PMP), Leverage (LEV), Market to book ratio (MBR), Tobin's Q, Debt maturity structure, Firm size, and Lagged total accruals (LTAC).

Interaction effect: the interaction of the family control on the relation between board-diversity, audit committee characteristics and earnings management

Table 5 illustrates the impact of family dummy interactions on the association between board-diversity, audit

Table 3. Univariate analysis.

Variable	AEM	REM	BS	IND	FMLD	BDM	ACM	ACMT	MNGO	PMP
AEM	1									
REM	0.49***	1								
BS	0.01	-0.15***	1							
IND	0.05	0.01	0.44***	1						
FMLD	0.00	-0.02	0.18***	0.09***	1					
BDM	-0.04	-0.09***	0.05*	0.00	-0.07**	1				
ACM	-0.08**	-0.10***	0.13***	0.06*	0.03	-0.03	1			
ACMT	0.10***	-0.04	0.19***	0.11***	-0.13***	0.28***	0.23***	1		
MNGO	-0.02	-0.02	-0.04	-0.08**	0.18***	-0.07**	-0.07**	0.02	1	
PMP	-0.03	-0.16***	0.06*	0.10***	0.03	0.11***	0.05*	0.02	-0.11***	1
LD	0.04	0.05	-0.02	0.00	-0.07**	-0.08**	-0.02	0.03	-0.05	-0.22***
LEV	0.01	-0.10***	0.13***	0.11***	-0.16***	0.20***	0.01	0.25***	0.04	0.01
ROA	-0.02	0.01	-0.03	0.02	0.00	-0.01	-0.01	-0.01	-0.02	0.02
MBR	0.10***	0.08**	-0.15***	0.03	-0.02	0.04	-0.13***	-0.02	-0.11***	0.03
TQ	0.07**	-0.01	-0.08**	0.07**	-0.06**	0.05*	-0.08**	0.07**	-0.04	-0.01
DSTR	0.06**	0.21***	-0.07**	-0.05*	-0.01	-0.17***	-0.07**	-0.06**	0.21***	-0.26***
SIZE	-0.45***	-0.21***	0.16***	0.09***	-0.04	0.12***	0.16***	0.01	0.02	0.07**
LTAC	-0.26***	-0.18***	0.13***	0.11***	-0.01	0.06**	0.09***	0.02	0.00	0.07**
AOC	0.01	0.02	0.00	-0.05	0.02	-0.03	0.06**	0.07**	0.07**	-0.05*
EXTF	-0.05	-0.04	-0.07**	-0.06**	0.01	0.01	0.04	0.05*	0.03	0.03
	LD	**LEV**	**ROA**	**MBR**	**TQ**	**DSTR**	**SIZE**	**LTAC**	**AOC**	**EXTF**
LD	1									
LEV	0.10***	1								
ROA	-0.05*	-0.02	1							
MBR	0.03	-0.07**	-0.03	1						
TQ	0.04	0.20***	-0.03	0.35***	1					
DSTR	0.05*	-0.09***	0.01	-0.08**	-0.01	1				
SIZE	-0.14***	0.09***	0.01	-0.30***	-0.16***	0.03	1			
LTAC	-0.02	-0.02	-0.05	-0.12***	-0.08**	0.05	0.49***	1		
AOC	0.02	-0.04	0.00	-0.03	-0.03	0.06*	0.00	-0.01	1	
EXTF	-0.04	0.01	0.00	0.00	0.01	-0.01	0.03	0.02	-0.01	1

Table shows the univariate results of all the variables. The definitions of variables are given in table 2. Statistical significance level are marked by star *, **, *** for 10, 5, and 1% level respectively.

committee characteristics, and earnings management. Results of model 8 show that the family dummy used as a moderator has a significant effect. The evidence further demonstrates a moderating effect between the association of independent directors, the presence of females in the boardroom, and accrual earnings management. Specifically, the independent director and accrual earnings management show an insignificant negative relationship, but we find a significant positive relationship when we use moderating effect. More independent directors are likely to augment accrual earnings management in dominant family firms.

On the other hand, the existence of a female director on the board may increase accrual earnings management. Still, moderating effects change the direction of the relationship from positive to negative.

They indicate that female director is more functional in dominant family firms to handle accrual earnings management.

The authors find significant moderating effects of the family dummy on the association between corporate governance index and earnings management. As shown in Table 5, CGI significantly negatively affects earning management, meaning combining board diversity and audit committee characteristics is likely to reduce earnings management.

Board-diversity, audit committee characteristics and earnings management: family firms

Table 6 shows that the corporate governance index is

Table 4. Board-diversity, audit committee characteristics and earnings management.

Variable	Model 06	Model 10	Model 07	Model 11
	AEM	**REM**	**AEM**	**REM**
	Coefficient	**Coefficient**	**Coefficient**	**Coefficient**
Constant	-1.809***(-6.52)	-0.541**(-2.33)	-1.562***(-5.17)	-1.036***(-4.04)
CGI			-0.089***(-3.03)	0.004(0.16)
BS	-0.019*(-1.78)	-0.010(-1.11)		
IND	-0.006(-0.19)	0.120***(4.73)		
FMLD	0.021(1.00)	-0.003(-0.18)		
BDM	-0.003(-0.79)	-0.001(-0.42)		
ACM	0.013(0.51)	-0.016(-0.76)		
ACMT	-0.035***(-3.10)	0.012(1.27)		
FAMILY	0.122*(1.73)	-0.252***(-4.30)		
MNGO	-0.508***(-3.52)	0.235**(1.95)	-0.328***(-3.37)	-0.134(-1.62)
LD	-0.007(-0.07)	-0.085(-1.03)	-0.033(-0.33)	-0.064(-0.77)
PMP	0.008(0.06)	-0.408***(-3.83)	0.015(0.12)	-0.342***(-3.20)
LEV	-0.041(-0.24)	-0.266*(-1.91)	-0.165(-1.03)	-0.130(-0.95)
ROA	0.014(0.50)	-0.005(-0.23)	0.014(0.49)	0.002(0.09)
MBR	0.123(1.47)	0.078(1.12)	0.116(1.39)	0.122*(1.73)
EXTF	0.000(-0.58)	-0.001(-1.02)	0.000(-0.60)	-0.001(-1.24)
TQ	0.004(0.07)	-0.124**(-2.52)	-0.007(-0.13)	-0.093*(-1.87)
DSTR	0.238**(2.28)	0.515***(5.90)	0.235**(2.26)	0.528***(5.98)
SIZE	0.021(1.09)	-0.028*(-1.74)	0.034*(1.74)	-0.030*(-1.83)
AOC	0.000(0.72)	0.000(-0.19)	0.000(0.54)	0.000(-0.55)
LTAC	0.000(1.02)	0.000***(-3.29)	0.000(1.06)	0.000***(-2.98)
Industry effect	Yes	Yes	Yes	Yes
Year effect	Yes	Yes	Yes	Yes
Adj. R-Square	0.134	0.22	0.109	0.194
N	1061	1061	1061	1061

Table shows the regression results of Board-diversity, Audit committee characteristics and Earnings management by using accrual and real-earnings management model. Statistical significance level are marked by star *, **, *** for 10, 5, and 1% level respectively. The values under brackets are t-values.

considerably adversely related to earnings management in family businesses, based on models 07 and 11. Moreover, in family-owned firms, the size of the board of directors and the number of female directors had little impact on earnings management. Furthermore, data from models 6 and 10 show that independent directors have a considerable beneficial impact on real earnings management, while board meetings have a negative impact, with a significance level of 5%. Audit committee size is favorably linked with accrual earnings management. In contrast, the audit committee meeting is negatively associated with accrual earnings management, and the association is statistically significant at the 5 and 1% levels, respectively.

Board-diversity, audit committee characteristics and earnings management: non-family firms

In non-family enterprises, the corporate governance

index has little effect on earnings management, as shown in Table 7. The number of board members in non-family enterprises' boardrooms, on the other hand, is likely to limit accrual and real earnings management.

Furthermore, the number of female directors on the board and the frequency of board meetings were both favorably related to accrual earnings management. Audit committee meetings have a large negative association with accrual earnings management and a significant positive relationship with real earnings management.

Additional analysis and robustness checks

Test of heteroscedasticity

Ordinary least squares (OLS) regression implies that all residuals are taken from a fixed difference (homoscedasticity) population. Therefore, the homoscedasticity of the observations is checked using

Table 5. The interaction of the family on the relation between Board-diversity, Audit committee characteristics and Earnings management.

Variable	Model 08 AEM	Model 12 REM	Model 09 AEM	Model 13 REM
	Coefficient	Coefficient	Coefficient	Coefficient
Constant	-1.813***(-6.26)	-0.697***(-2.92)	-1.707***(-5.53)	-1.335***(-5.17)
Family	0.433*(1.71)	0.153(0.73)	0.468**(2.60)	0.445***(2.95)
CGI			-0.050(-1.39)	0.101***(3.38)
BS	-0.014(-1.09)	0.006(0.59)		
IND	-0.041(-1.13)	0.101***(3.33)		
FMLD	0.050*(1.82)	-0.030(-1.31)		
BDM	-0.001(-0.29)	0.009**(2.38)		
ACM	0.013(0.43)	-0.017(-0.69)		
ACMT	-0.030**(-1.96)	0.020(1.54)		
BS × family	-0.026(-1.05)	-0.044**(-2.14)		
IND × Family	0.009***(1.62)	0.001(0.11)		
FLMD × Family	-0.073*(-1.73)	0.052(1.51)		
BDM × Family	-0.007(-0.69)	-0.043***(-5.00)		
ACM × Family	-0.002(-0.05)	0.030(0.66)		
ACMT × Family	-0.011(-0.45)	0.026(1.26)		
CGI × Family			-0.124**(-2.23)	-0.225***(-4.87)
MNGO	-0.551***(3.54)	0.383***(2.99)	-0.417***(-2.93)	0.302**(2.54)
LD	-0.007(-0.07)	-0.077(-0.94)	-0.007(-0.07)	-0.050(-0.61)
PMP	-0.011(-0.09)	-0.378***(-3.58)	0.020(0.16)	-0.336***(-3.19)
LEV	0.014(0.08)	-0.149(-1.06)	-0.066(-0.40)	-0.049(-0.35)
ROA	0.016(0.57)	-0.003(-0.11)	0.016(0.57)	0.003(0.11)
MBR	0.125(1.48)	0.048(0.69)	0.110(1.32)	0.072(1.04)
EXTF	-0.001(-0.66)	-0.001-0.89)	0.000(-0.51)	-0.001(-1.06)
TQ	0.008(0.13)	-0.116**(-2.41)	0.001(0.04)	-0.102**(-2.09)
DSTR	0.243**(2.30)	0.498***(5.73)	0.217**(2.09)	0.506***(5.83)
SIZE	0.016(0.79)	-0.038**(-2.37)	0.028(1.46)	-0.046***(-2.81)
AOC	0.000(0.63)	0.000(0.11)	0.000(0.63)	0.000(-0.22)
LTAC	0.000(1.11)	0.000***(-2.97)	0.000(1.22)	0.000***(-2.75)
Industry effect	Yes	Yes	Yes	Yes
Year effect	Yes	Yes	Yes	Yes
Adj. R-Square	0.114	0.245	0.113	0.223
N	1061	1061	1061	1061

Table shows the regression results of Board-diversity, Audit committee characteristics and Earnings management by using accrual and real-earnings management model. Statistical significance level are marked by star *, **, *** for 10, 5, and 1% level respectively. The values under brackets are t-values.

the Breusch and Pagan (1979) test. Homoscedasticity indicates that the variations in various groups are equal or comparable because parametric statistical experiments are sensitive to dissimilarity. Usually, uneven discrepancies in observations provide biased and skewed findings. The basic indicator of the Breusch and Pagan (1979) test is the p-value. If the test statistic has a p-value less than a certain threshold (e.g., 0.05), the null hypothesis of homoskedasticity is rejected. But heteroskedasticity is accepted (Breusch and Pagan, 1979). The findings in Table 8 reveal that p-value is

greater than 0.05 (P>0.05), indicating homoscedasticity of variance.

Test of multicollinerarity

In a multivariate regression model, multicollinearity occurs when strong inter-correlations exist between two or more independent variables. Multicollinearity can lead to bigger confidence intervals and less reliable probability when it comes to the influence of independent variables

Table 6. Board-diversity, audit committee characteristics and earnings management: family firms.

Variable	Model 06	Model 10	Model 07	Model 11
	AEM	**REM**	**AEM**	**REM**
	Coefficient	**Coefficient**	**Coefficient**	**Coefficient**
Constant	-1.397**(-2.45)	-1.119**(-2.47)	-0.787(-1.46)	-1.330***(-3.14)
CGI			-0.174***(-2.96)	-0.104**(-2.25)
BS	0.009(0.44)	-0.024(-1.56)		
IND	-0.045(-0.88)	0.102**(2.49)		
FMLD	-0.018(-0.49)	-0.002(-0.08)		
BDM	-0.015(-1.35)	-0.020**(-2.28)		
ACM	0.126**(2.51)	-0.040(-0.99)		
ACMT	-0.075***(-3.53)	0.023(1.39)		
MNGO	-0.521(-1.56)	0.349(1.31)	-0.665**(-1.98)	0.402(1.52)
LD	0.098(0.40)	0.072(0.37)	0.050(0.20)	0.213(1.11)
PMP	0.085(0.32)	-1.020***(-4.81)	-0.002(-0.01)	-0.908***(-4.36)
LEV	0.985(1.64)	-0.700(-1.46)	0.819(1.34)	-0.606(-1.26)
ROA	-0.582(-0.78)	0.947(1.59)	-0.194(-0.26)	1.192(2.07)
MBR	-0.310(-0.67)	-0.103(-0.28)	-0.014(-0.03)	-0.206(-0.57)
EXTF	0.000(-0.40)	-0.001(-1.04)	0.000(-0.44)	-0.00(-1.27)
TQ	0.080(0.15)	0.801(1.88)	-0.230(-0.43)	0.939**(2.23)
DSTR	0.087(0.45)	0.205(1.33)	0.008(0.04)	0.256*(1.68)
SIZE	-0.048(-1.02)	0.057(1.54)	-0.037(-0.79)	0.064*(1.72)
AOC	-0.001(-0.54)	-0.003**(-2.33)	-0.001(-0.53)	-0.004***(-2.71)
LTAC	0.000(0.88)	0.000*(-1.79)	0.000(0.65)	0.000*(-1.67)
Industry effect	yes	yes	yes	yes
Year effect	yes	yes	yes	yes
Adj. R-Square	0.267	0.338	0.234	0.366
N	376	376	376	376

Table shows the regression results of Board-diversity, Audit committee characteristics and Earnings management by using accrual and real-earnings management model. Statistical significance level are marked by star *, **, *** for 10%, 5%, and 1% level respectively. The values under brackets are t-values.

in a model. As a result, the author employs the multicollinearity VIF test.

The variance inflation factor (VIF) is a metric used to determine the existence of multicollinearity in the multivariate regression variables. The VIF for a regression model variable is equal to the ratio of the total model variance to the variance of a model that includes that single independent variable in mathematics. This ratio is determined for each independent variable. A high VIF shows that the linked independent variable has a high degree of collinearity with the model's other variables. Multicollinearity might be an issue in a regression model since it will not discern between the independent variables' impacts on the dependent variable. According to conventional norms, VIF starts at one and has no maximum limit. There is no association between the independent and other variables when the VIF value is 1. When the VIF is more than 5 or 10, there is a lot of multicollinearity between one independent variable and the others (Snee, 1981). The results,

displayed in Table 9, reveal that no variables have a VIF greater than 5, indicating no multicollinearity concern.

Test of endogeneity

Endogeneity occurs when an explanatory variable correlates with the regression equation's error term, and failing to account for it will likely result in skewed parameter estimates, undermining the validity of the conclusions gained from regression-type studies of observational data. The authors employ a two-stage least square (2SLS) instrumental variables technique to solve endogeneity problems such as the Hausman specification test. The uniformity of an estimate is evaluated by comparing it to another, the less efficient estimator that is previously known to be consistent. It aids in determining if a statistical model matches the data (Durbin, 1954; Wu, De-Min, 1973). According to the Durbin-Wu-Hausman test, endogeneity exists if the P-

Table 7. Board-diversity, audit committee characteristics and earnings management: non-family firms.

Variable	Model 08	Model 12	Model 09	Model 13
	AEM	REM	AEM	REM
	Coefficient	Coefficient	Coefficient	Coefficient
Constant	-1.899***(-4.20)	0.179(0.50)	-0.118(-0.38)	-2.022***(-4.89)
CGI			0.003(0.04)	0.048(1.01)
BS	-0.049*(-1.85)	-0.041*(-1.96)		
IND	0.048(0.59)	-0.007(-0.11)		
FMLD	0.227***(4.61)	0.002(0.06)		
BDM	0.017*(1.68)	0.003(0.37)		
ACM	0.029(0.45)	-0.048(-0.95)		
ACMT	-0.050**(-1.97)	0.069***(3.50)		
MNGO	-0.740**(-2.16)	0.349(1.29)	0.287(1.05)	-0.629*(-1.74)
LD	0.090(0.56)	0.217*(1.71)	0.191(1.50)	0.113(0.68)
PMP	-0.256(-1.06)	-0.612***(-3.20)	-0.617***(-3.20)	-0.149(-0.59)
LEV	-0.725***(-2.83)	0.170(0.84)	0.143(0.70)	-0.814***(-3.02)
ROA	1.930*(1.90)	2.005**(2.51)	1.919**(2.38)	2.065*(1.95)
MBR	-0.379(-1.16)	-0.343(-1.33)	-0.327(-1.29)	-0.259(-0.77)
EXTF	-0.016**(-2.57)	0.007(1.41)	0.007(1.29)	-0.01**(-2.26)
TQ	0.823**(2.14)	-0.088(-0.29)	0.042(0.14)	0.544(1.40)
DSTR	1.067***(3.25)	0.999***(3.86)	1.076***(4.28)	0.937***(2.83)
SIZE	-0.026(-0.62)	-0.102***(-3.08)	-0.150***(-4.89)	0.023(0.57)
AOC	0.000(-0.26)	0.000(0.29)	0.001(1.43)	0.000(-0.56)
LTAC	0.000(1.40)	0.000**(2.35)	0.000**(2.45)	0.000(0.77)
Industry effect	Yes	Yes	Yes	Yes
Year effect	Yes	Yes	Yes	Yes
Adj. R-Square	0.159	0.298	0.145	0.274
N	686	686	686	686

Table shows the regression results of Board-diversity, Audit committee characteristics and Earnings management by using accrual and real-earnings management model. Statistical significance level are marked by star *, **, *** for 10%, 5%, and 1% level respectively. The values under brackets are t-values.

Table 8. Breusch-Pagan / Cook-Weisberg test for heteroskedasticity.

Particulars	Accrual-earnings management	Real-earnings management
Chi^2	2.89	0.69
Prob.> Chi^2	0.089	0.405

value is less than 0.05; however, the results reveal that there are no values less than 5, indicating that there is no endogeneity in the model.

The J-test (over-identifying restrictions test) is a method for determining whether or not extra instruments are exogenous. The J-test requires more instruments than endogenous regressors to be valid, and the Sargan (1958)'s test has a null hypothesis (Ho): The instruments are exogenous as a whole. According to the Sargan's test, the p-value of the Sargan statistic must be between5 and 10%; the higher the p-value, the better (Sargan, 1958). Roodman (2007), on the other hand, recommends that the Sargan p-value be more than 0.25. According to

the research, the p-value in both accrual and real-earning management is more than 5. As a result, they may infer that their model has no over-identifying constraints. Furthermore, Basmann's test (Basmann, 1960) shows (Table 10) a P-value greater than 5, indicating that their model is solid in the scenario of over-identification limitation.

Conclusion

From the perspective of Bangladeshi non-financial enterprises, the author investigate the association

Table 9. VIF test for multicollinerarity.

Variable	Accrual earnings management		Real-earnings management	
	VIF	Tolerance	VIF	Tolerance
MNGO	2.48	0.403	2.48	0.403
FAMILY	2.44	0.409	2.44	0.409
SIZE	1.55	0.646	1.55	0.646
BS	1.51	0.66	1.51	0.660
LTAC	1.36	0.736	1.36	0.736
MBR	1.32	0.76	1.32	0.760
IND	1.3	0.768	1.3	0.768
ACMT	1.3	0.77	1.3	0.770
LEV	1.26	0.795	1.26	0.795
TQ	1.24	0.806	1.24	0.806
FMLD	1.19	0.838	1.19	0.838
BDM	1.19	0.839	1.19	0.839
DSTR	1.17	0.856	1.17	0.856
PMP	1.15	0.868	1.15	0.868
ACMT	1.14	0.875	1.14	0.875
LD	1.12	0.896	1.12	0.896
AOC	1.02	0.978	1.02	0.978
EXTF	1.02	0.982	1.02	0.982
ROA	1.01	0.989	1.01	0.989
MEAN VIF	1.36		1.36	

Table 10. Test of endogeneity and over identifying restrictions.

Tests of endogeneity				
H_0: variables are exogenous				
	Accrual-earnings management		Real-earnings management	
Durbin (score) chi^2(7)	5.83293	p=0.5594	5.9564	p = 0.5448
Wu-Hausman F(7,1032)	0.816529	p=0.5735	0.8339	p = 0.5591
Tests of over identifying restrictions				
Sargan chi^2(12)	7.96978	p= 0.7875	4.41229	p=0.9748
Basmann chi^2(12)	7.78757	p =0.8015	4.29687	p=0.9775

between corporate governance traits (board diversity, audit committee characteristics), and earnings management. Their goal was twofold: first, to assess the influence of board diversity and audit committee attributes on earnings management.

Second, the authors examine how the family dummy interacts with individual proxies for board diversity and audit committees. They have created a composite corporate governance index to quantify the link. According to their empirical research, all of the board diversity and audit committee characteristics relate to any earnings management. The corporate governance index shows a strong negative association with accrual earning manipulation in the overall sample. They see a significant positive association with real-earnings management when utilizing a family dummy as interaction terms with CGI.

Furthermore, CGI has a statistically significant negative relationship with earnings management in family-owned businesses.

The board size demonstrates a substantial negative connection with accrual earnings management in the total dataset. The authors note that the family dummy moderates this correlation; the sign and significant coefficient change, and the author also discovered a significant negative relationship in non-family controlled businesses after interacting with the family dummy. In the association between independent directors in the boardroom and earnings management, they find that independent directors boost real earnings management in the entire sample. Still, they find a moderating impact when they include the family dummy. Interestingly, the interaction variable (IND×Family) has a meaningful

positive effect on accrual earnings management; however, there is no significant relationship in non-family-oriented enterprises. There is a strong positive relationship with actual earnings management in family-controlled firms.

The presence of female directors is remunerative in non-family-controlled firms because several female directors in the boardroom only positively affect accrual earnings management in family-controlled firms. However, there is no significant link in the total sample, but the interaction variable (FMLD× Family) changes the relationship from positive to negative. The board of directors meeting shows no meaningful impact on earnings management in the whole sample.

But they identified a negative link with natural earnings management when they used the interaction term (family dummy), and the relationship is significant at the 1% level. The same relationship, however, may be found in family-owned businesses. In family-controlled enterprises, the size of the audit committee is positively connected to accrual earnings management. When they used interaction terms, they discovered that the size of the audit committee and the family dummy combined did not affect the outcomes. The audit committee meeting has a substantial negative relationship with accrual earnings management in the total sample and family companies. In contrast, it has a significant positive relationship with real earnings management in all non-family firms.

The findings of the study contribute to the corporate governance literature by highlighting the influence of board diversity and audit committee attributes on earnings management in a developing country. The study is the first in Bangladesh to use the Caylor's model to measure accrual earnings management and a comparative analysis of family and non-family firms in this respect. The findings also help legislators alter reporting methods, board formation, and audit committee regulations to protect stakeholders' interests. Heteroscedasticity, multicollinearity, and endogeneity are not issues in the research. However, several features of the study's findings should be taken into account before generalizing the findings. For example, owing to a lack of information and the complexity of data collection, their analysis did not include all publicly traded corporations but instead focused on family and non-family-owned non-financial enterprises exclusively functioning in Bangladesh. Second, the scope of our research was confined to determining the impact of board diversity and audit committee composition on earnings management. Other elements, including the ruling government's national culture, political philosophy, and personnel characteristics, may influence earnings management. Finally, the scope of this research was confined to a single emerging economy. More research in the fields of board-diversity and audit committee characteristics and earnings management using a large sample size from multiple developing economy contexts and taking into account other factors such as national and political culture, as well as the personal characteristics of higher-level managerial people, may help to improve understandings in the field of interests.

CONFLICT OF INTERESTS

The author has not declared any conflict of interest.

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Appendix 1: Variable Definitions

Variable	Description
Accrual-based earnings management:	
AEM	The absolute value of discretionary accruals measured by The Caylor (2010)
Real-earnings management:	
R_CFO	Abnormal cash flow from operations (Dechow et al., 1998)
R_PROD	Abnormal production costs (Dechow et al., 1998)
R_DISC	Abnormal discretionary expenses (Dechow et al., 1998)
REM	We measure real earnings management by combining of R_CFO, R_PROD, and R_DISC (Roychowdhury, 2006)
Independent variable:	
BS (Board size)	The number of board members that are in the annual report at the end of each year (Peasnell et al., 2005)
IND (Independent director)	Number of independent director in the board at the end of each year (Sarkar et al., 2008)
FMLD (Female director)	Number of female director in the board at the end of each year (Peni & Vahamaa, 2010)
BDM (Board Meeting)	The number of annual meetings the board holds per annum (Obigbemi et al., 2016)
ACM(Audit Committee member)	The number of members on the committee (Saleh et al., 2007)
ACMT (Audit Committee Meeting)	The number of meeting hold by Audit committee (Xie et al., 2003)
Family dummy	A dummy variable equal to 1 if any member of the board occupied 10% or more shares, otherwise 0 (Kuan et al.,2011)
MNGO (Managerial Ownership)	The percentage of shares holds by directors of the board (Al-Fayoumi et al., 2010)
LD (Loss Dummy)	If companies incur loss in a year we denoted it by 1 and 0 otherwise (Zhang et al., 2020)
PMP (Product Market Power)	(Sales-Cost of goods sold- selling and administrative expenses)/ Sales (Datta et al.,2013)
LEV(Leverage)	The ratio of total shareholders' equity to total assets (Zouari et al., 2012)
ROA (Return on Asset)	We measure ROA by using the formula, such as, Net income / Total asset (Barua et al., 2010)
MBR(Market to Book Ratio)	Market value divided by the book value of shareholders equity (El-Guindy and Basuony, 2018)
EXTF(External financing)	Total long-term interest-bearing debt, current long-term debt, other short-term debt, and capital from common stocks divided by retained earnings (Zhang et al., 2020)
TQ (Tobin's Q)	Tobin's q is the market value of equity plus the book value of total debt divided by the book value of asset (Muttakin et al., 2017)
DSTR (Debt maturity structure)	Total current liabilities to total liabilities.(Lemma et al., 2018)
SIZE (Firm Size)	Firm Size is calculated by taking the natural log of total sales (Sellami and Slimi, 2016)
AOC (Average Operating Cycle)	We use the following formula $(\frac{\text{Average account receivable}}{\text{Sales}/360}+\frac{\text{Average Inventory}}{\text{Cost of Good sold}/360})-\frac{\text{Average account Payable}}{\text{Purchase}/360}$ (Kordestani and Mohammadi, 2016)
LTAC (Lagged total Accruals)	Lagged total accruals (Muttakin et al., 2015)