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Article

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ACCOUNTING, CORPORATE GOVERNANCE & BUSINESS ETHICS | RESEARCH ARTICLE

IFRS adoption and real earnings management in Bangladesh: The role of board characteristics

Mohammad Tariq Hasan^{1*}, Md. Kaium Hossain¹, Mohammad Sarwar Rekabder², Mohammad Shahansha Molla³ and Abu Sadat Muhammad Ashif⁴

Abstract: The adoption of the international financial reporting standard (IFRS) has become an important research topic and received considerable attention from many empirical researchers worldwide. However, to the best of the authors' knowledge, it's one of the very few efforts to examine the relationship between IFRS adoption and real earnings management (REM) with the moderating role of board characteristics (board size, independence, expertise, CEO duality, and gender diversity). The study employs 94 firms listed on the Dhaka Stock Exchange (DSE) for six years, i.e., 564 firm year's observations, over two time periods as pre (2004–06) and post (2013/14–15/16) adoption of IFRS. The underpinning theory of the study is agency theory, which explains the relationship among variables. To perform regression analysis on balanced panel data, STATA was used with PCSE estimators. The results show that IFRS has a significant negative relationship with REM. Board expertise and gender diversity have a significant negative relationship with REM, whereas CEO duality has a significant positive association with REM. Moreover, it is documented that board size and CEO duality have a significant negative moderating effect on the relationship between IFRS and REM. In contrast, board expertise, board independence, and gender diversity have significant positive moderation. **It implies that a strong corporate governance mechanism may help to attain the objectives of IFRS adoption in Bangladesh.** Thus, the findings of this study may persuade regulatory authorities in Bangladesh to make corporate governance compliance mandatory with punitive action, which would also act as a guideline for developing countries.

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1. Introduction

There is a long craving in the international equity markets to have a unique set of accounting standards to reduce complexity and enhance transparency and comparability. In response to the demand for a unique set of accounting standards, international financial reporting standards (IFRS) are progressively adopted by practitioners to present financial information worldwide. The primary objective of the IFRS is to ensure uniformity in the application of accounting rules and regulations so that financial statements presented through maintaining IFRS are comparable, simplified, understandable, and trustworthy to the users, enhancing the quality of information presented. It is assumed that the quality of accounting information is improved due to comparability and high-quality standard. Management's sole responsibility is to prepare the financial statements as per the respective country's regulatory guidelines and accounting standards. Accordingly, the company's management should closely monitor the changes in accounting standards and follow appropriate procedures to execute those changes in existing systems, ensuring better compliance linked to financial reporting. IFRS adoption has been mandatory for Bangladeshi listed companies since 1 January 2007. Most of the standards are adopted by the end of 2012.

The main reason for adopting IFRS is to ensure a high degree of accounting information quality through simplicity and comparability of the financial statements, which enhance the credibility of equity markets and promote macroeconomics development (Brüggemann et al., 2013). In line with the objectives, it is assumed that the adoption of IFRS for financial reporting of listed non-financial companies in Bangladesh by ICAB may lead to better financial reporting quality in terms of lower incidences of earnings management. The quality of accounting information may link to comparability, transparency, the practice of earnings management, conservatism, and appropriateness. This study evaluates accounting quality in view of earnings management practices, measured through level cash flow reflections of those earnings—the real earnings activities. According to World Bank Report ("World Bank Press Release," 1 July 2015), Bangladesh has moved to the lower-middle earner group in terms of per Capita Gross National Income (GNI). Previously this country was recognized as one of the pioneer nations among the Least Developed Countries (LDCs) to develop and implement international policy. It requires an intensive study to identify the effect of IFRS adoption in the developing economy. In addition, the country's capital market suffered a market scam in 2009–10 that destroyed the confidence of the small and medium investors and consequently wiped out potential investment opportunities in the economy. M. S. Hasan et al. (2014) study pointed out that the market scam could result from the country's ineffective regulation and weak financial reporting framework. So, it is necessary to know the effect of IFRS adoption in Bangladesh, which will guide policymakers in developing their strategy for the successful implementation of international accounting standards.

2. Literature review and hypothesis development

The study thrives to explore the interplay among various related and widely researched phenomena such as implementation of the IFRS, earnings management activities in terms of real earnings management (REM), and the effect of board characteristics on earnings management. Agency theory explains the theoretical background of the issue linked to the separation of ownership and management. Designing and implementing accounting standards is an important aspect to improve the decision making capacity of the investors, and it also serves as an effective tool for managers' performance evaluation (Scott, 2014). Performance-based financial reporting becomes

essential for the investor, which helps them to have a prudent decision regarding investment because the board of the company is delegated with stewardship of the corporation (Scott, 2014). Investors, creditors, and other stakeholders require efficient financial reporting procedures in place, which provides information about the management stewardship of the resources. Conflicting issue between management and users of financial reporting is explained through agency theory (Jensen & Meckling, 1976). This study is structured under the framework of agency theory, which highlights the issue of agency conflict, i.e., the relationship between management and owners as well as positive accounting theory (efficient contracting perspective and opportunistic perspective) where theory postulates that firms cannot always enjoy efficient contracts. Firstly, this is due to the theory's assumption that corporate managers are rational (like other contracting parties) and will choose accounting practice in their own best interest (i.e., opportunistically) if able to do so (Scott, 2014).

Various studies recommend that the application of accounting standards can differ among countries, which are pivotal for the change of quality through the implementation of IFRS (Brüggemann et al., 2013; Daske et al., 2008; Hasan, 2020; Hasan & Rahman, 2017). Liu et al. (2011) study based on Chinese economy found that the implementation of IFRS significantly enhanced the quality of the accounting information evidenced from lower incidence of earnings management and income smoothing activities and higher value relevance for share price. The study further confirmed that all those improvements took place not because of the economic conditions but because of the changes in the accounting standards. Chua et al. (2012) study based on Australian Capital Market found similar outcome that says that mandatory adoption of IFRS was associated with higher accounting quality and value relevance. Ismail et al. (2013) study based in Malaysia comprising of 4010 observations reported that subsequent to IFRS implementation earnings management went down leading to enhanced earnings quality and higher value relevance. Liang and Shan (2013) documented that the earnings quality is improved following the implementation of IFRS only under the strong institutional settings. They also suggested for further study in relation to IFRS adoption and corporate governance. On the other hand, Jeanjean and Stolowy (2008) uncover that for the first time adopters, namely, United Kingdom, Australia and France, incidences earnings management activities did not decrease subsequent to compulsory implementation of IFRS. Similar results are identified by Goncharov and Zimmermann (2006) in Germany; Callao and Jarne (2010) in European Union.

2.1. IFRS Adoption and earnings management

Financial statements are prepared and assessed by the accountant, which is used by investors, analysts, and other interested group of people for their future decision. They considered the information has high quality only if the information has relevance and consistency. The main reason behind the adoption of IFRS is to ensure a high degree accounting information quality through simplicity and comparability of the financial statements, which improves the credibility of equity markets and promotes macroeconomics development (Brüggemann et al., 2013). In line with the objectives, it is assumed that the implementation of IFRS enhances the quality of accounting information through transparency and comparability in the reporting process, which will reduce the opportunistic behavior of managers. A good number of research has been conducted throughout the world on the adoption of IFRS and its effect on financial reporting. Several research confirmed that the adoption of IFRS brings tremendous benefits to the adopting countries as the implementation improves the informational environments and consequently improves the quality of the disclosures (Barth et al., 2008; Daske et al., 2008). On the other hand, few studies also reported that IFRS implementation always leads to improvements in the disclosures of the financial information because IFRS implementations open up opportunities for flexibility and discretion in applying accounting practices and standards (Barth et al., 2008; Hasan & Rahman, 2017, 2019; Key & Kim, 2020). It's perceived that the adoption of IFRS may restrain the opportunistic behavior of manager, which is the concern of agency theory, by ensuring transparency and comparability of the financial statement. Based on theory

and the findings of the previous studies, we are anticipating that IFRS implementation will be associated with higher level of transparency and comparability of accounting information and lowers incidences of earnings management practices in Bangladesh. Accordingly, the study assumes that,

H₁: The adoption of IFRS has significant negative relationship with real earnings management.

2.2. Board characteristics and earnings management

Board is one of the most important elements of corporate governance, which has significant influence. Board characteristics comprise board size, i.e., number of members in the board; board independence, i.e., existence of independent board members; CEO duality, i.e., individual played dual role as CEO and Chairman of the board in the company; and board expertise, i.e., qualification of the board members and/or their representing group (Nugroho & Eko, 2012). The credibility and integrity of the financial reporting highly depend on the role of firm level corporate governance, which is highly influenced by the board characteristics (Dakhlallh et al., 2021; Lin & Hwang, 2010).

2.2.1. Board size and earnings management

The size of the board is an important determinant for the effectiveness of the board, which also guide for better corporate governance (Nahar Abdullah, 2004). However, in literature, there is no conclusive findings. Few studies documented that the large board is associated with the effective monitoring and supervision (Coles et al., 2008; Dakhlallh et al., 2021). In contrast, few studies suggest that the smaller board is less likely to have free riders and coordination problem (Dechow et al., 1996). According to Vafeas (2000), smaller board is more effective and informative in terms of earnings disclosure, which may reduce the earnings management. Similar results is explored by Kao and Chen (2004) who described a positive association between larger board and earnings management. Conversely, few studies identified that the board size is negatively associated with the earnings management behavior of the management (Hasan et al., 2019; Iraya et al., 2014; Kharashgah et al., 2019). Based on the above discussion, this study hypothesis that,

H_{2.1}: Board size positively influences the real earnings management practice of the firm.

2.2.2. Board Independence and earnings management

Agency theory explain the main role of the board is to monitor the activities of the management and to protect the interest of the shareholders (Jensen & Meckling, 1976). It means that the board of directors are responsible for the firm's operation as a custodian of the shareholders wealth. Independent or external directors is the prerequisite of the effective board composition who acts as an arbiters at the time of dispute within the board (Garcia Osma, 2008; Visvanathan, 2008). They also help to reduce agency cost and conserve the right of the shareholders. Recently, Rashid et al. (2010) reported that the firm performance is not influenced by the presence of independent directors in the board but it can increase transparency which may provide better financial reporting quality. Moreover, the presence of the majority external directors in the board lead to conservative earnings reporting and less earnings management (Kao et al., 2004; Visvanathan, 2008). According to Jaggi et al. (2009) corporate board independence is significantly associated with the effective monitoring to restrain earnings management and ensure better financial reporting quality. Sun et al. (2014) have reported that there is no impact of the board independence on REM. Similarly, Kharashgah et al. (2019) failed to find an effect of board independence on the REM in non-financial Jordanian companies. Based on the above discussion, this study hypothesis that,

H_{2.2}: Board independence negatively influences the real earnings management practice of the firm.

2.2.3. *CEO duality and earnings management*

CEO duality refers to the scenario where chairman of the board and CEO are the same individual. According to Cadbury (1992) report, no dual role should exist in the company to ensure effective corporate governance and the balance of power within the company. Separation of this two role is vital for the effective board management, which is supported by the advocate of the agency theory (Hashim & Devi, 2008). Inconclusive result is documented by the researchers in case of CEO duality and earnings management. Few studies revealed that there is no relation between CEO duality and earnings management, i.e., CEO duality does not influence the earnings management practice within the company (Chouaibi et al., 2018; Johari et al., 2009). However, Abdul Rahman and Haniffa (2005) finds significant association between CEO duality and firm's performance, i.e., firm with CEO duality did not perform well compare to other firms. Similar results is documented by Saleh et al. (2005) in respect of earnings management. Recent study of Rashid (2013) explored that the CEO duality offers enormous power to the CEO, which may restrain effective corporate governance within the firm and reduced firm efficiency. Thus, the study hypothesis that,

H_{2.3}: CEO duality positively influences the real earnings management practice of the firm.

2.2.4. *Board expertise and earnings management*

Board expertise refers to the qualification of the board members, i.e., whether they have any professional qualification or financial expertise. Recent study documented that the board representation of the institutional shareholders, directors from financial intermediaries, and financial expertise of the board members may reduce the earnings management (Park & Shin, 2004). Peasnell et al. (2005) identified that the board composition is significantly related to income increasing earnings management in post Cadbury (1992) period. So it becomes understandable that the board expertise improves financial reporting quality by providing better corporate governance within the company (Hashed & Almaqtari, 2021; Srinidhi et al., 2011). Thus,

H_{2.4}: Board expertise negatively influences the real earnings management practice of the firm.

2.2.5. *Gender diversity and earnings management*

Prior literature suggests that female representation in the corporate boards increases the monitoring effectiveness and reduces earnings management related activities (Adams & Ferreira, 2009; Umer et al., 2020). Adams et al. (2010) also found similar outcome that presence of female directors is associated with improved monitoring process and independent thinking. Female board members are likely to be associated with higher level of cooperation, trust, and better board dynamics (Larcker & Tayan, 2013). Moreover, participation of the female members in the board provide better oversight of manager's reporting and improve board communication, which may increase earnings quality in terms of lower earnings management (Adams & Ferreira, 2009; Srinidhi et al., 2011). Thiruvadi and Huang (2011) study on USA shows that presence of the female directors in the audit committee constrains earnings management activities of the firm. The study assumed following hypothesis to test the influence of the female directors in corporate board:

H_{2.5}: Gender diversity negatively influences the real earnings management practice of the firm.

2.2.6. Moderating role of board characteristics on the relationship between IFRS adoption and real earnings management

Several research have been conducted to test the effect of IFRS adoption on earnings management and to test the impact of board characteristics on earnings management. However, very few studies have been conducted to test the combined effect of IFRS adoption and board characteristics on earnings management. This study will bring all three phenomena (variables) under same framework and test the aggregate effects. This study scrutinizes the influence of board characteristics on the relationship between IFRS adoption and real earnings management. From previous studies, it is documented that IFRS with good governance has significant effect on earnings management, even though it's not conclusive. Earnings management is the result of management discretion, which need to monitor. From agency theory perspective, corporate governance is one of the most effective tools to monitor the activities of the agent, where board characteristic's plays a fundamental role. From regulatory perspectives, corporate governance guidelines can be implemented through corporate governance mechanism like board and audit committee, which will protect the interest of different stakeholders. Accordingly, it's perceived that the role of corporate governance should have significant influence on the relationship between IFRS and earnings management. Among few studies, Chang and Sun (2009) study the effect of SOX implementation on corporate governance to improve earning quality and recognized that the earnings management and corporate governance are conversely related in pre and post SOX period (Chang & Sun, 2009). In another study of Salleh (2009) documented that the improvement of corporate governance practice lead to better financial quality. Recent studies recognized that IFRS adoption may condense the level of earnings management, offer superior timeliness of financial reporting, as well as increase value relevance of income, only if the company has strong corporate governance practices (Ajina et al., 2013; Boghdady, 2019; Chalmers et al., 2011; Rahmawati & Putri, 2019; Setiawan et al., 2020; Shawn et al., 2015; Zéghal et al., 2011). Very few studies explore the outcome of IFRS adoption and board characteristics on real earnings management. Thus, the study hypothesize that:

H₃: Board characteristics significantly moderate the relationship between IFRS adoption and real earnings management.

3. Research framework

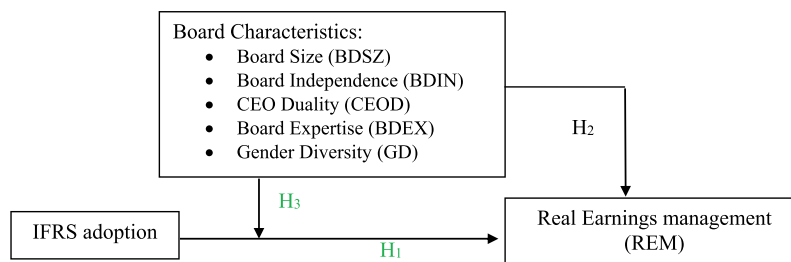
The objective of this study is to explore the effect of IFRS adoption on real earnings management (REM) and the role of board characteristics as prime component of corporate governance mechanism on that relationship. The study is conducted in two folds: Firstly, on the basis of the literature evaluation of different resource papers linked to IFRS adoption, board characteristics and earnings management and secondly, on the basis of empirical data analysis, which is collected from the financial statements of the listed company in DSE, Bangladesh. Theoretical framework of the study is presented in Figure 1, which includes all the variables: independent, dependent, and moderating. This study employ cash flow earnings by following Roychowdhury (2006) as proxy of real earnings management. To examine the research questions, earnings management proxies (real activities management) are regressed on IFRS adoption, board characteristics, and a number of indicator (Skrivanek, 2009) as well as control variables. Based on previous research, this study is applied few control variables in the regression model, which are used as distinct firm's uniqueness, which may persuade earnings management behavior of the company (Abdullah & Tursoy, 2021; Dechow & Dichev, 2002; Hasan, 2020; Hasan & Rahman, 2020; Hasan et al., 2020; Masum et al., 2020).

4. Research methodology

4.1. Population and sample selection

The study focused on relevant data from the listed firms of Dhaka stock exchange (DSE) for two different time periods: 3 years before and after the adoption of IFRS. This study intends to explore the role of board characteristics on the relationship between IFRS adoption and real earnings

Figure 1. Study framework (relation between IFRS adoption, board characteristics, and real earnings management).



management, around the year of IFRS adoption, and the changes of corporate governance guidelines in Bangladesh. Accordingly, the study considers the time period of 2004–06 and 2013/14–2015/16 which is followed by three criteria: first, time for the adoption of IFRS and its implementation which started in 2007 and mostly accomplished by 2012 (Deloitte: IAS Plus, 2012); second, first time introduction of CG guidelines in Bangladesh (BEI, 2004); third, the revision of corporate governance guidelines in Bangladesh at the end of 2012, which is voluntary in nature without any punitive measure (BSEC, 2012). There were two basic criteria based on which firms were selected: firms must be listed in DSE and have active participation in the capital market for both study period. By the end of December 2016, there were 560 listed firms and securities at DSE (DSE, 2016). Out of those listed firms and securities, 266 were securities listing, 100 were financial firms, and 8 were Government-owned companies, all of which are operated under the supervision of the Bangladesh Central Bank and concerned authorities. As previous studies did (Hasan & Rahman, 2020; Ismail et al., 2013; Molla et al., 2021), all those firms have been excluded from the study. There were few other companies whose financial statements were not available for both period of the study and hence excluded from the study. Finally, data of 94 firms listed in DSE have been selected to conduct the study for the period of 6 years, indicating $(94 \times 6) = 564$ firm year's observations.

4.2. Measurement of the variables

In order to test the hypothesis, the study applied multiple regression model on panel data to discover the association between IFRS adoption, board characteristics, and incidences of real earnings management activities. The study considered aggregate value of real activities management (REM) as dependent variables, IFRS adoption (IFRS) as independent variable, and board characteristics as moderating variable. As used in the previous research, the study also included number of indicator and control variable in the regression model such as audit quality (AQ) measured by the affiliation with big4 audit firms, size of the company measured by total assets (SIZE), the structure of debt (LEV), yearly growth in terms of sales (GRT), the return of assets (ROA), and industry dummy (IND) based on the market category of the listed firm in DSE (Abdullah & Tursoy, 2021; Hasan, 2020; Hasan et al., 2011; Masum et al., 2020; Molla et al., 2021). Table 1 stands for the explanation of the functional variables in the regression model:

4.3. Model specification

To scrutinize the hypothesis of the study, following multiple regression models are developed:

5. Model 1

$$REM_{it} = \beta_0 + \beta_1 IFRS_{it} + \beta_2 AQ_{it} + \beta_3 SIZE_{it} + \beta_4 LEV_{it} + \beta_5 GRT_{it} + \beta_6 ROA_{it} + \text{Industry dummies} + \epsilon_{it} \quad (1)$$

6. Model 2

$$REM_{it} = \beta_0 + \beta_1 BDSZ_{it} + \beta_2 BDIN_{it} + \beta_3 CEOD_{it} + \beta_4 BDEX_{it} + \beta_5 GD_{it} + \beta_6 SIZE_{it} + \beta_7 LEV_{it} + \beta_8 GRT_{it} + \beta_9 ROA_{it} + \beta_{10} AQ_{it} + \text{Industry dummies} + \epsilon_{it} \quad (2)$$

Table 1. Study variables clarification

Variables	Measurements
Real Earnings Management (REM_{it})	Aggregate value of ABN_PROD, ABN_CFO and ABN_DISEX as proxy of REM
IFRS adoption ($IFRS_{it}$)	IFRS adoption dummy (0 = Pre IFRS, 2004–06; 1 = Post IFRS, 2013/14–15/16)
Board size ($BDSZ_{it}$)	Number of directors in the board for the firm in year t
Board Independence ($BDIN_{it}$)	Number of independent directors in the board for the firm in year t
CEO Duality ($CEOD_{it}$)	Dummy variable, equal to 1, if CEO duality exist otherwise “0”
Board Expertise ($BDEX_{it}$)	Number of professional accountants in the board for the firm in year t
Gender Diversity (GD_{it})	Number of female members in the board for the firm in year t
Audit Quality (AQ_{it})	Dummy variable, equal to 1 if the company is audited by Big-4 auditors, 0 otherwise
Firm size ($SIZE_{it}$)	Natural logarithm of average total assets for the firm in year t
Leverage (LEV_{it})	The ratio of total liabilities to total assets for the firm in year t
Growth (GRT_{it})	Annual percentage of changes in sales for the firm in year t
Return on Assets (ROA_{it})	Ratio of total income to average total assets for the firm in year t
Industry dummy (IND_{it})	Industry dummy, based on market category of the listed firm in DSE

7. Model 3

$$REM_{it} = \beta_0 + \beta_1 IFRS_{it} + \beta_2 BDSZ_{it} + \beta_3 BDIN_{it} + \beta_4 CEOD_{it} + \beta_5 BDEX_{it} + \beta_6 GD_{it} + \beta_7 SIZE_{it} + \beta_8 LEV_{it} + \beta_9 GRT_{it} + \beta_{10} ROA_{it} + \beta_{11} AQ_{it} + \text{Industry dummies} + \varepsilon_{it} \quad (3)$$

8. Model 4

$$REM_{it} = \beta_0 + \beta_1 IFRS_{it} + \beta_2 BDSZ_{it} + \beta_3 BDIN_{it} + \beta_4 CEOD_{it} + \beta_5 BDEX_{it} + \beta_6 GD_{it} + \beta_7 IFRS * BDSZ_{it} + \beta_8 IFRS * BDIN_{it} + \beta_9 IFRS * CEOD_{it} + \beta_{10} IFRS * BDEX_{it} + \beta_{11} IFRS * GD_{it} + \beta_{12} AQ_{it} + \beta_{13} SIZE_{it} + \beta_{14} LEV_{it} + \beta_{15} GRT_{it} + \beta_{16} ROA_{it} + \text{Industry dummies} + \varepsilon_{it} \quad (4)$$

The application of those regression equations is consistent with the framework to test the moderating effect of the variable (i.e., board characteristics), which is established by Baron and Kenny (1986). In equation 1, the coefficient of IFRS (β_1) signals the outcome of IFRS adoption, i.e., positive (negative) coefficient reflects that IFRS adoption has an influence on higher (lower) real earnings management. The coefficients of board characteristics [$BDSZ(\beta_2)$, $BDIN(\beta_3)$, $CEOD(\beta_4)$, $BDEX(\beta_5)$, $GD(\beta_6)$] in equation 2 shows the association between board characteristics and real earnings management. Moreover, IFRS (β_1) and board characteristics [$BDSZ(\beta_2)$, $BDIN(\beta_3)$, $CEOD(\beta_4)$, $BDEX(\beta_5)$, $GD(\beta_6)$] in equations 3 and 4 identify the sign of relationship and the effect of interacting variables, IFRS*board characteristics [$BDSZ(\beta_7)$, $BDIN(\beta_8)$, $CEOD(\beta_9)$, $BDEX(\beta_{10})$, $GD(\beta_{11})$] on REM, which shows the incremental effect of board characteristics on the relationship between IFRS adoption and real earnings management.

4.3 1. Real earnings management model

Previous studies recognized that managers discretion in financial reporting not only incurred by accounting estimations but also applied in real activities management (Cohen & Zarowin, 2010;

Table 2. Roychowdhury model for real earnings management

$$\frac{CFO_{it}}{ASSETS_{i,t-1}} = \beta_0 + \beta_1 \frac{1}{ASSETS_{i,t-1}} + \beta_2 \frac{SALES_{it}}{ASSETS_{i,t-1}} + \beta_3 \frac{\Delta SALES_{it}}{ASSETS_{i,t-1}} + \epsilon_{it} \quad (5.1)$$

CFOit = cash flows from operations taken from the statement of cash flows. Abnormal cash flow from operations is the actual CFO less the normal level of CFO calculated with the estimated coefficient from equation (5.1)

$$\frac{PROD_{it}}{ASSETS_{i,t-1}} = \beta_0 + \beta_1 \frac{1}{ASSETS_{i,t-1}} + \beta_2 \frac{SALES_{it}}{ASSETS_{i,t-1}} + \beta_3 \frac{\Delta SALES_{it}}{ASSETS_{i,t-1}} + \beta_3 \frac{\Delta SALES_{i,t-1}}{ASSETS_{i,t-1}} + \epsilon_{it} \quad (5.2)$$

where PRODit = production costs, defined as the sum of cost of goods sold and the change in inventories from year t-1 to year t.

$$\frac{DISEX_{it}}{ASSETS_{i,t-1}} = \beta_0 + \beta_1 \frac{1}{ASSETS_{i,t-1}} + \beta_2 \frac{SALES_{i,t-1}}{ASSETS_{i,t-1}} + \epsilon_{it} \quad (5.3)$$

DISEXit = discretionary expenses defined as selling, general and administrative expenses for year t.

Zang, 2011). Real activity management is described as a deviation from normal operational practices, which is provoked by managers' desire to mislead the users of financial information, i.e., in the normal course of business, managers applied discretion to attain their expected outcome (Roychowdhury, 2006). This model comprised three proxies (Table 2): abnormal cash flow from operations (ABN_CFO), abnormal production costs (ABN_PROD), and abnormal discretionary expenses (ABN_DISEX). All of these measures have been used in several studies as an aggregate measure of REM (Cohen & Zarowin, 2010; Hasan, 2020; Hasan & Rahman, 2020). In line with the study of Cohen and Zarowin (2010), Doukakis (2014), and Zang (2011), this study considers abnormal production costs (ABN_PROD), abnormal operating cash flows (ABN_CFO), and abnormal discretionary expenses (ABN_DISEX), to identify real earnings management.

From equations 5.1, 5.2, and 5.3, the normal level of production cost, operating cash flow, and discretionary expenses are estimated, respectively, and the difference between this estimated value and the actual value is considered as abnormal. Following the estimation, abnormal cash flow from operations (ABN_CFO) and abnormal discretionary expenses (ABN_DISEX) are multiplied by negative one (-1) for interpretation. The higher value of those metrics refers to the possibility of the firm to engage in earnings manipulation. Firm engaged in real activities manipulation may have unusual low CFO or lower discretionary expenses or higher production cost or all of those elements together (Cohen & Zarowin, 2010). This study developed aggregate measure (the sum of all three metrics) of real earnings management (RM), where higher value shows an elevated level of real activities.

5. Analysis and findings

5.1. Descriptive analysis

The annual report of the firm is used to extract the data required for the study. Following the data collection, the aggregate value of real earnings (ABN_CFO, ABN_PROD, and ABN_DISEX) is estimated by applying Roychowdhury model (Roychowdhury, 2006). Table 3 presents the descriptive analysis of the study variables, which includes mean, median, standard deviation, minimum, and maximum. This study employs panel data of 564 firm year's observation from two period, i.e., 2004–06 as pre-adoption of IFRS and 2013/14–15/16 as post-adoption of IFRS. Table 3 characterizes mean of real earnings activities which represents the mean value of 3.37e-09 with the standard deviation of 0.5830; similar to the study of Bhuiyan (2015), where the minimum value is -2.472 and maximum value is 2.702, means that the company are engaged in real earnings management in both directions. Board size presents that the highest number of board member is 14 where lowest is 3 with mean value of 6.65. Besides, board independent presents the number of independent members in the board which average is 1.21 and board expertise shows the number of professional in the board which has a mean value of 0.216. Gender diversity presents the number of female members in the board where maximum value is 4 and minimum value is 0

Table 3. Descriptive statistics (n = 94, t = 6, observations = 564)

Variables	Mean	Std. Deviation	Minimum	Maximum
IFRS	0.5	0.5004	0	1
REM	3.37e-09	0.5830	-2.4720	2.7027
BDSZ	6.6524	1.9285	3	14
BDIN	1.2109	0.9937	0	5
CEOD	0.2234	0.4168	0	1
BDEX	0.2163	0.4331	0	3
GD	1.1879	1.0097	0	4
AQ	0.1401	0.3473	0	1
SIZE	8.9103	0.6458	7.2784	10.9799
LEV	0.5890	0.4541	0.0235	6.6216
GRT	0.1127	0.4625	-1	4.3968
ROA	0.0298	0.0911	-1.0021	0.2667

IFRS for IFRS adoption; REM for real earnings management; BDSZ for board size; BDIN for board independence; CEOD for CEO duality; BDEX for board expertise; GD for gender diversity; AQ for Audit Quality; SIZE is natural logarithm of total assets; LEV for Leverage; GRT for Growth in terms of sales revenue; ROA for Return on Assets.

with an average of 1.18. Moreover, CEO duality presents the number of company where both chairman and managing director is same person which mean value is 0.223.

In terms of audit quality (AQ) refers to big4 audit firm, the table shows the mean value is 0.1401 with a standard deviation of 0.3473, which is approximate to the recent study of Muttakin et al. (2017). In addition, firm size characterized by natural logarithm of average total assets which mean value is 8.91 with a standard deviation of 0.6458, similar to the result of Humayun Kabir et al. (2011). Furthermore, it reveals that the mean value of leverage (LEV) is 0.5890 with least value of 0.0235 and maximum value of 6.621. That means, some of the firms are highly leveraged compared to others which are consistent with the study of Humayun Kabir et al. (2011), Muttakin et al. (2017), and Hasan and Rahman (2020). Corresponding to the study of Humayun Kabir et al. (2011), this study shows an average growth of the firm is 11.27% with a minimum value of -100%, which indicate to the shutdown of the operation for a time being by few firms.

5.2. Test of multicollinearity

Correlation analysis is applied to get information about the strength of relationship and direction among the variables (Pallant, 2011). This study performed correlation analysis to reveal the relationship and direction among dependent, independent, and control variables. To investigate the relationship among variables, this study performs Pearson correlation which is applied to reveal the relationship between two variables with the control feature for other variables. The relationship among the variables can be divided into three categories, which are low (0.10–0.29), medium (0.30–0.49), and high (0.50–0.99) correlation (Pallant, 2011). Table 4 presents the correlation matrix which characterizes the relationship and direction among all study variables. Table shows that there is a significant negative correlation between IFRS and REM, which means that IFRS adoption may reduce the extent of EM in view of real earnings managements (Barth et al., 2008; Hasan & Rahman, 2020; Hasan et al., 2020). Moreover, board size, independence, expertise, and gender diversity show significant negative correlation, which refers that REM practice of the firm has reverse relationship with those board characteristics. Besides, CEO duality has significant positive correlation with REM which means the presence of CEO duality increase the possibility of higher earnings manipulation. From correlation matrix, it is confirmed that none of the study variable has correlation above 80% where highest correlation exist

Table 4. Correlation matrix

	IFRS	REM	BDSZ	BDIN	CEOD	BDEX	GD	AQ	SIZE	LEV	GRT	ROA
IFRS	1.000											
REM	-0.5538***	1.000										
BDSZ	0.1362***	-0.1643***	1.000									
BDIN	0.5983***	-0.3252***	0.3766***	1.000								
CEOD	-0.3576***	0.2081***	-0.0955**	-0.1740***	1.000							
BDEX	0.3770***	-0.2101***	0.1710***	0.3395***	-0.1993***	1.000						
GD	0.1722***	-0.1228***	0.1859***	0.1976***	0.0351	0.0571	1.000					
AQ	-0.0358	-0.0538	0.2610***	0.1252***	0.0043	-0.0010	-0.0549	1.000				
SIZE	0.3157***	-0.0742*	0.3288***	0.2495***	-0.0135	0.0624	0.0046	0.3099***	1.000			
LEV	-0.0509	0.0974**	-0.0952**	-0.0641	0.0186	0.0236	-0.0732*	-0.0398	-0.0833**	1.000		
GRT	-0.0846**	0.0085	-0.0145	-0.0007	0.0001	0.0105	0.0363	0.0022	-0.0044	0.0725*	1.000	
ROA	0.0308	-0.1316***	0.2023***	0.0598	-0.0036	-0.0471	0.0576	0.2245***	0.1667***	0.6064***	0.0870**	1.000

IFRS for IFRS adoption; REM for Real Earnings Management; BDSZ for board size; BDIN for board independence; CEOD for CEO duality; BDEX for board expertise; GD for gender diversity; AQ for Audit Quality; SIZE is natural logarithm of total assets; LEV for Leverage; GRT for Growth in terms of sales revenue; ROA for Return on Assets.
 Level of significance: *** p < 0.01, ** p < 0.05, * p < 0.1.

Table 5. VIF and tolerance value

Name of the variable	Model 1		Model 2		Model 3/4	
	VIF	Tolerance value	VIF	Tolerance value	VIF	Tolerance value
IFRS	1.15	0.873	-	-	2.19	0.457
BDSZ	-	-	1.36	0.738	1.43	0.699
BDIN	-	-	1.36	0.734	1.89	0.527
CEOD	-	-	1.07	0.939	1.21	0.828
BDEX	-	-	1.17	0.855	1.23	0.811
GD	-	-	1.09	0.919	1.11	0.900
AQ	1.19	0.841	1.21	0.829	1.25	0.802
SIZE	1.27	0.789	1.23	0.813	1.40	0.716
LEV	1.65	0.606	1.66	0.602	1.66	0.602
GRT	1.04	0.959	1.04	0.962	1.06	0.944
ROA	1.75	0.571	1.78	0.561	1.79	0.559

between leverage and ROA (60.6%) along with IFRS and board independence (59.83%). That means, there is less possibility to have the issue of multicollinearity among the study variables.

Furthermore, to address the issue of multicollinearity (if any), this study winsorized the study variables at the 1% and 99% levels to eliminate the possible outlier as like previous studies (Hasan & Rahman, 2020; Routledge, 2020; Zhang et al., 2020). Moreover, previous studies suggest that the data set with large samples, multicollinearity should not be a problem (Allison, 2012; Hasan et al., 2019). For further investigation of this issue, this study checks the VIF and tolerance value which is presented in Table 5. Literature suggests that the VIF and tolerance value is more appropriate to identify the issue of multicollinearity (Hamilton, 2012; Molla et al., 2021). A range of acceptable variable inflation factor (VIF) value is mentioned in the literature. The rule of thumb is that the VIF value should be below 5 and could not be more than 10, which is mostly recommended in the literature (Allison, 2012; Daoud, 2017). In corresponds to the maximum VIF value, recommended tolerance value is 0.10 (i.e., 1/10). Table 5 represents the VIF and tolerance value of the different regression model and it shows that none of the VIF score cross the cut off level or more than 3. Accordingly, it can be mentioned that none of the models have the issue of multicollinearity.

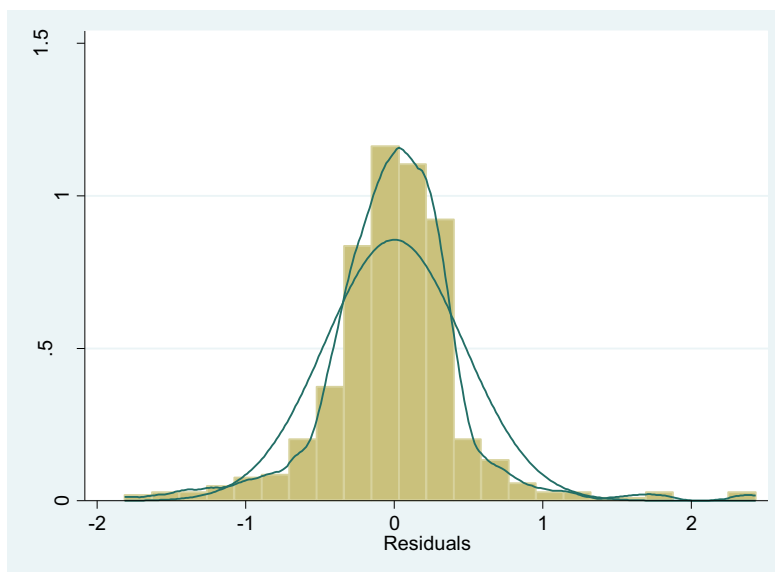
5.3. Test for normality and autocorrelation

Normality test for residual of data shows that there is no abnormality in data, which means data are normally distributed in Figure 2.

Jarque-Bera normality test also represents the similar outcome in Table 6, where p-value is insignificant which means a null hypothesis is accepted. The study also conducted Wooldridge test for autocorrelation to check the issue of serial autocorrelation, which indicates that there is no serial autocorrelation, as p-value is insignificant, i.e., null hypothesis is accepted. In addition, Ramsey RESET test is done to identify the issue of endogeneity problems. Result shows that the model does not have any such issue, p-value insignificant (Prob. > F = 0.1036), means accept the null hypothesis, which refers to unlikely present of any misspecification problem in the model (Adib & Xianzhi, 2019; Ramsey, 1969).

(bin = 23, start = -1.9718632, width = .19217467)

Figure 2. Normal distribution of residual.



(bin=23, start=-1.9718632, width=.19217467)

Table 6. Test of normality and autocorrelation

Name of the Test	Outcome
Jarque-Bera normality test	Jarque-Bera normality test: 398.1 Chi (2) 3.e-152 Jarque-Bera test for Ho: normality
Wooldridge test for autocorrelation in panel data	H0: no first order autocorrelation F (1, 93) = 0.479 Prob. > F = 0.4907
Ramsey RESET test	Ho: model has no omitted variables F (3, 549) = 2.07 Prob. > F = 0.1036

5.4. Test for heteroskedasticity

Beside the issue of multicollinearity, normality of data and autocorrelation, the study needs to check the issue of heteroskedasticity. Following the assumption of heteroskedasticity, i.e., variance of the data set is not invariable, in OLS regression model, Breusch-Pagan/Cook-Weisberg test and White test for heteroskedasticity are carried out which shows that data are not homoskedasticity, as p-value in both cases are significant, i.e., null hypothesis is rejected, present in [Table 7](#).

Table 7. Test for heteroskedasticity

Name of the Test	Outcome
Breusch-Pagan/Cook-Weisberg test	Breusch-Pagan/Cook-Weisberg test for heteroskedasticity Ho: Constant variance Variables: fitted value of REM chi2(1) = 40.05 Prob. > chi2 = 0.0000
White's test/IM-test	White's test for Ho: homoskedasticity against Ha: unrestricted heteroskedasticity chi2(63) = 172.65 Prob. > chi2 = 0.0000

Table 8. Result of breusch and pagan LM test and Hausman test

Name of the test	
Breusch and Pagan LM test	Hausman specification test
Ho: there is no cross-sectional dependence $\text{Var}(u) = 0$ $\text{chibar2}(01) = 52.63$ $\text{Prob.} > \text{chibar2} = 0.0000$	Ho: difference in coefficients not systematic $\text{chi2}(12) = (b-B) [(V_b - V_B)^{-1}] (b-B) = 28.33$ $\text{Prob.} > \text{chi2} = 0.0050$

5.5. Breusch and Pagan LM test and Hausman test

The study needs to specify the model which is applied for data analysis. In the model specification procedure of panel data, the first step is to compare the pooled OLS model and the random effect model (GLS) to identify the most appropriate model. Breusch and Pagan Lagrangian multiplier test for random effects was conducted which shows that the random effect model is more appropriate than the pooled OLS model, as P-value of the test is significant at 1% level, means that data have cross-sectional dependence.

Next, Hausman specification test was conducted to identify the most appropriate model between the random effect and fixed effect model. The result of Hausman test shows that the fixed effect model is more appropriate than the random effect model, as p-value is $\text{Prob.} > \text{chi2} = 0.0050$, significant at 1% level of significance. The result of Hausman test is presented in [Table 8](#). Accordingly, the study considered the fixed effect regression model for better estimation.

5.6. Regression analysis

From the diagnostic tests, it is documented that fixed effect model is more appropriate to run the multiple regressions for this study. However, the potential econometric problems of heteroskedasticity, and cross-sectional dependence are found in the data. In this context, panel corrected standard errors (PCSE) estimate is more appropriate for the panel with $T < N$ (Hasan, 2020; Molla et al., 2021). Moreover, PCSE estimate is robust not only to unit heteroskedasticity, but also robust against possible contemporaneous correlation across the units (Hasan, 2020; Hasan & Rahman, 2020). Accordingly, this study assumes that PCSE is the most suitable estimator for analyzing the panel data. As per the estimation, there is a significant negative association between IFRS adoption and real earnings management (-0.689 significant at 1% level), which means that the implementation of IFRS restrain the practice of real earnings manipulation. Similar outcome is documented by Sellami and Fakhfakh (2013) in France and Setiawan et al. (2020) in Indonesia. Besides, CEO duality has significant positive relationship with REM (0.0860 , significant at 10% level) which refers that the presence of CEO duality may encourage earnings manipulation. In contrary, board expertise (-0.125 , significant at 1% level) and gender diversity (-0.0366 , significant at 5% level) both have significant negative relationship with REM, means that the presence of professional and female in the board reduce the level of earnings management (Table 9). To measure the moderating role of board characteristics on the relationship between IFRS adoption and REM of the firms, the hierarchical moderated multiple regression model has been used. This regression model is more appropriate to evaluate the effect of moderating variable in the study (Han & Ellis, 2019; Hasan & Rahman, 2020; Li et al., 2019; Molla et al., 2021). From analysis, it is observed that the board size (-0.340 , significant at 5% level) and CEO duality (-0.419 , significant at 1% level) both have significant negative moderating effect on the relationship between IFRS adoption and REM. It refers that the big board size and the presence of CEO duality both are responsible for reducing the influence of IFRS adoption on REM. Conversely, board independence (0.826 , significant at 10% level), board expertise (0.158 , significant at 1% level) and gender diversity (0.0719 , significant at 5% level) all have significant positive moderating effect on the relationship between IFRS adoption and REM. It refers that the presence of independent, professional and female member in the board may reduce the earnings management behavior of the firm. Furthermore, the regression model has few control variables which estimates show that audit quality (-0.196 , significant at 1% level)

Table 9. Results of regression model using panel corrected standard errors (PCSE) estimator

Variables/Model	M1(REM)	M2(REM)	M3(REM)	M4(REM)
IFRS	-0.710***	-	-0.777***	-0.689***
	(0.0145)	-	(0.0568)	(0.148)
BDSZ	-	-0.00281	-0.0402***	-0.0206
	-	(0.00709)	(0.00900)	(0.0137)
BDIN	-	-0.145***	0.0480*	0.00449
	-	(0.0360)	(0.0274)	(0.0297)
CEOD	-	0.205***	-0.0327	0.0860*
	-	(0.0338)	(0.0587)	(0.0446)
BDEX	-	-0.133***	0.0195	-0.125***
	-	(0.0506)	(0.0346)	(0.0324)
GD	-	-0.0381*	0.00130	-0.0366**
	-	(0.0222)	(0.0208)	(0.0184)
IFRS*BDSZ	-	-	-	-0.0340**
	-	-	-	(0.0155)
IFRS*BDIN	-	-	-	0.0826*
	-	-	-	(0.0469)
IFRS*CEOD	-	-	-	-0.419***
	-	-	-	(0.0637)
IFRS*BDEX	-	-	-	0.158***
	-	-	-	(0.0493)
IFRS*GD	-	-	-	0.0719**
	-	-	-	(0.0334)
AQ	-0.174***	-0.00813	-0.162***	-0.196***
	(0.0512)	(0.0763)	(0.0498)	(0.0486)
SIZE	0.153***	0.0183	0.184***	0.205***
	(0.0175)	(0.0421)	(0.0194)	(0.0181)
LEV	0.0186	0.00599	0.0277	0.0234
	(0.129)	(0.126)	(0.122)	(0.122)
GRT	-0.0427	0.0272	-0.0543	-0.0504
	(0.0424)	(0.0526)	(0.0420)	(0.0419)
ROA	-0.678	-0.746	-0.538	-0.517
	(0.470)	(0.483)	(0.477)	(0.482)
Constant	-0.967***	0.0758	-1.011***	-1.283***
	(0.212)	(0.387)	(0.178)	(0.136)
Observations	564	564	564	564
R-squared	0.346	0.156	0.359	0.381
Number of ID	94	94	94	94

Standard errors in parentheses: *** p < 0.01, ** p < 0.05, * p < 0.1.

has a significant negative association with real earnings management, i.e., restrain opportunistic behavior of the manager (Hasan et al., 2019; Hasan & Rahman, 2020; Masum et al., 2020). The similar relationship exists with growth (GRT) and return on assets (ROA) though those are not significant. Moreover, firm size has significant positive effect on REM (0.205, significant at 1% level) which means that large company are more intend for earnings manipulation. However, Leverage (LEV) has insignificant positive relationship with REM.

6. Conclusion

The study is focused to investigate the relationship between IFRS adoption and REM with moderating role of board characteristics. All of the listed firms of DSE during the study period is considered for the purpose except public and financial companies. To the best of the researchers' understanding, this is one of the very few studies that examined both the effect of IFRS adoption on REM and the moderating role of the board variables on the association between IFRS adoption and REM activities. Findings of the study shows that IFRS adoption is significantly negatively associated with the REM activities. It is also documented that CEO duality (0.0860, significant at 10% level), board expertise (−0.125, significant at 1% level), and gender diversity (−0.0366, significant at 5% level) have significant influence on REM. Moreover, all of the board characteristics in the study moderate the relationship between IFRS adoption and REM, where board independence (BDIN), board expertise (BDEX), and gender diversity (GD) have significant positive moderation, which refers that the presence of the independent member, professional and female in the board may enhance the effect of IFRS adoption on REM and restrain the practice of earnings management. However, board size (BDSZ) and CEO duality (CEOD) have significant negative moderation effect on the relationship between IFRS adoption and REM, which means the big size of the board and the presence of CEO duality weaken the effect of IFRS adoption on REM and lead to higher earnings manipulation. The findings have important implications for policy implementation, theory building, and creating standards in capital markets and financial sector regulation in developing and emerging economies like Bangladesh. Specifically, the study's findings will enable regulatory authorities to understand the effect of good governance following the adoption of IFRS, and it will lead them to develop a comprehensive plan that ensures higher accounting quality. Accordingly, regulatory authorities of Bangladesh may revise their corporate governance guidelines to emphasize board independence, expertise, and gender diversity, along with the small size of the board and the nonexistence of CEO duality. Furthermore, regulatory bodies in Bangladesh may pursue to make corporate governance compliance mandatory with punitive measure, which is voluntary at present, and there is no option to have punitive action for non-compliance (BSEC, 2012). Following this revision may lead to better corporate governance practice and higher financial reporting quality in terms of less earnings management. The study outcome enhanced the literature on earnings management by exploring the role of IFRS adoption and board characteristics as one of the major components of corporate governance. Theoretical implications of the study explained the importance of corporate governance to address the issue of agency problem. In the case of IFRS adoption, the outcomes of this study can also serve as a model for other developing countries around the world. The researcher can investigate the relationship between real earnings management and accruals management over an extended period for future study.

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Data availability statement

Data is available on request from the authors.

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