

Do manufacturing firms in Bangladesh engage in earnings management to avoid losses? Further evidence using the governance elements as monitors

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Abstract

Purpose – This study aims to investigate the earnings management practices of the listed manufacturing firms in Bangladesh and assess the impact of corporate governance mechanisms on such earnings management behavior.

Design/methodology/approach – The study applies the real earnings management (REM) model developed by Dechow *et al.* (1998) and implemented by Roychowdhury (2006) and modified Jones model (1991) for the proxy of accrual-based earnings management (AEM). It uses a pooled ordinary least square regression model corrected with robust standard errors for empirical analysis.

Findings – The study finds that firms with small positive earnings per share are engaged in AEM to avoid losses. Also, firm managers craft discretionary expenses to manage real earnings. For governance factors, the institutional shareholders tend to play a significant role in limiting both REM and AEM embedded in generally accepted accounting principles or International Financial Reporting Standards. Also, factors such as foreign ownership and board size significantly restrict REM, whereas director ownership encourages the same. The paper does not reveal any significant monitoring role for other governance factors in curbing either REM or AEM practices by Bangladeshi firms.

Research limitations/implications – The paper studies the monitoring role of governance mechanisms on listed manufacturing firms' earnings management. A study of separating the listed firms into family and non-family ones could be interesting for future research.

Practical implications – The paper unveils earning management techniques used by firms in Bangladesh and provides critical policy implications to the corporate governance mechanisms that effectively limit earnings management practice.

Social implications – The social significance is to aware constituents of financial reporting about the earnings management behavior by firms in emerging economies.

Originality/value – The study adds to evidence that the manufacturing firms in Bangladesh adopt both REM and AEM techniques to avoid losses. Simultaneously, the paper highlights some critical governance



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factors that can restrict misleading earnings management behavior by firms in an emerging economy to assist in policymaking.

Keywords Corporate governance, Bangladesh, Real earnings management, Accrual earnings management

Paper type Research paper

1. Introduction

One of the critical assumptions of agency theory is that executives are likely to engage in earnings management to escalate their benefits (Jensen and Meckling, 1976). Following the agency theory, some researchers document several reasons for earnings management, such as an increase in executives' benefits (Rahman and Ali, 2006), avoidance of losses (Burgstahler and Dichev, 1997; Roychowdhury, 2006), meeting and beating the analysts' forecasts (Gunny, 2010) and upholding positive market perception (Healy and Wahlen, 1999; Matsumoto, 2002; Cohen and Zarowin, 2010). Some others argue that the opportunities for earnings management increase in emerging economies because of higher information asymmetry, regulatory loopholes and a weak governance structure compared to the developed ones. Bao and Lewellyn (2017). Also, earnings management is a critical issue for policymakers in emerging economies because it inhibits foreign capital inflows and hinders corporate partnership (Bao and Lewellyn, 2017). However, empirical literature does not provide sufficient evidence on why and how firms in emerging economies manipulate earnings and the ways to control such mischievous behavior.

Given the above, we study the listed manufacturing firms' earnings management behavior of an emerging economy such as Bangladesh. Specifically, we address two questions:

- Q1. Do the listed manufacturing firms in Bangladesh engage in earnings management?
- Q2. Can the main governance mechanisms such as board, ownership and audit committee structures monitor executives' guile behavior?

Our estimation covers 110 manufacturing firms (out of 178) listed in the Dhaka Stock Exchange (DSE) over 2013–2017. The firms suspected of earnings manipulation to eschew losses are selected based on small positive earnings per share (EPS) and a small positive return on assets (ROA) following Roychowdhury (2006). The existence of real earnings management (REM) is measured through all the three proxies of REM (abnormal cash flow from operations, abnormal production costs and abnormal discretionary expenses) following Roychowdhury (2006). The presence of accrual-based earnings management (AEM) is studied using abnormal accruals following Jones (1991) and Cohen and Zarowin (2010).

We add value to the previous studies in Bangladesh in the following ways. First, we provide updated evidence on the incentives of earnings management investigated by Bhuiyan (2015). Notably, except for Bhuiyan (2015), all the previous studies assume that the Bangladeshi manufacturing firms practice earnings management (Ahmed and Azim, 2015; Khan and Akter, 2017; Razzaque *et al.*, 2016; Muttakin *et al.*, 2017). We separate firms with small positive EPS and small positive ROA following Roychowdhury (2006) and Bhuiyan (2015) to comprehend earnings management incentives.

Second, we extend Bhuiyan's (2015) work by incorporating governance mechanisms in the regression equation. Some scholars have examined the impact of governance factors on firms' earnings management in Bangladesh. For example, Razzaque *et al.* (2016) investigate

the link between family ownership and REM in the listed firms of Bangladesh, whereas [Muttakin *et al.* \(2017\)](#) examine the impact of business group affiliation and audit quality on AEM for the same. [Khan and Akter \(2017\)](#) examine earnings management in the listed food and allied companies in Bangladesh using the [Beneish \(1999\)](#) model. [Ahmed and Azim \(2015\)](#) discuss earnings management with data from the annual reports of the listed cement companies in Bangladesh from 2009 to 2013. Also, [Islam *et al.* \(2011\)](#) examine the effectiveness of the modified Jones model in detecting earnings management for the listed firms in Bangladesh. However, none of the studies have checked the impact of main governance variables on REM and AEM. We study the effects of main governance mechanisms on curbing both REM and AEM.

We find that the manufacturing firms in Bangladesh have incentives to meet or beat the zero earnings benchmark. However, a strong discontinuity is evidenced between the small positive earnings (EPS and ROA) and small negative earnings (EPS and ROA). Our regression results confirm that manufacturing firms are involved in both AEM and REM (crafting discretionary expenses) to eschew losses for positive earnings. Besides, we uncover that a negative and significant link exists between institutional ownership, and AEM and REM, suggesting that institutional shareholders can play a substantial role in limiting managerial discretions embedded in generally accepted accounting principles (GAAP) or International Financial Reporting Standards (IFRS). Moreover, we unveil that governance factors such as foreign ownership and board size significantly restrict REM, whereas director ownership encourages the same.

The rest of the manuscript is organized as follows. Section 2 provides an institutional background. Section 3 discusses theories and develops hypotheses. Section 4 delineates research methods. Section 5 presents the empirical results. Section 6 concludes with some limitations.

2. Institutional setting

The Companies Act, 1994, regulates the corporate governance structure for firms in Bangladesh. The Bangladesh Securities and Exchange Commission guards shareholders' interests, regulates capital markets and enhances the listed companies' governance and reporting quality by monitoring and enforcing the mandatory disclosure requirements. The DSE computes its all share price index according to the formula of International Finance Corporation since 1993 and started automated trading in 2001. A central securities depository system was established in 2004 to preserve share certificates and other records digitally. Other notable corporate governance initiatives include mandatory compliance with International Accounting Standards and International Standards on Auditing (1997), amending the Securities and Exchange Rules of 1987 requiring listed companies to prepare half-yearly financial statements (1997), requiring the financial statement of an issuer to be audited within 120 days or within a period as extended by the securities exchange commission (SEC) (2000), issuance of corporate governance guidelines (2006), requiring listed companies to include a statement in their yearly and periodic financial statements explaining that the financial statements comply with the IFRS issued by the International Accounting Standards Board (2008), requiring all listed companies (except life insurance companies) to submit interim financial reports to the SEC and stock exchanges within 45 days of the end of the first quarter and 30 days of the end of the third quarter of the financial year (2009), corporate governance codes (2012) and the latest corporate governance codes (2018).

Nonetheless, Bangladesh's stock markets function in a weak form with less dispersed shareholdings. Many of the listed companies in Bangladesh are grown from traditional family-owned businesses, reflecting higher incentives to manipulate earnings. This becomes

evident from a report on the share market debacle in 2011 by the “Ibrahim Khalid Share Market Probe Committee.” Also, Bangladesh has a relatively poor bond market in Asian countries. Most of the firm’s long-term finance includes a loan from banks or other financial institutions.

As a whole, the salient features of the Bangladesh capital market include a weak form of efficient markets with limited bond instruments, absence of an active market for hostile takeovers, insufficient incentives contract for management and poor enforcement status of regulations (Muttakin *et al.*, 2017). These features imply that management has enough opportunities, incentives and rationalization (fraud triangle) to manipulate earnings.

3. Theories and hypotheses

The agency theory discussed by Jensen and Meckling (1976) can be considered fundamental to earnings management behavior in emerging economies. Agency theory postulates that managers tend to maximize private gains because of the difficulty in designing a perfect incentive contract that would align managers’ and shareholders’ interests. Also, the interest conflict between managers and shareholders increases in emerging economies because of higher information asymmetry, moral hazard and institutional lagging (Rahman and Ali, 2006). Arguably, as insiders, managers have ample opportunities to exploit the loopholes of accounting rules to expropriate profits at the expense of minority shareholders (Type 2 agency problem).

Besides the agency theory, the upper echelons theory proposes that top-level executives’ background characteristics can predict organizational outputs. Likewise, the fraud triangle theory outlines that managers commit fraud when there is an opportunity to do so, pressures to commit unethical works, and a justification for doing fraud. As Bangladeshi firms mainly rely on the debt capital from banks wherein banks set earnings-based loan covenants in the form of a positive debt-service coverage ratio, firms tend to eschew losses to comply with the loan covenants. Also, factors such as stock market inefficiency, absence of corporate takeovers and a weak governance environment increase earnings management chances in developing countries such as Bangladesh. Therefore, the study adopts the agency theory to interpret the results considering the characteristics of Bangladesh capital markets.

In empirical works, Woodhouse and Mather (2013) reveal that Australian chief financial officers (CFOs) manipulate earnings primarily in two ways, namely, showing a profit ($EPS > 0$) and beating prior-year earnings ($EPS_t > EPS_{t-1}$). They note that the motive for showing $EPS > 0$ is to eschew losses by manipulating real activities. Hansen (2010) lends that firms with positively very close to the earnings benchmark or negatively very close to the earnings threshold are likely to manage earnings. Mendes *et al.* (2012) claim that firm managers in Portugal use income smoothing practices to reduce income variability. Also, taking leverage and audit quality as proxies for agency theory, Yimenu and Surur (2019) find that leverage and audit quality have a significant positive and negative association with earnings management, respectively.

In the context of Bangladesh, Bhuiyan (2015) reveals that firm managers beat the earnings threshold by making a small change in EPS and ROA. Evidencing by the signs of highly volatile revenue and operating profit, Ahmed and Azim (2015) conclude that some Bangladeshi companies manipulate earnings. Similarly, Khan and Akter (2017) find that most of the listed food and allied companies in Bangladesh do earnings management at least once every five years. We also believe that Bangladeshi firms manage earnings by shifting small negative EPS to small positive EPS and small negative ROA to immediately above zero benchmarks.

Regarding the impact of corporate governance factors on limiting earnings management, we first consider board size following previous works ([Xie et al., 2003](#); [Peasnell et al., 2005](#); [Rahman and Ali, 2006](#)). Large members on board with diverse expertise can restrict earnings manipulation by increasing the board's integrated monitoring function and enhancing resource utilization efficiency. Zahra and Pearce (1989) contend that large panels can check the actions of top management. However, [Xie et al. \(2003\)](#) provide evidence that board size can significantly hinder earnings management. Also, [Rahman and Ali \(2006\)](#) note that a smaller board is more beneficial to circumscribe earnings manipulation than a larger panel. Therefore, we take the following hypothesis concerning board size:

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

Board independence is another critical component that can effectively monitor managers' opportunistic behavior. Board independence is likely to improve the board's monitoring functions, as outside directors want to enhance their reputational capital. Independent directors are also better positioned to control the expropriation of firms' wealth because of their contractual appointment and expertise. [Chen and Liu \(2010\)](#) note that board independence can ensure reliable and complete financial reporting when there are interest conflicts between controlling and minority shareholders. Also, firms with more independent directors are less likely to involve in earnings management. As a whole, empirical studies tend to show that board independence reduces earnings management. Therefore, we take the following hypothesis:

H2. There is a negative relationship between board independence and earnings management.

The frequency of board meetings can lessen earnings management behavior by providing added value to the board monitoring process. Firms with frequent board meetings tend to perform better than firms with a low frequency of board meetings, reducing earnings misrepresentation. However, [Johl et al. \(2015\)](#) note that frequent board meetings may divert a firm's time, energy and resources into less productive activities, thereby dipping firm value. Altogether, the link between the frequency of board meetings and earnings management is not a clear priority in the empirical literature. However, considering the agency problem associated with firms in emerging economies, we take the following hypothesis:

H3. There is a negative relationship between the frequency of board meetings and earnings management.

Some researchers recognize the benefits of gender diversity on the board ([Harris et al., 2019](#)). According to [Peni and Vahamaa \(2010\)](#), a female chief executive officer (CEO) is less likely to engage in earnings management by manipulating real activities than her male counterpart. Likewise, [Krishnan and Parsons \(2008\)](#) reveal that female CEOs reduce earnings management practice by adopting more conservative financial strategies. Given the empirical findings, we take the following hypothesis concerning gender diversity:

H4. There is a negative relationship between gender diversity and earnings management.

Akin to board composition, the ownership structure is likely to shape firms' earnings management behavior. In emerging economies, shares of a firm are often held by identifiable and united groups such as founding family members or small groups of shareholders such

as lending banks, other institutions and foreigners. According to agency theory, directors' share ownership expects to resolve agency costs by aligning shareholders' and directors' interests. [McConvill and Bagaric \(2004\)](#) argue that directors' wealth inextricably becomes intertwined with the firm's wealth when they own sufficient equity stakes, incentivizing them to enhance the long-term value of the firm. Such a long-term focus on wealth maximization limits managerial opportunism to redress earnings. Thus, we take the following hypothesis:

H5. There is a negative relationship between board ownership and earnings management.

Similarly, institutional investors can limit earnings management. Institutional investors have the incentives to gather reliable information about earnings expectations than other investors to protect their capital and reputation. [Bao and Lewellyn \(2017\)](#) and [Jirapon and Gleason \(2007\)](#) note that institutional investors have the required knowledge and expertise in monitoring firm performance, thereby limiting discretionary accruals. However, some studies do not find any significant link between them ([Sarkar et al., 2008](#); Siregar and Utama, 2008). Given the differences in institutional settings and ownership structure in emerging economies, we posit that institutional shareholders have more incentives to limit firms' earnings management behavior. This leads us to develop the following hypothesis:

H6. There is a negative relationship between institutional ownership and earnings management.

Similar to the institutional shareholders, foreign shareholding expects to curb earnings management. Foreign investors have the necessary resources and skills to scrutinize the investee firms' corporate reporting choices and policies. [Guo et al. \(2015\)](#) find that greater foreign ownership limits REM in Japanese firms. [Chung et al. \(2004\)](#) note that firms with higher foreign shareholdings in Japan produce credible discretionary accruals. Thus, we propound the following hypothesis:

H7. There is a negative relationship between foreign ownership and earnings management.

Parallel to the ownership structure, the audit committee structure is also critical to earnings management. Auditors perform a watchdog role for investors and provide credible attestation services to uphold their reputation. We consider audit committee size, independence and frequency of audit committee meetings as limiting factors of earnings management. [Choi et al. \(2004\)](#) contend that the audit committee members can enhance financial reporting quality when they possess accounting and financial knowledge. [Rahman and Ali \(2006\)](#) reveal that a larger audit committee tends to have diverse skills to negate earnings misstatements. Thus, we take the following hypothesis:

H8. There is a negative relationship between audit committee size and earnings management.

To continue, the audit committee members need to remain free from the management's undue influence. [Choi et al. \(2004\)](#) find that audit committee members have fewer incentives to uncover earnings management when they hold a firm's share. [Xie et al. \(2003\)](#) find that a negative connection runs between audit committee independence and financial fraud. [Sun](#)

et al. (2014) unearth that the audit committee members' freedom inhibits real earnings manipulation. Thus, we take the following hypothesis:

Manufacturing firms

H9. There is a negative relationship between audit committee independence and earnings management.

Similarly, the audit committee can enhance financial reporting quality when they have frequent meetings and allocate sufficient time to resolve immediate issues (Rahman and Ali, 2006). Xie et al. (2003) unveil that regular audit committee meetings can circumscribe managers' predilection to engage in earnings manipulation. Also, frequent meetings between audit committee members reduce the informational gap between executives and auditors, leading to quick decision-making and proper reporting. Therefore, we take the following hypothesis:

H10. There is a negative relationship between the frequency of audit committee meetings and earnings management.

4. Research methods

4.1 Sample selection

We hand-collect data from the annual reports of all the manufacturing companies listed in the DSE covering the period 2011–2017. Our estimation covers the period 2013–2017 because we need the previous two years' financial information to calculate earnings management proxies. Also, we need the cost of goods sold to detect REM. Therefore, we consider the manufacturing sector, which is the best candidate in this respect. We leave firms that do not have the required financial information. Our data is free of survivorship bias because it contains both old and new generation firms, regardless of their size. In total, our sample covers 110 manufacturing firms (out of 178 firms) with an unbalanced panel. Table 1 shows the industry classification of sample firms.

4.2 Selection of suspect-firm years

Firms suspected of REM are identified in the form of small positive EPS. Firm-years with small positive EPS greater than BDT 0.00 and less than or equal to BDT 2.00 are clustered as suspect EPS (SUS_EPS) firm years. Similarly, firm-years with a small positive return on assets (ROA) greater than 0% and less than or equal to 2% are grouped as suspect ROA (SUS_ROA) firm-years.

Industry	Total firms	Selected firms	(%)
Cement	7	6	85.71
Ceramics	5	5	100
Food and allied	17	12	70.59
Power and fuel	19	12	63.16
Pharmaceuticals and chemicals	30	22	73.33
Textiles	52	28	53.85
Engineering	36	19	52.78
Others	12	6	58.33
Total	178	110	61.80

Table 1.
Industry
classification of
sample firms

Figures 1 and 2 present the evidence of earnings management in terms of EPS and ROA, respectively. The horizontal axis of Figure 1 indicates EPS with an interval of Bangladeshi Taka (BDT) 2 (two) and the vertical axis represents the number of sample firms with a frequency of 50. Figure 1 is constructed for 511 industry years. On the other hand, Figure 2 is built with an interval width of 2% $\geq$ ROA $>$ 0%. The horizontal axis of Figure 2 shows

Figure 1.
EPS-based earnings
management

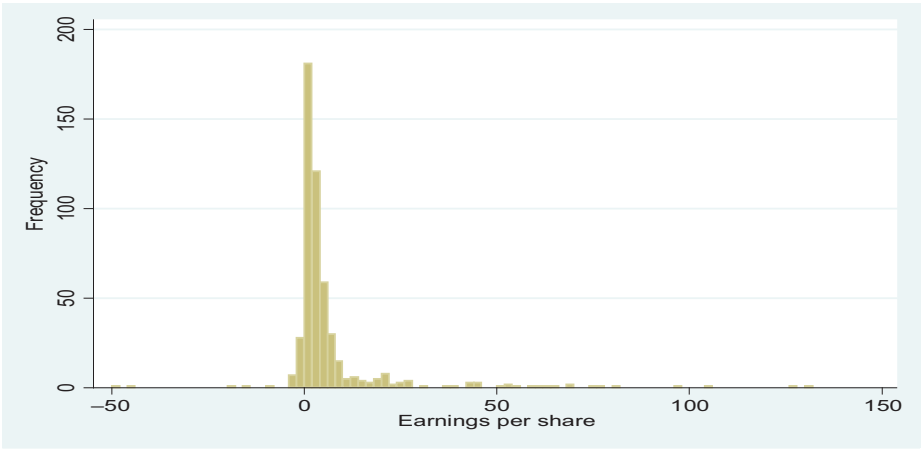
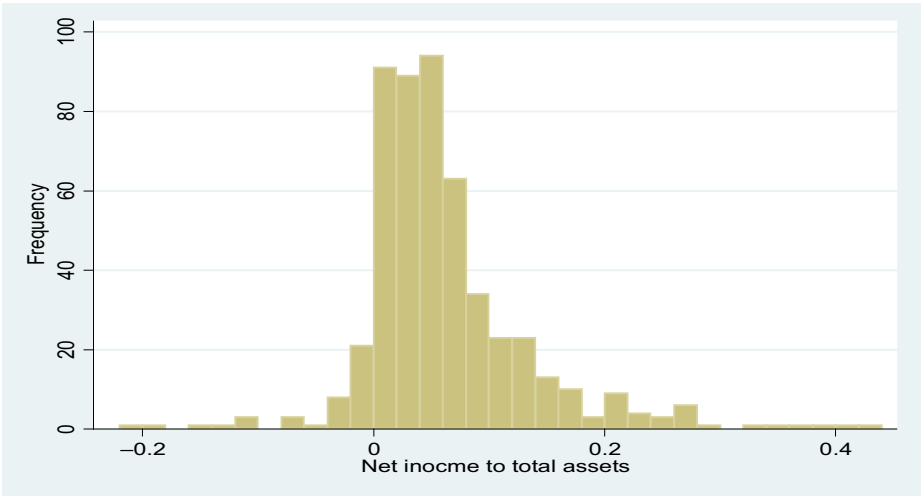


Figure 2.
ROA-based earnings
management



ROA with an interval of 2%, and the vertical axis represents the number of sample firms with a frequency of 20.

As is observed from Figure 1, almost 190 firms appear to be in the place that crosses the zero earnings benchmark by moving from small negative EPS ($0 > \text{EPS} \geq \text{BDT} - 2$) to small positive EPS ($\text{BDT} 2 \geq \text{EPS} > 0$). There are only 25 firms that report small negative EPS. This indicates that most of the firms with a negative EPS near to zero have moved their direction to the immediate right of zero to avoid losses.

Similarly, Figure 2 shows that most of the firms tend to eschew losses by shifting a small negative ROA to the immediate right of the zero of the threshold level ($2\% \geq \text{ROA} > 0\%$) to show earnings positive. All together, Figures 1 and 2 provide evidence that firms having small EPS and ROA above zero are engaged in earnings management. These are the alleged firms for earnings management of this study.

In addition to visual evidence, we examine whether the cross-sectional distributions of EPS and ROA are relatively smooth following the Burgstahler and Dichev (1997). We use standardized differences defined as the differences between the actual number of observations and the expected number of observations within an interval divided by the differences' estimated standard deviation. The expected number of observations in an interval is equal to the average of the two adjacent intervals. This standardized difference approximates a normal distribution with a mean 0 and standard deviation 1 in smooth distribution with no discontinuity. We examine the intervals around the zero benchmark and test whether the interval immediately right or left of zero has a statistically significant positive (actual observations greater than expected) or negative (actual observations lower than expected) standardized differences. We hope that the standardized difference will be significantly positive (negative) in the interval just after (before) zero in the case of discontinuity. The statistical tests confirm our prediction. When we test EPS distribution, we find that the standardized difference for the interval immediately after (before) zero is 23.43 (−14.66), which is statistically significant. We see a qualitatively similar result for ROA distribution. Thus, both histograms and statistical tests confirm discontinuity at zero for EPS and ROA distribution.

4.3 Estimation parameters

Following Dechow *et al.* (1998) and Roychowdhury (2006), we consider three proxies for measuring REM, namely, abnormal cash flow from operations (AB_CFO), abnormal production costs (AB_PROD) and abnormal discretionary expenses (AB_DIS). The following cross-sectional ordinary least square (OLS) model is applied every year to calculate the normal cash flows from operations, production costs and discretionary expenses.

4.3.1 Measuring the normal level of cash flow from operations

$$\text{CFO}_t / \text{TA}_{t-1} = \lambda_0 + \lambda_1 (1 / \text{TA}_{t-1}) + \lambda_2 (S_t / \text{TA}_{t-1}) + \lambda_3 (\Delta S_t / \text{TA}_{t-1}) + \varepsilon_t \quad (1)$$

where CFO = cash from operations, TA = total assets, TA_{t-1} = one year lagged total assets, S = sales revenues, ΔS = changes in sales revenues.

4.3.2 Measuring the normal level of production costs

$$\begin{aligned} \text{PROD}_t / \text{TA}_{t-1} = & \lambda_0 + \lambda_1 (1 / \text{TA}_{t-1}) + \lambda_2 (S_t / \text{TA}_{t-1}) + \lambda_3 (\Delta S_t / \text{TA}_{t-1}) \\ & + \lambda_4 (\Delta S_{t-1} / \text{TA}_{t-1}) + \varepsilon_t \end{aligned} \quad (2)$$

where PROD = production cost. The production cost is calculated as the sum of cost of goods sold (COGS) and inventory changes during the period following Roychowdhury (2006). All other variables are the same as defined in equation (1).

$$\text{DISEXP}_t / \text{TA}_{t-1} = \lambda_0 + \lambda_1(1/\text{TA}_{t-1}) + \lambda_2(\text{S}_{t-1}/\text{TA}_{t-1}) + \varepsilon_t \quad (3)$$

where DISEXP = discretionary expenses during the current period, other variables are the same as defined in [equation \(1\)](#).

The proxies for REM are estimated as a deviation of the normal cash flow from operations from the actual cash flow from operations, normal production costs from the actual production costs and normal discretionary expenses from the actual discretionary expenses sequentially. The suspected firms committing REM are expected to carry negative abnormal cash flow from operations (AB_CFO), positive abnormal production costs (AB_PROD) and negative abnormal discretionary expenses (AB_DIS). To get the combined REM (AB_COMB), we first multiply AB_PROD with minus 1 to read all REM proxies in a similar fashion. Then, we sum all the three proxies of REM to get AB_COMB.

4.3.4 Measuring the normal level of accruals. We determine the normal level of accruals following the cross-sectional [Jones \(1991\)](#) model and previous studies ([Cohen and Zarowin, 2010](#); [Zang, 2012](#); [Alhadab and Nguyen, 2017](#)). To estimate total accruals, the earnings after interests and taxes are deducted from the cash flow from operations following [Hribar and Collins \(2002\)](#). The following cross-sectional OLS model is estimated for each fiscal year to measure the normal level of accruals.

$$\text{ACC}_t / \text{TA}_{t-1} = \lambda_0 + \lambda_1(1/\text{TA}_{t-1}) + \lambda_2(\Delta \text{S}_t / \text{TA}_{t-1}) + \lambda_3(\text{PPE}_{t-1} / \text{TA}_{t-1}) + \varepsilon_t \quad (4)$$

According to [Kaplan \(1985\)](#), the normal level of accruals arising in the ordinary business course is improbable to represent opportunistic managerial behavior. In this case, the abnormal accruals can reflect the manipulation of accounting figures. Thus, to get the abnormal level of accruals (AB_ACC), the normal level of accruals has been deducted from the actual accruals. A positive abnormal accrual (AB_ACC) indicates earnings management. Notably, [Islam et al. \(2011\)](#) find that the modified Jones model is not effective for Bangladeshi firms. However, recent studies adopted the modified Jones model in Bangladesh's context ([Muttakin et al., 2017](#); [Bhuiyan, 2015](#)). Also, it is not logical to generalize that the modified Jones model is ineffective based on a piece of available evidence. Therefore, we adopt the modified Jones model in our study. [Table 2](#) presents the definition and acronyms of the variables.

5. Results and discussion

5.1 Descriptive statistics

[Table 3](#) presents the descriptive statistics of the abnormal REM and AEM estimated from [equations \(1\) to \(4\)](#). As is observed from [Table 3](#), the mean residuals of all estimated variables are nearly close to zero. The minimum and maximum residuals of all estimated variables range from negative to positive figures where AB_PROD has the lowest and highest residuals, reflecting that earnings are likely to be managed by firms.

5.2 Univariate analysis – the presence of real earnings management and accrual-based earnings management

The existence of earnings manipulation through REM and AEM in the year of suspect small positive EPS (SUS_EPS) and small positive ROA (SUS_ROA) is done by group comparison

		Manufacturing firms
Variable	Definition	
$1/TA_{t-1}$	Lagged inverse of total assets	
AB_ACC	Abnormal accruals	
AB_CFO	Abnormal cash flow from operations	
AB_COMB	Aggregate abnormal cash flow from operations, production costs and discretionary expenses	
AB_DIS	Abnormal discretionary expenses	
AB_PROD	Abnormal production costs	
ACC_t	Accruals during the current period	
ACC_t/TA_{t-1}	% of accruals to lagged total assets	
AEM	Accrual earnings management	
$Audind$	% of independent audit committee members to total audit committee members	
$Audmeet$	Number of meetings held by the audit committee	
$Audsize$	Natural logarithm of the number of audit committee members	
$Bdgen$	% of female directors to the board of directors	
$Bdind$	% of independent directors to the board of directors	
$Bdmeet$	Number of meetings held by the board of directors	
$Bdsize$	Natural logarithm of the number of board of directors	
CFO_t	Cash flow from operations during the current period	
CFO_t/TA_{t-1}	Ratio of cash flow from operations to lagged total assets	
$COGS$	Cost of goods sold	
$DISEXP_t$	Discretionary expenses during the current period	
$DISEXP_t/TA_{t-1}$	% of discretionary expenses to lagged total assets	
$Drctown$	% of shares held by the board of directors	
$EAIT_t$	Earnings after interests and taxes	
EPS_t	Earnings per share	
$Frngown$	% of shares held by foreign investors	
$Growth_t$	Difference of current year and previous year sales divided by previous year sales	
$Instown$	% of shares held by the institutions	
PPE/TA_{t-1}	Gross property, plant and equipment during the year t divided by lagged total assets	
$PROD_t$	Production costs during the year t	
$PROD_t/TA_{t-1}$	Ratio of production costs to lagged total assets	
ROA_t	Return on assets, calculated as $EATBEX_t$ scaled by lagged total assets	
REM	Real earnings management	
S_t/TA_{t-1}	% of sales to lagged total assets	
S_{t-1}/TA_{t-1}	Sales during the year $t-1$ divided by lagged total assets	
$\Delta S_t/TA_{t-1}$	Changes in sales during the year t divided by lagged total assets	
$\Delta S_{t-1}/TA_{t-1}$	Changes in sales during the year $t-1$ divided by lagged total assets	
$SIZE_t$	Natural logarithm of total assets	
SUS_EPS_t	An indicator variable scored one if small positive EPS is greater than BDT 0.00 but less than BDT 2.00 and zero otherwise	
SUS_ROA_t	An indicator variable scored one if the small positive ROA is greater than 0% but less than 2% and zero otherwise	
TA_t	Total assets	
TA_{t-1}	Lagged total assets	

Table 2.
Variable definition

analysis, using the mean and median proxies for REM and AEM across the SUS_EPS and SUS_ROA firm-years and rest of the sample.

5.2.1 Firms suspected of earnings management in the form of small positive earnings per share (SUS_EPS). SUS_EPS firm-years represent firm-years observations with small positive EPS greater than BDT 0.00 but less than or equal to BDT 2.00, where the rest of the sample represents firm-years observations EPS that are less than BDT 0.00 or greater than BDT 2.00. Table 4 provides that the mean (median) residuals of AB_CFO are -0.0132

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(−0.0108) for the suspect group, which is lower and significantly different from the mean (median) residuals of AB_CFO, 0.0071 (0.0013) for the rest of the sample. This result supports that the suspected firms with small positive EPS are engaged in REM by producing less AB_CFO. The evidence of REM is also documented in the measurement of aggregate REM (AB_COMB). This result is in line with the findings of [Bhuiyan \(2015\)](#).

Besides, [Table 4](#) provides evidence that the mean (median) residuals of AB_ACC are 0.0099 (0.0136) for the suspect group, which is significantly different from the mean (median) residuals of AB_ACC −0.0054 (−0.0004) for the rest of the samples, implying that firm years that have small positive EPS involve in loss avoiding AEM. However, the mean (median) residuals of AB_PROD and AB_DIS for the SUS_EPS group are found not to be

Table 3.
Descriptive statistics for proxies of earnings management (REM and AEM): residuals from [equations \(1\) to \(4\)](#)

Variables	Obs	Mean	SD	Min	Max
AB_CFO	511	0.0000	0.0967	−0.3585	0.9803
AB_PROD	511	0.0000	0.1760	−2.2290	2.2553
AB_DIS	511	0.0000	0.0556	−0.2300	0.2492
AB_COMB	511	0.0000	0.2370	−2.300	2.2388
AB_ACC	511	0.0000	0.0881	−0.8011	0.3596

Table 4.
A comparison of suspect firm-years in the form of small positive EPS (SUS_EPS) with the rest of the sample

Variables	SUS_EPS firm years		Rest of the sample		Difference	
	Mean	Median	Mean	Median	Means (<i>t</i> -statistics)	Medians (<i>z</i> -statistics)
AB_CFO	−0.0132	−0.0108	0.0071	0.0013	−0.0203** (−2.29)	−0.0121** (−2.28)
AB_PROD	0.0118	0.0050	−0.0064	−0.0024	0.0182 (1.12)	0.0074 (1.62)
AB_DIS	−0.0023	−0.0045	0.0013	−0.0019	−0.0036 (−0.70)	−0.0026 (−0.97)
AB_COMB	−0.0274	−0.0300	0.0149	0.0145	−0.0423** (−1.93)	−0.0445** (−2.28)
AB_ACC	0.0099	0.0136	−0.0054	−0.0004	0.0153** (1.89)	0.014* (1.57)

Notes: **Significant at 5% level, *significant at 10% level, two-tailed. The *t*-statistics (in parenthesis) are obtained from the two-group comparison test and *z*-statistics (in parenthesis) are obtained from the Wilcoxon rank-sum test

Table 5.
A comparison of suspect firm-years in the form of small positive ROA (SUS_ROA) with the rest of the sample

Variables	SUS_ROA firm-years		Rest of the sample		Difference	
	Mean	Median	Mean	Median	Means (<i>t</i> -statistics)	Medians (<i>z</i> -statistics)
AB_CFO	−0.0291	−0.0213	0.0063	0.0018	−0.0354*** (−3.19)	−0.0231*** (−3.32)
AB_PROD	−0.0034	0.0080	0.0007	−0.0018	−0.0041 (−0.20)	0.0098** (1.98)
AB_DIS	−0.0012	−0.0040	0.0053	−0.0013	−0.0065 (−1.01)	−0.0027 (−1.01)
AB_COMB	−0.0203	−0.0345	0.0044	0.0141	−0.0247 (−0.90)	−0.0486*** (−2.8)
AB_ACC	0.0076	0.0056	−0.0016	0.0043	0.0092 (0.91)	0.0013 (0.14)

Notes: ***Significant at 1% level, **significant at 5% level, two-tailed. The *t*-statistics (in parenthesis) are obtained from the two-group comparison test and *z*-statistics (in parenthesis) are obtained from the Wilcoxon rank-sum test

significantly different from that of the rest of the samples, indicating that managers do not alter COGS and discretionary expenses as a tool for REM. Manufacturing firms

5.2.2 *Firms suspected of earnings management in the form of a small positive return on assets (SUS_ROA).* Table 5 presents the mean (median) residuals differences of SUS_ROA firm-years showing small positive ROA that are greater than 0% but less than or equal to 2% compared to the rest of the sample firm-years. Table 5 provides evidence that the mean (median) residuals of AB_CFO, $-0.0291(-0.0213)$ for the suspect group, is much lower and significantly different from the mean (median) residuals of AB_CFO $0.0063(0.0018)$ for the rest of the sample. This result indicates that firm-years with small positive ROA are engaged in REM to avoid losses. Besides, the median aggregate REM (AB_COMB) for the suspect group (-0.0345) is found to be much lower and significantly different from that (median 0.0141) of the rest of the samples, indicating the presence of REM. Moreover, the difference between suspect firms and the rest of the sample firms in terms of median abnormal production cost ($0.0098, 0.0080$) is statistically significant, suggesting that suspect firms are involved in REM. However, the mean (median) residuals of AB_DIS and AB_ACC between the suspect ROA group and the rest of the samples do not confirm the presence of REM or AEM.

5.3 Multivariate analysis – the presence of real earnings management and accrual-based earnings management

We apply the pooled OLS model after controlling the firm-specific variables and estimate the t -statistics using robust standard errors to investigate the true presence of REM and AEM. The proxies for REM and AEM are assumed to be exogenous in this study following Gunny (2010). We estimate equation (5) to investigate whether the firm-years that are involved in the REM are significantly different from that of the rest of the samples.

$$\begin{aligned} AB_REM_t = & \beta_0 + \beta_1 ROA_t + \beta_2 SIZE_t + \beta_3 Growth_t + \beta_4 Suspect_IN_t \\ & + \sum_{N=1}^n \beta_N Year \text{ dummies} + \varepsilon_t \end{aligned} \quad (5)$$

where AB_REM represents all the proxies of REM used in the study. The regression is invoked on both SUS_EPS and SUS_ROA, considering that they are mutually exclusive. The control variables are defined in Table 2. Similarly, to examine the firm-years that are involved in AEM, equation (6) is estimated:

Variables	AB_CFO _t	AB_PROD _t	AB_DIS _t	AB_COMB _t	AB_ACC _t	ROA _t	SIZE _t
AB_PROD _t	-0.215***	1					
AB_DIS _t	0.029	-0.262***	1				
AB_COMB _t	0.5741***	-0.792***	0.441***	1			
AB_ACC _t	-0.774***	0.094**	-0.028	-0.392***	1		
ROA _t	0.369***	-0.169***	0.083*	0.2953***	-0.019	1	
SIZE _t	0.042	-0.062	0.042	0.073	0.048	0.226***	1
GROWTH _t	0.013	-0.015	-0.018	0.012	0.057	0.222***	0.06

Notes: ***Significant at 1% level, **significant at 5% level, *significant at 10% level, two-tailed

Table 6.
Correlation matrix

$$AB_AEM_t = \beta_0 + \beta_1 ROA_t + \beta_2 SIZE_t + \beta_3 Growth_t + \beta_4 Suspect_IN_t + \sum_{N=1}^n \beta_N Year\ dummies + \varepsilon_t$$

(6)

where AB_AEM represents the only proxy of AEM used in the study.

5.3.1 *Correlation results.* Table 6 does not show a multicollinearity problem. Table 6 depicts that AB_CFO_t and AB_COMB_t are positively correlated with ROA_t. However, AB_PROD_t is negatively correlated with ROA_t at the 1% significance level. Between the REM and AEM proxies, AB_CFO_t is significantly and negatively correlated to AB_PROD_t and AB_ACC_t, which is consistent with prior studies (Roychowdhury, 2006; Zang, 2012; Bhuiyan, 2015). By contrast, AB_PROD_t has a robust negative connection with AB_DIS_t, implying that Bangladeshi firms are engaged in REM activities either by increasing abnormal production costs or reducing discretionary expenses.

5.4 Multivariate analysis-regression results

5.4.1 *Firm-years reporting small positive earnings per share without control variables.* Table 7 shows the results of pooled cross-sectional regressions for the three proxies of REM, one proxy of aggregate REM and one proxy of AEM on SUS_EPS firm-years without controlling systematic variations. Table 7 reveals that AB_CFO is negatively correlated to SUS_EPS and statistically significant at the 5% level. This implies that managers are engaged in REM in the form of sales manipulation. This result supports the findings of Roychowdhury (2006), Woodhouse and Mather (2013) and Bhuiyan (2015). On the other hand, AB_ACC_t is found to be significantly associated with SUS_EPS, indicating that firms with small positive EPS are engaged in higher levels of AEM. This finding approves the previous results of Coulton et al. (2005). It also supports the fraud triangle theory in that the earnings-based loan covenants set by Bangladeshi banks compel firms to eschew losses by exploiting the loopholes embedded in GAAP or IFRS.

5.4.2 *Firm-years reporting small positive return on assets without control variables.* Table 8 presents the regression results for the suspected firms with small positive ROA (SUS_ROA). We find that AB_CFO is statistically significant at the 1% level. The coefficient parameter on the SUS_ROA implies that managers are engaged in the REM (sales manipulation). However, no significant link is traced between dependent variables (AB_PROD, AB_DIS, AB_COMB and AB_ACC) and SUS_ROA.

Table 7.
Pooled cross-sectional regressions regarding abnormal residuals in the form of small positive EPS immediately above the earnings threshold: a comparison between suspect firm-years and the rest of the sample

Variables	Model 1 AB_CFO _t	Model 2 AB_PROD _t	Model 3 AB_DIS _t	Model 4 AB_COMB _t	Model 5 AB_ACC _t
Intercept	0.0070 (0.85)	−0.0063 (−0.57)	0.0012 (0.20)	0.0145 (0.78)	−0.0053 (−0.67)
SUS_EPS _t	−0.0204** (−2.51)	0.0183 (0.92)	−0.0036 (−0.83)	−0.0423* (−1.76)	0.0154** (2.02)
Year dummies	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0.0202	0.0125	0.0110	0.0173	0.0170
No. of observations	511	511	511	511	511
Notes: **Significant at 5% level, *significant at 10% level, two-tailed. The <i>t</i> -statistics (in parenthesis) are measured using robust standard errors clustered at the firm level					

5.4.3 *Firm-years reporting small positive earnings per share with control variables.* Table 9 presents regression results for the suspected firms with small positive EPS (SUS_EPS) after controlling firm size, profitability and sales growth. Table 9 confirms that firms with small positive EPS are engaged in higher levels of AB_ACC using managerial discretions embedded in GAAP or IFRS. This finding is consistent with Coulton *et al.* (2005) and Hansen (2010). However, Table 9 does not reveal any significant link between SUS_EPS and REM. Among the control variables, firms' profitability and sales growth are found to be significantly connected with REM.

5.4.4 *Firm-years reporting small positive return on assets with control variables.* Table 10 presents the suspected firms' regression results with small positive ROA (SUS_ROA) after controlling the firm-specific variables. Table 10 reveals that firms with small positive ROA are involved with REM by cooking discretionary expenses (AB_DIS). This result approves the previous result of Roychowdhury (2006) and Cohen and Zarowin (2010). However, Table 10 does not seal any link between SUS_ROA and other measures of REM and AEM.

5.5 Multivariate analysis – the effects of governance elements on earnings management

To test the impact of corporate governance factors on REM and AEM, the following regression is estimated:

Table 8.

Pooled cross-sectional regressions regarding abnormal residuals in the form of small positive ROA immediately above the earnings threshold: a comparison between suspect firm-years and the rest of the sample

Variables	Model 1 AB_CFO _t	Model 2 AB_PROD _t	Model 3 AB_DIS _t	Model 4 AB_COMB _t	Model 5 AB_ACC _t
Intercept	0.0069 (0.88)	0.0008 (0.08)	−0.0013 (−0.22)	0.0049 (0.28)	−0.0018 (−0.24)
SUS_ROA _t	−0.0355*** (−4.03)	−0.0042 (−0.15)	−0.0065 (−1.27)	−0.0248 (−0.79)	0.0093 (1.04)
Year dummies	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0.0297	0.0101	0.0120	0.0116	0.0116
No. of observations	511	511	511	511	511

Notes: **Significant at 5% level, *significant at 10% level, two-tailed. The *t*-statistics (in parenthesis) are measured using robust standard errors clustered at the firm level

Variables	Model 1 AB_CFO _t	Model 2 AB_PROD _t	Model 3 AB_DIS _t	Model 4 AB_COMB _t	Model 5 AB_ACC _t
Intercept	−0.0070 (−0.30)	0.0480 (1.62)	−0.0105 (−0.78)	−0.0655 (−1.35)	−0.0385 (−1.63)
SUS_EPS _t	−0.0021 (−0.27)	0.0003 (0.02)	−0.0004 (−0.09)	−0.0028 (−0.12)	0.0170** (2.19)
ROA _t	0.5251*** (5.40)	−0.4087*** (−5.25)	0.0655 (1.29)	0.9993*** (7.57)	−0.0299 (−0.32)
SIZE _t	−0.0031 (−1.14)	−0.0029 (−0.75)	0.0009 (0.64)	0.0008 (0.13)	0.0042 (1.57)
Growth _t	−0.0172* (−1.76)	0.0105 (0.88)	−0.0052 (−1.14)	−0.0329* (−1.78)	0.0123 (1.18)
Year dummies	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0.1436	0.0296	0.0100	0.0905	0.0249
No of observations	511	511	511	511	511

Notes: ***Significant at 1% level, **significant at 5% level, *significant at 10% level, two-tailed. The *t*-statistics (in parenthesis) are measured using robust standard errors clustered at the firm level

Table 9.

Pooled cross-sectional regressions regarding abnormal residuals in the form of small positive EPS immediately above the earnings threshold

JFRA

$$Y_t = \beta_0 + \beta_1 Bsize_t + \beta_2 Bdmeet_t + \beta_3 Bbind_t + \beta_4 Bdgen_t + \beta_5 Drctown_t + \beta_6 Instown_t + \beta_7 Frgnown_t + \beta_8 Audsize_t + \beta_9 Audmeet_t + \beta_{10} Audind_t + \beta_{11} SUS_ROA_t + \beta_{12} ROA_t + \beta_{13} SIZE_t + \beta_{14} Growth_t + \varepsilon_t$$

(7)

where the dependent variable Y represents the proxies of REM and AEM. The corporate governance factors and control variables are the same as defined in Table 2.

Table 10.
Pooled cross-sectional regressions regarding abnormal residuals in the form of small positive ROA immediately above the earnings threshold

Variables	Model 1 AB_CFO _t	Model 2 AB_PROD _t	Model 3 AB_DIS _t	Model 4 AB_COMB _t	Model 5 AB_ACC _t
Intercept	−0.0077 (−0.35)	0.0577* (1.68)	−0.0142 (−1.22)	−0.0797 (−1.61)	−0.0257 (−1.18)
SUS_ROA _t	−0.0039 (−0.41)	−0.0340 (−1.16)	−0.0122** (−2.27)	0.0422 (1.29)	0.0075 (0.74)
ROA _t	0.5211*** (5.03)	−0.4713*** (−5.52)	0.0884* (1.63)	1.0808*** (7.58)	−0.0422 (−0.42)
SIZE _t	−0.0030 (−1.11)	−0.0028 (−0.64)	0.0008 (0.67)	0.0008 (0.12)	0.0032 (1.26)
Growth _t	−0.0171* (−1.74)	0.0128 (1.04)	−0.0061 (−1.31)	−0.0361* (−1.91)	0.0135 (1.26)
Year dummies	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0.1437	0.0345	0.0151	0.0946	0.0182
No of observations	511	511	511	511	511

Notes: ***Significant at 1% level, **significant at 5% level, *significant at 10% level, two-tailed. The *t*-statistics (in parenthesis) are measured using robust standard errors clustered at the firm level

Table 11.
Corporate governance and REM

Variables	Model 1 Board structure	Model 2 Ownership structure	Model 3 Audit committee characteristics	Model 4 Corporate governance
Intercept	−0.2546*** (−3.31)	−0.0159 (−1.29)	−0.0945 (−1.31)	−0.1597* (−2.26)
Bsize _t	0.0847* (1.66)			0.0883* (1.85)
Bdmeet _t	0.0005 (0.28)			0.0014 (0.93)
Bbind _t	0.1130 (1.11)			0.1110 (1.08)
Bdgen _t	0.0179 (0.27)			0.0546 (0.88)
Drctown _t		−0.0004 (−1.44)		−0.0007** (−2.29)
Instown _t		0.0001*** (5.55)		0.0001*** (5.07)
Frgnown _t		0.0022*** (2.61)		0.0022** (2.44)
Audsize _t			0.0169 (0.31)	−0.0001 (−0.01)
Audmeet _t			0.0042 (0.95)	−0.0016 (−0.36)
Audind _t			−0.0308 (−0.59)	−0.0540 (−1.08)
SUS_ROA _t	0.0365 (0.75)	0.036 (0.81)	0.0398 (0.82)	0.0334 (0.73)
ROA _t	1.0180*** (3.84)	0.7043*** (2.77)	1.0175*** (3.86)	0.6604** (2.54)
SIZE _t	−0.0013 (−0.37)	−0.0039** (−2.38)	0.0003 (0.12)	−0.0085 (−2.75)
Growth _t	−0.0289 (−1.46)	−0.0084 (−0.46)	−0.0366 (−1.26)	−0.0134 (−0.77)
Year dummies	Yes	Yes	Yes	Yes
Adjusted R ²	0.1022	0.1279	0.0963	0.1389
No. of observations	508	507	511	505

Notes: ***Significant at 1% level, **significant at 5% level, *significant at 10% level, two-tailed. The *t*-statistics (in parenthesis) are measured using robust standard errors clustered at the firm level

5.5.1 Regressions results for real earnings management and corporate governance factors. Table 11 presents regression output between REM (the combination of AB-CFO, AB_PROD and AB_DIS) and governance factors. Models 1–3 show the separate effects of governance mechanisms such as board structure, ownership structure and audit committee characteristics. Model 4 studies the collective impact of all governance factors on REM. Table 11 shows that board size (Bsize) is significant in curbing REM. This result supports the previous findings of Zahra and Pearce (1989) but disapproves of Xie *et al.* (2003) and Peasnell *et al.* (2005).

In the ownership structure, institutional and foreign ownership factors are found to be positive and significant in reducing the REM. This positive relationship suggests that firms with more institutional ownership (Instown) and foreign ownership (Frgnwn) can restrict REM. This result is consistent with the previous results of Roychowdhury (2006) and Jirapon and Gleason (2007) for institutional ownership and Chung *et al.* (2004) and Guo *et al.* (2015) for foreign ownership. By contrast, director ownership tends to encourage REM. We do not find any significant connection for the remaining governance variables such as board meetings, board independence, board gender, audit size, audit meeting and audit independence with REM. For the control variables, we find that factors such as firm size impact REM. We have checked the robustness of our results by introducing SUS_EPS and leverage in the regression models. However, the central tenants of the findings remain unchanged. To minimize the paper's size, we do not include those results, but they would be available on request.

5.5.2 Regressions results for accrual-based earnings management and corporate governance factors. Table 12 provides regression results with abnormal accruals (AB_ACC). Models 1–3 of Table 12 show the separate effects of governance mechanisms, while Model 4 presents the combined impact of all governance factors on AEM. Table 12 shows that

	Model 1	Model 2	Model 3	Model 4
Variables	Board structure	Ownership structure	Audit committee characteristics	Corporate governance
Intercept	0.0284 (0.68)	−0.0349** (−2.22)	−0.0099 (−0.44)	0.0080 (0.20)
Bsize _t	−0.0255* (−1.70)			−0.0202 (−1.11)
Bdmeet _t	0.0009 (1.10)			0.0008 (1.14)
Bdind _t	−0.0740 (−0.88)			−0.0605 (−0.69)
Bdgen _t	0.0226 (1.08)			0.0183 (0.85)
Drctrown _t		−0.0001 (−0.25)		0.0001 (0.27)
Instown _t		−0.0001*** (−3.63)		−0.0001*** (−2.75)
Frgnwn _t		−0.0005 (−1.22)		−0.0003 (−0.78)
Audsize _t			−0.0038 (−0.39)	0.0021 (0.23)
Audmeet _t			−0.0034 (−1.50)	−0.0022 (−1.10)
Audind _t			−0.0106 (−0.23)	0.0022 (0.08)
SUS_ROA _t	0.0079 (0.69)	0.0083 (0.75)	0.0086 (0.85)	0.0091 (0.86)
ROA _t	−0.0375 (−0.43)	0.0207 (0.17)	−0.0492 (−0.58)	−0.0040 (−0.03)
SIZE _t	0.0035** (2.09)	0.0045*** (2.81)	0.0036*** (2.59)	0.0048*** (3.79)
Growth _t	0.0141 (1.35)	0.0109 (0.97)	0.0129 (1.22)	0.0119 (0.99)
Year dummies	Yes	Yes	Yes	Yes
Adjusted R ²	0.0222	0.0188	0.0142	0.0306
No. of observations	508	507	511	505

Notes: ***Significant at 1% level, **significant at 5% level, *significant at 10% level, two-tailed. The *t*-statistics (in parenthesis) are measured using robust standard errors clustered at the firm level

Manufacturing firms

Table 12.
Corporate governance and AEM

Table 13.
Pooled cross-sectional regressions regarding abnormal residuals in the form of small positive EPS immediately above the earnings threshold

institutional ownership (Instown) lowers abnormal accruals. Although the board size inhibits AEM individually, such impact disappears when all the governance variables are taken into account, indicating that board size is not an effective tool in controlling AEM. We do not find any significant connection between AEM and the reaming governance factors either individually or in a joint sitting. Presumably, this may be grounded in managerial hegemony theory that argues a board could be ineffective in monitoring managers' myopic behavior when management dominance over the board matters (Rahman and Ali, 2006). As a whole, our result suggests that policymakers should carefully review the corporate governance elements to control the exercise of AEM.

5.6 Robustness check

We check the robustness of our estimates by introducing leverage and audit quality as additional control variables to equation (5). Leverage is measured as total liabilities divided by total assets, and audit quality is a binary variable that equals 1 if the Big-4 auditor audit the firm, otherwise 0. Tables 13–14 demonstrate the regression results with SUS_EPS and

Variables	Model 1 AB_CFO _t	Model 2 AB_PROD _t	Model 3 AB_DIS _t	Model 4 AB_COMB _t	Model 5 AB_ACC _t
Intercept	−0.0068 (−0.28)	0.0305 (1.02)	−0.0003 (−0.02)	−0.0376 (−0.75)	−0.0430* (−1.73)
SUS_EPS _t	−0.0025 (−0.33)	−0.0005 (−0.03)	−0.0002 (−0.04)	−0.0022 (−0.10)	0.0170** (2.18)
ROA _t	0.5155*** (4.99)	−0.3858*** (−4.92)	0.0472 (0.89)	0.9485*** (6.90)	−0.0210 (−0.21)
SIZE _t	−0.0028 (−1.00)	−0.0001 (−0.03)	−0.0006 (−0.39)	−0.0033 (−0.54)	0.0049* (1.74)
Growth _t	−0.0168* (−1.71)	0.0096 (0.81)	−0.0045 (−0.97)	−0.0309* (−1.69)	0.0121 (1.14)
Leverage _t	−0.0090*** (−3.02)	−0.0048 (−1.27)	−0.0020** (−2.18)	−0.0063 (−1.16)	0.0016 (0.84)
Auditor _t	0.0009 (0.07)	−0.0291** (−2.25)	0.0173** (2.32)	0.0473** (2.03)	−0.0078 (−0.66)
Year dummies	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0.1468	0.0333	0.0204	0.0953	0.0359
No of observations	511	511	511	511	511

Notes: ***Significant at 1% level, **significant at 5% level, *significant at 10% level, two-tailed. The *t*-statistics (in parenthesis) are measured using robust standard errors clustered at the firm level

Table 14.
Pooled cross-sectional regressions regarding abnormal residuals in the form of small positive ROA immediately above the earnings threshold

Variables	Model 1 AB_CFO _t	Model 2 AB_PROD _t	Model 3 AB_DIS _t	Model 4 AB_COMB _t	Model 5 AB_ACC _t
Intercept	−0.0082 (−0.35)	0.0399 (1.17)	−0.0040 (−0.32)	−0.0521 (−1.02)	−0.0308 (−1.33)
SUS_ROA _t	−0.0027 (−0.28)	−0.0327 (−1.11)	−0.0120** (−2.23)	0.0420 (1.28)	0.0076 (0.75)
ROA _t	0.5145*** (4.68)	−0.4442*** (−5.14)	0.0692 (1.23)	1.0278*** (6.93)	−0.0330 (−0.31)
SIZE _t	−0.0027 (−0.97)	−0.0001 (−0.03)	−0.0006 (−0.39)	−0.0031 (−0.50)	0.0040 (1.48)
Growth _t	−0.0169* (−1.70)	0.0118 (0.96)	−0.0053 (−1.13)	−0.0340* (−1.83)	0.0131 (1.22)
Leverage _t	−0.0088*** (−2.96)	−0.0032 (−1.22)	−0.0026*** (−2.80)	−0.0083* (−1.79)	0.0008 (0.40)
Auditor _t	0.0010 (0.08)	−0.0282** (−2.14)	0.0170** (2.28)	0.0462** (1.97)	−0.0084 (−0.71)
Year dummies	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0.1468	0.0378	0.0264	0.0993	0.0292
No of observations	511	511	511	511	511

Note: ***Significant at 1% level, **significant at 5% level, *significant at 10% level, two-tailed. The *t*-statistics (in parenthesis) are measured using robust standard errors clustered at the firm level

SUS_ROA, respectively. As shown in Table 13, firms with small positive EPS are engaged in higher levels of AEM. Similarly, Table 14 reveals that firms with small positive ROA manipulate discretionary expenses (AB_DIS) to eschew losses. This result is consistent with the results obtained in Tables 9–10. Therefore, the impact of leverage and audit quality does not drive our main results. Similarly, we have checked the robustness of our estimates using SUS_EPS, leverage and audit quality to equation (7) and find no significant difference with our main results. These results would be available on request.

6. Conclusion

We study whether the manufacturing firms in emerging economies such as Bangladesh are involved in real and AEM. Simultaneously, we investigate the monitoring role of governance mechanisms in curbing such earnings management behavior. In doing so, we adopt the REM model developed by Dechow *et al.* (1998) and implemented by Roychowdhury (2006) and the AEM model advocated by Jones (1991). Our sample consists of 110 manufacturing firms listed in the DSE over 2013–2017.

We find that firms with small positive EPS are involved in loss-avoiding AEM. This result remains consistent after controlling the systematic variations. This finding is in line with the findings of Coulton *et al.* (2005) and Hansen (2010). The univariate analysis documents that firms are involved with REM in terms of producing less AB_CFO and incurring higher AB_PROD. However, when the systematic variation is controlled, firms with small positive ROA are found to be engaged in REM in the form of reducing AB_DIS. This result is consistent with the previous results of Roychowdhury (2006) and Cohen and Zarowin (2010), which show firms reduce discretionary expenses to achieve a certain income-increasing earnings threshold.

As for governance factors, we find that the institutional shareholders play a significant role in limiting both REM and AEM. Also, factors such as foreign ownership and board size significantly inhibit REM, whereas director ownership encourages the same. However, we do not reveal any significant monitoring role for other governance factors such as board meetings, board independence, board gender, director ownership, audit committee size, audit committee meeting and audit committee independence in curbing either REM or AEM by Bangladeshi firms. The results of this study suggest that a close review of the current governance mechanisms is indeed essential to stop the proliferation of managers' mischievous behavior, thereby heightening investors' confidence.

However, our study is not free of certain limitations. First, some of the sample firms included in the study changed their accounting period from January–December to July–June due to compliance with the new guidelines. We keep those firms to increase the sample size. Second, following Bhuiyan (2015), we considered EPS at BDT 2 and ROA at a 2% interval level to identify firms engaged in earnings manipulation. A different threshold level of EPS and ROA can produce inconsistent results. Also, the results may vary between family and non-family firms. We leave these issues as avenues for future research.

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Further reading

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