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Real earnings management in family firms: Evidence from an emerging economy☆

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We examine the relationship between family ownership and real earnings management in an emerging economy context, Bangladesh. Existing literature reports evidence of minority expropriations by the controlling shareholders in weaker investor protection environments. Based on that argument, we hypothesize and provide evidence that family firms in Bangladesh engage in more real earnings management (REMs) compared to non-family firms during the period 2006-2011. Moreover, we obtain evidence of existence of curvilinear relationships between family ownership and REMs. In Bangladesh, family firms manifest higher level of REMs at a relatively earlier stage of ownership concentration and this pattern reverses once family ownership passes a certain ownership threshold. In addition, we also provide evidence that REMs are associated with lower future performance.

1. Introduction

Prior studies examine earnings quality of family firms focusing on accruals earnings management (Ali et al., 2007; Ding et al., 2011; Fan and Wong, 2002; Wang, 2006). Graham et al. (2005) provide evidence that managers prefer real earnings management (REMs) activities compared to accrual-based earnings management. Roychowdhury (2006) finds that firms use multiple REMs tools in order to meet certain financial reporting benchmarks to avoid reporting annual losses. Surprisingly, there is a paucity of research on family firms' engagement in REMs despite the fact that family firms offer an interesting experimental setting for the investigation of REMs engagement. On the one hand, it may be argued that the activities that result in REMs are more easily facilitated in family firms. On the other hand, the potential adverse effect of deviating from regular operational and investment activities may act as a deterrent to REMs in family firms.

A recent study by Achleintner et al. (2014) in the German context provides evidence that family firms are less likely to engage in REMs, which is perhaps indicative of the fact that family owners are less likely to jeopardize the long term prospects of their investments in the firms. However, this finding may not be generalizable in contexts that substantially differ from Germany. On the other hand, it has also be shown that insiders are more likely to engage in earnings management to facilitate their private benefit consumptions in weaker investors' protection regime (Leuz et al., 2003). Hence, the issue of REMs in family firms in a weaker investor protection environment merits empirical investigation. Accordingly, we examine whether family firms engage in REMs in Bangladesh. Further, we examine whether a curvilinear relationship exists between family ownership and the level of REMs and whether engaging in REMs results in lower future profitability or not in the Bangladesh context.

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Extant literature observes contrasting findings with regard to earnings quality in family firms. One strand of research argues that family firms demonstrate better earnings quality compared to non-family firms (Ali et al., 2007; Wang, 2006), while Claessens et al. (2002) and Fan and Wong (2002) contend that family firms generally have lower quality accounting information. This lack of generalizability of the findings on earnings quality in family firms mostly revolves around the accruals earnings management measurements. However, there is evidence that earnings management is not limited to accruals management only but may involve real earnings management (Cohen et al., 2008; Cohen and Zarowin, 2010; Graham et al., 2005; Gunny, 2010; Roychowdhury, 2006; Zang, 2012). Real earning management (REMs) involves manipulation of real activities to meet some earnings benchmark that may result in sub-optimization of firm's resources. REMs has its impact on firm's cash flows (Roychowdhury, 2006) and it is less susceptible to external scrutiny.

Family firms offer an interesting avenue for investigation of REMs. Family owners are often active managers in the firms (Anderson and Reeb, 2003), and hence, may enjoy greater latitude in altering regular operational and investment activities. Such actions are less likely to be contested by the professional managers since they serve the family interests (DeAngelo and DeAngelo, 2000). Accordingly, the REMs, achieved through alteration of regular operational and investment decisions, may turn out to be a more convenient option for family firms. However, this facilitation may be negated by the concern for potential adverse impact of REMs (Cohen and Zarowin, 2010; Graham et al., 2005; Roychowdhury, 2006). Family owners are less likely to manifest myopic and value decreasing actions due to their long run investment horizon in family firms (Stein, 1989). As such, the issue of REMs in family firms is a compelling one to examine empirically. Despite this, REMs in family firms is heavily under researched.

The issue of REMs in family firms may be of greater interest in weaker investor protection regimes. The poor legal protection for investors has been found to be positively related to poor quality reported earnings (Leuz et al., 2003). Insiders are more likely to acquire private benefits in such environment and this in turn induces them to manage earnings to conceal their activities (Leuz et al., 2003). The question of REMs in family firms becomes even more intriguing under such circumstance. Our study is carried out in a developing economic context, namely Bangladesh, which bears the characteristics of having a relatively weaker investor protection regime including underdeveloped capital markets (Siddiqui, 2010). With the dominant presence of family ownership (Farooque et al., 2007a; Muttakin et al., 2014; World Bank, 2009), the possibilities of private rent seeking activities of family owners are higher with the existing frailties in Bangladesh's governance environment. Hence, the question of REMs in family firms in the context of Bangladesh is worthy of examination.

Moreover, the Bangladesh Securities Exchange Commission (BSEC) makes it mandatory for the sponsors/promoters and directors of listed companies to hold 30% of total paid-up share capital in aggregate (Bangladesh Securities and Exchange Commission, 2011). Most of the sponsor directors in listed companies of Bangladesh belong to families that hold controlling shares in those companies (World Bank, 2009). Accordingly, the BSEC's decision will likely result in higher concentration of ownership in the hands of controlling families. Moreover, this stipulation should result in long-term investment horizon since the cumulative equity holdings by the sponsors/promoters and directors are required to be at least 30% at all times. Given the fact that the consequence of concentrated ownership on firms' earnings management remains unexplored in Bangladesh, the finding of our study provides an ex-ante analysis of this mandated ownership with regard to the impact of family ownership concentration on REMs.

The extant literature on family firms provides evidence that family ownership has non-monotonic relationship with accruals earnings management (Wang, 2006). Wang (2006) documents that there remains a nonlinear or curvilinear relationship between family ownership and earnings quality measured by abnormal accruals. This supports his argument that earnings management in family firms is an empirical issue since it depends on the relative influence of alignment and entrenchment effects. In a similar vein, we argue that the magnitude of REMs in family firms may also exhibit a curvilinear pattern. Interestingly, to date no study attempts to explore the curvilinear relationship between family ownership and REMs. Our study makes an effort to fill this gap through investigating the nonlinearity of the relationship between family ownership and REMs in a developing economic context.

Modifications to regular operational and investment activities are argued to have negative consequences if resulting from opportunistic managerial actions (Cohen and Zarowin, 2010; Graham et al., 2005; Roychowdhury, 2006). However, these modifications may not always bring negative future consequences if such modifications are the outcomes of efficient managerial actions (Gunny, 2010). We hypothesize that the modifications of activities are more likely to be the effect of opportunistic managerial actions in Bangladesh. Given the competing arguments in the extant literature, the consequences of engaging in REMs is worthy of investigation.

Our study contributes to the literature in several ways. First, the issue of REMs in family firms is heavily under researched. Apart from the study by Achleintner et al. (2014) in a developed country context, most of the earnings management study of family firms address the accruals earnings management. Hence, our study contributes to the scant literature of REMs in family firms. The findings of our study suggest that family firms are found to engage in REMs more than the non-family firms in Bangladesh. This finding is in contrast to that of Achleintner et al. (2014) and the deviance of findings is perhaps due to the contextual difference of the two studies. Our findings provide evidence on REMs in family firms in a developing economy context. Hence, the findings of the study adds to the literature by providing the empirical evidence of REMs in family firms of an emerging economy and may be generalized in contexts similar to Bangladesh in terms of institutional weaknesses and inadequate investor protection.

Second, our study is the first to obtain empirical evidence of existence of curvilinear relationships between the level of different REMs and family ownership. The findings in our study suggest that the magnitude of REMs increases with the increase in the level of family ownership at earlier ownership threshold highlighting the entrenchment effect. At a relatively higher family ownership this pattern reverses, perhaps indicating stronger alignment effect.

Finally, our study finds that firms that engage in REMs in the current period report lower profitability in subsequent years. This finding is consistent with the argument that modifications of regular operational and investment activities with a view to reporting higher earnings has negative future consequences (Cohen and Zarowin, 2010; Graham et al., 2005; Roychowdhury, 2006).

The remainder of the paper is structured as follows. Section 2 develops the hypotheses of the study, while Section 3 offers the research methodology. Section 4 analyses the results of the study and Section 5 concludes the paper.

2. Hypotheses development

2.1. Real earnings management in family firms

It is argued that family firms are primarily exposed to higher level of type II agency conflict that results from the conflict between the controlling owners and the minority shareholders (Ali et al., 2007; Morck et al., 1988; Shleifer and Vishny, 1997). Controlling shareholders may have incentives to expropriate minority shareholders to pursue their private benefits. The East Asian evidence provides empirical support for family owners' expropriating actions (Claessens et al., 2002; Fan and Wong, 2002). To camouflage the effect of expropriation, family firms' managers may manage their earnings. Gopalan and Jayraman (2012) show that earnings management has strong association with private benefit consumptions in relatively weaker investor protection countries.

From the above discussion, it may be argued that the magnitude of earnings management in family firms may vary from that of non-family firms in environment that does not provide adequate investor protection. Among the different forms of earnings management, REMs may appear to be more conducive in family firms in low investor protection environment. Family owners enjoy their entrenched positions in the firm. This creates a unique alignment of ownership and management in family firms, which may facilitate collusion to engage in REMs. Moreover, REMs can take place at any time during the year, whereas accruals manipulations are carried out at the end of fiscal year most of the times. Therefore, REMs offer greater flexibility from managerial perspective.

We carry out this study in Bangladesh context that is featured with relatively poor enforcement of the legal codes (Farooque et al., 2010; Rashid, 2011; Siddiqui, 2010). The substantial presence of family ownership (Farooque et al., 2007a; Muttakin et al., 2014)[1] and the weak investors' protection may facilitate expropriation of minority shareholders by the family owners in Bangladesh. This minority expropriation provides incentive for earnings management in family firms. As it is argued, among the different forms of earnings management, the REMs offer greater latitude in terms of timing of execution and lower detection risk from an opportunistic managerial perspective.

Therefore, the REMs is expected to be a more common phenomenon among family firms in Bangladesh compared to non-family firms. Accordingly, the following hypothesis is postulated for testing.

H1. Family firms in Bangladesh are more likely to engage in real earnings management (REMs) than non-family firms.

2.2. Curvilinear relationship between REMs and family ownership

There is evidence that the level of earnings management may have curvilinear relationship with family ownership (Wang, 2006). Arguably, this may be the result of two alternative hypotheses, the entrenchment hypothesis and the alignment of interest hypothesis. The entrenchment hypothesis contends that family firms are prone to minority expropriation by the controlling family owners (Morck et al., 1988), which in turn may encourage family owners to indulge in earnings management (Claessens et al., 2002; Fan and Wong, 2002). In contrast, the alignment of interest hypothesis postulates that higher family ownerships results in greater alignment of interest between the controlling owners and the other stakeholders (Demsetz and Lehn, 1985). This is likely to result in lower minority expropriation by the family owners that might disincentivise earnings management (Ali et al., 2007).

Wang (2006) investigates and finds curvilinear relationship between accruals earnings management and family ownership in the US context. He provides evidence that the level of abnormal accruals earnings management tends to demonstrate a declining trend up to around 33.72% of family ownership and then starts to increase with the increase in family ownership magnitude. This results in a U-shaped relationship between accruals earnings management and family ownership. Based on this evidence, we contend that the relationships between family ownership and the level of different REMs proxies are curvilinear. In a relatively weaker minority protection environment, family firms are more likely to engage in REMs at a relatively earlier stage of equity ownership. At this stage, family ownerships are more likely to be characterized with a higher gap between cash flow and control rights, which facilitates greater expropriation (Claessens et al., 2002; Fan and Wong, 2002). Hence, a higher level of REMs is expected. However, at a higher level of ownership threshold, family owners have higher stake in the firm that may discourage expropriating activities and REMs. Following this, the relationship between family ownership and the level of REMs is expected to be an inverted U-shaped and the following hypothesis is proposed.

H2. There is a curvilinear relationship between family ownership and the level of REMs in Bangladesh; the level of REMs tends to rise to a threshold and then declines with the increase in the family ownership.

[1] According to Muttakin et al. (2014), around 64% of listed companies are family owned in Bangladesh.

2.3. REM and subsequent year's performance

REMs involve alteration of regular operational and investment decisions. If such actions are solely driven by optimal economic reasons, one should not expect any future negative impact of such managerial decisions and actions. However, the altered activities may also be the result of managerial opportunism not being carried out in the best interest of the firm. A survey by Graham et al. (2005) finds that chief financial officers (CFOs) are willing to postpone investment activities to increase the earnings knowing their negative future value consequences. Roychowdhury (2006) argues that earnings management through altering real activities entails future value destroying impact. In devising sales manipulation, managers offer attractive price discounts. This influences customers' expectation and may force the firm to lower the regular price in future accordingly. Earnings management through overproduction causes burden to the firm in terms of higher carrying costs and imposes additional sales effort to sell them.

Cohen and Zarowin (2010) find that the seasoned equity offering (SEO) firms that engage in REMs experience significant decline in the future performance. However, Gunny (2010) shows that firms that engage in REMs to meet earnings benchmark demonstrate better future performance compared to firms that do not engage in REMs and miss the earnings benchmark by reasonable margin. Such finding support the argument that real activity alterations are not always the outcome of opportunistic managerial behavior.

In this study we examine the REMs practices of firms' in a relatively weak governance regime. In such environment, the incidence of altering regular business decisions is more likely to be motivated by the private rent seeking objectives of managers. Hence, these actions are prone to be classified as opportunistic managerial actions and will most likely have negative consequences. This is expected for both, family and non-family firms in Bangladesh. As such, the following hypothesis is proposed:

H3. Firms that engage in REMs in Bangladesh have lower future performance than firms that do not engage in REMs.

3. Methodology

3.1. Data selection

Our study examines panel data over a six-year period from 2006 to 2011. During this period, all the listed public companies in Bangladesh were required to disclose the corporate governance compliance report on a 'comply or explain' basis (Bangladesh Securities and Exchange Commission, 2006a). Following prior studies on real earnings management (Cohen et al., 2008; Cohen and Zarowin, 2010; Roychowdhury, 2006), the financial companies are excluded from the study sample. Our sample consists 105, 109, 116, 117, 122, and 122 firms for the year 2006, 2007, 2008, 2009, 2010, and 2011 respectively.[2] For the computation of different REMs metrics, the local industry classification has been followed to define the group. Table 1 describes the number of observations according to each industry and each year.

Due to lack of an electronic database of financial and governance data of listed public companies in Bangladesh, the data was hand collected from several source documents. Primary source document of the required data are the company annual reports. Other sources include initial public offerings (IPO) documents, right shares issue documents and Dhaka Stock Exchange (DSE) status of shareholdings of directors of listed companies.

3.2. Dependent variable

This paper employs three primary measures of REMs and two aggregate measures following Roychowdhury (2006) and other REMs studies (Cohen et al., 2008; Cohen and Zarowin, 2010; Gunny, 2010; Zang, 2012). The primary measures of REMs are: the abnormal cash flows from operations (AB_CFO), the abnormal discretionary expenses (AB_DISC), and the abnormal production costs (AB_PROD).

3.2.1. Abnormal cash flows from operations (AB_CFO)

To record higher earnings, managers can reduce the current selling price as well as offer greater price discount and more lenient credit terms. However, such sales might not be sustained once the firm reverts to its regular practices. Due to reduced prices, higher price discounts, and lenient credit terms, cash flows from operations (CFO) will decrease in the current period for a given level of sales (Roychowdhury, 2006). Hence, cash flows from operations (CFO) abnormally lower than the normal level is deemed as a manifestation of REMs. The AB_CFO is computed as the difference between the actual CFO and the estimated normal level of CFO.

The Normal level of CFO is considered to be a linear function of sales and changes in sales (Cohen et al., 2008; Roychowdhury, 2006). Accordingly, the following cross-sectional regression is employed for each industry and each year to estimate the normal level of CFO.

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

[2] Our un-balanced panel does not have any attrition of firms.

Table 1
Firm-years according to industry and year classification.

Industry	2006	2007	2008	2009	2010	2011	Total
1. Engineering	18	19	20	20	21	21	119
2. Food & allied	15	15	15	15	15	15	90
3. Textile	20	20	21	22	22	22	127
4. Fuel & power	7	9	10	10	10	10	56
5. Pharmaceuticals & chemicals	14	15	17	17	20	20	103
6. Cement & ceramics	8	8	9	9	10	10	54
7. IT & services	7	7	8	8	8	8	46
8. Miscellaneous	11	11	11	11	11	11	66
9. Tannery	5	5	5	5	5	5	30
Total	105	109	116	117	122	122	691

where: CFO_t = cash flows from operations during period t; A_t = total assets at the end of period t; $SALES_t$ = total sales during period t; and Δ $SALES_t$ = change in sales computed as $SALES_t - SALES_{t-1}$.

3.2.2. Abnormal discretionary expenses (AB_DISC)

Firms enjoy greater latitude in incurring expenses such as research and development (R&D), selling and administrative (SG&A), advertising expenses, employee training and maintenance. These expenses are to be charged in the current period and by not incurring them currently, a firm may report higher earnings figure. Hence, discretionary expenses reported abnormally lower than the expected normal level is considered as REMs. The AB_DISC is the difference between the actual discretionary expenses and predicted normal level of discretionary expenses.

According to Roychowdhury (2006) and Cohen et al. (2008), the following model is adopted to estimate the normal level of discretionary expenses (DISC_EXP).

$$\frac{DISC\_EXP_{it}}{A_{it-1}} = \alpha_0 + \alpha_1\left(\frac{1}{A_{it-1}}\right) + \alpha_2\left(\frac{SALES_{it-1}}{A_{it-1}}\right) + \varepsilon_{it} \tag{2}$$

where: $DISC\_EXP_t$ = discretionary expenses for the period t; and all other variables are as previously defined.

The discretionary expenses are the aggregate of advertising expenses, research and development expenses, and selling-administrative expenses.

3.2.3. Abnormal production costs (AB_PROD)

Producing the additional units results in spreading fixed manufacturing overhead across higher number of units and hence, lowers the per unit production cost. As long as this reduction in per unit fixed cost is not outweighed by incremental marginal production costs and additional inventory holding cost, firm enjoys reporting a higher margin. Accordingly, production cost abnormally higher than the expected normal level is a demonstration of REMs (Roychowdhury, 2006). The AB_PROD is the difference between the actual production costs and the expected normal level. Production costs (PROD) are the aggregate of the costs of goods sold (COGS) and the change in inventory (ΔINV). The normal level of PROD is estimated with the following cross-sectional regression.

$$\frac{PROD_{it}}{A_{it-1}} = \alpha_0 + \alpha_1\left(\frac{1}{A_{it-1}}\right) + \alpha_2\left(\frac{SALES_{it}}{A_{it-1}}\right) + \alpha_3\left(\frac{\Delta SALES_{it}}{A_{it-1}}\right) + \alpha_4\left(\frac{\Delta SALES_{it-1}}{A_{it-1}}\right) + \varepsilon_{it} \tag{3}$$

where: $PROD_t$ = production costs during period t computed as ($COGS_t + \Delta\ INV_t$); and all other variables are as previously defined.

Two aggregate measures of REMs, REM_1 and REM_2, are also developed following Cohen and Zarowin (2010) and Zang (2012). REM_1 is the composite of AB_CFO and AB_DISC. REM_2 is the aggregate of AB_PROD and AB_DISC. Since AB_PROD and AB_DISC are directionally opposite of each other, AB_DISC is multiplied by (−1) to achieve a consistent direction of the REM_2. This implies that higher the value of REM_2, the more the likelihood of REMs through overproduction and lowering discretionary expenses contemporaneously.

3.3. Independent variables

We investigate REMs in the family firms of Bangladesh and hence, the family ownership is the independent variable. A firm is classified as a family firm (FAM) if one or more directors on the board are from the same family and the aggregate ownership of these directors are at least 10% of total outstanding shares. The literature reports evidence of varying threshold being used to classify family firms (Claessens et al., 2000; La Porta et al., 1999). Anderson and Reeb (2003) argue that family owners wield more influence than their fractional equity holdings. Our study uses the direct ownership and hence, a less stringent ownership threshold is being used to define family ownership. Moreover, the local regularity body, BSEC (Bangladesh Securities and Exchange

Commission, 2006a,b) deems this 10% as substantial controlling ownership by requiring an explicit disclosure of ownership equals to or more than that.

For the investigation of curvilinear relationship between family ownership and different REMs, the percentage of common stock holding by a family (FAM_OWN) is used as independent variable. Family ownership data is collected from company annual reports, primary issue document, subsequent equity offering documents, and relevant company websites.

In the test of the H3, REM_DUM is employed to indicate the likelihood of REMs in the current period. REM_DUM is the dummy variable coded with the value one if the values of AB_CFO, AB_DISC and REM_1 (AB_PROD andREM_2) are lower (greater) than the respective industry median value, zero otherwise.

3.4. Control variables

The empirical models of our study consider several variables as control variables as suggested by extant earnings management and corporate governance literature. These control variables are: firm size (SIZE) measured by the natural logarithm of total assets, performance (ROA) measured as return on assets, risk (LEV) measured as the ratio of total debts to total assets, growth (GROWTH) as measured by the sales growth rate for the current period, firm age (FIRM_AGE) measured as natural logarithm of total years since the firm is incorporated, and loss (LOSS) is a dummy variable coded with the value one if the firm incurred a loss in the previous period, zero otherwise.

3.5. Empirical models

3.5.1. Empirical model for H1

Model 1 is developed to test the association between family firms and REMs following Wang (2006). This model considers AB_CFO, AB_DISC, AB_PROD, REM_1, and REM_2 as dependent variables and they are regressed on FAM, the dummy variable for family firm. Model 1 also incorporates SIZE, ROA, LEV, GROWTH, FIRM_AGE and LOSS as control variables to control the effect of size of a company, profitability, capital structure, growth prospect, firms age, and financial distress (Cohen et al., 2008; Roychowdhury, 2006; Wang, 2006). Model 1 is estimated with a two-dimensional industry year fixed effect to address unobserved group level heterogeneity.

Model 1

$$\begin{aligned} REM_{it} = {} & \beta_0 + \beta_1 FAM_{it} + \beta_2 SIZE_{it} + \beta_3 ROA_{it} + \beta_4 LEV_{it} + \beta_5 GROWTH_{it} + \beta_6 FIRM\_AGE_{it+} \beta_7 LOSS_{it} \\ & + \sum \text{ Industry Year Fixed Effect} + \varepsilon_{it} \end{aligned} \tag{4}$$

where: REM = real earnings management measured by AB_CFO, AB_DISC, REM_1, AB_PROD, and REM_2; FAM = dummy variable that takes the value 1 if a firm is classified as family firm, zero otherwise; SIZE = natural logarithm of total assets; ROA = ratio of net income before extraordinary items to total assets; LEV = ratio of total debts to total assets; GROWTH = sales growth rate for the current period; FIRM_AGE = natural logarithm of number of years since the firm is incorporated; and LOSS = dummy variable coded with the value one if the firm incurs a loss in the previous year, zero otherwise.

The test variable in model 1 is FAM. A significant β_1 with the expected sign supports the hypothesis that family firms are more prone to REMs than non-family firms. β_1 is expected to be negative to indicate the higher magnitude of REMs for AB_CFO, AB_DISC and REM_1, since lower level of these variables indicate higher likelihood of REMs. In contrast, a higher value for AB_PROD and REM_2 manifest greater likelihood of REMs. Accordingly, β_1 is predicted to be positive for these two dependent variables.

No directional predictions are made regarding the coefficients of SIZE, ROA and GROWTH. FIRM_AGE is expected to lower the magnitude of REMs and hence, a negative association with REMs is assumed. On the other hand, LEV and LOSS are expected to have positive relations with the magnitude of REMs.

3.5.3. Empirical model for H2

A polynomial equation to the second degree is used to test the curvilinear relationship between different REMs proxies and family ownership. Following Wang (2006), a quadratic term of family ownership (FAM_OWN) is employed in the model. The family ownership is measured as percentage of common stock held by the controlling family and the squared family ownership is the variable of interest in the model. Similar to the Model 1, Model 2 is estimated with industry year fixed effect to address unobserved group level heterogeneity.

Model 2.

$$\begin{aligned} REM_{it} = {} & \beta_0 + \beta_1 FAM\_OWN_{it} + \beta_2 (FAM\_OWN)^2{}_{it} + \beta_3 SIZE_{it} + \beta_4 ROA_{it} + \beta_5 LEV_{it} + \beta_6 GROWTH_{it+} \beta_7 FIRM\_AGE_{it} + \beta_8 LOSS_{it} \\ & + \sum \text{ Industry Year Fixed Effect} + \varepsilon_{it} \end{aligned} \tag{5}$$

where: FAM_OWN = proportion of common stock held by the family members centered at mean value; and all other variables are as previously defined.

Significant β_2 is the statistical evidence of the existence of curvilinear relationship between family ownership and different REMs. A positive sign of the squared FAM_OWN indicates that the curve is U-shaped and a negative sign suggests the curve to be an inverted U-shaped. The second hypothesis proposes that the level of REMs increases initially with the increase in family ownership and after reaching a certain ownership threshold, the magnitude of REMs tends to decline. The shapes of the curve of family ownership and AB_CFO, AB_DISC and REM_1 are expected to be U-shaped since lower value of these REMs proxies indicates higher magnitude of REMs. Accordingly, a positive coefficient of the squared family ownership is expected. On the other hand, higher value for AB_PROD and REM_2 refer higher level of earnings management. As such, the relationship curve for these two REMs proxies are expected to be inverted U-shaped and negative coefficient of the test variable is expected.

3.5.4. Empirical model for H3

H3 argues that if any firm engages in REMs in the current period, it is likely to have negative consequences in terms of lower subsequent performance. Model 3 is employed to test the hypothesis. The test variable in the model is REM_DUM, which is the measure of whether a firm-year is deemed as real earnings management firm-year or not.

Model 3.

$$\begin{aligned} ROA_{it+1} = {} & \beta_0 + \beta_1 REM\_DUM_{it} + \beta_2 SIZE_{it} + \beta_3 ROA_{it} + \beta_4 LEV_{it} + \beta_5 GROWTH_{it} + \beta_6 FIRM\_AGE_{it+} \beta_7 LOSS_{it} \\ & + \sum \text{ Industry Year Fixed Effect} + \varepsilon_{it} \end{aligned} \tag{6}$$

where: REM_DUM = dummy variable coded with the value one if the REMs is lesser (greater) or equals to industry median for AB_CFO, AB_DISC and REM_1 (AB_PROD and REM_2) respectively, zero otherwise; and all other variables are as previously defined.

The coefficient of the test variable REM_DUM, β_1, indicates the magnitude of difference with respect to subsequent year's performance between REMs suspect firms and firms that are not suspected to engage in REMs in the current period. A significant β_1 with negative sign provides support for the hypothesis.

Table 2
Descriptive statistics.

Panel A: Non-family firms (N = 327)

			Quantiles				
Variable	Mean	S.D.	Min	.25	Mdn	.75	Max
AB_CFO	0.003	0.134	−0.905	−0.050	0.008	0.065	0.827
AB_DISC	0.010	0.086	−0.225	−0.030	−0.005	0.040	0.362
REM_1	0.013	0.154	−0.818	−0.068	0.015	0.095	0.804
AB_PROD	−0.002	0.136	−0.576	−0.067	−0.005	0.058	0.629
REM_2	−0.013	0.181	−0.714	−0.097	0.010	0.086	0.584
SIZE	20.859	1.623	18.142	19.513	20.569	21.808	25.034
T_ASSET	4937	11,000	76	298	857	2960	75,000
ROA	0.052	0.132	−0.631	0.009	0.046	0.109	0.901
LEV	0.761	0.877	0.036	0.431	0.607	0.789	6.774
GROWTH	0.408	2.737	−0.970	0.024	0.143	0.286	45.163
F_ AGE	27.908	13.346	6.000	15.000	27.000	37.000	63.000

Panel B: Family firms (N = 364)

			Quantiles				
Variable	Mean	S.D.	Min	.25	Mdn	.75	Max
AB_CFO	−0.004	0.103	−0.444	−0.057	−0.002	0.048	0.421
AB_DISC	−0.008	0.065	−0.218	−0.031	−0.007	0.013	0.273
REM_1	−0.013	0.127	−0.629	−0.075	−0.015	0.048	0.549
AB_PROD	0.001	0.135	−0.748	−0.055	−0.005	0.047	0.806
REM_2	0.009	0.172	−0.851	−0.067	0.002	0.070	0.814
SIZE	20.404	1.499	16.633	19.501	20.454	21.452	24.989
T_ASSET	2161	4998	17	295	764	2073	71,000
ROA	0.047	0.089	−0.569	0.014	0.030	0.061	0.595
LEV	0.546	0.411	−5.715	0.378	0.569	0.752	1.117
GROWTH	0.504	5.095	−1.000	−0.032	0.103	0.286	94.705
F_AGE	24.385	10.110	3.000	16.000	26.000	30.000	56.000
FAM_OWN%	0.35	0.14	0.10	0.25	0.35	0.46	0.76
FAM_SPN	0.78	0.25	0.13	0.55	0.89	1.00	1.05

Where, AB_CFO is the abnormal cash flows from operations; AB_DISC is the abnormal discretionary expenses; REM_1 is the aggregate of AB_CFO and AB_DISC; AB_PROD is the abnormal production costs; REM_2 is the aggregate of AB_PROD and AB_DISC; SIZE is the natural logarithm of total assets of the current period; T_ASSET is the amount of total assets in the current period in BDT million; ROA is the ratio of net income to total assets of the current period; LEV is the ratio of total debt to total asset of the current period; GROWTH is the sales growth rate for the current period; F_AGE is the number of years since the firm is incorporated; FAM_OWN% is the proportion of common equity held by family owners; FAM_SPN is the proportion of common equity held by family owners out of total common stock held by the sponsors/promoters and directors.

4. Results

4.1. Descriptive statistics

Table 2 provides the descriptive statistics of key variables of this study. About 53% of the observations in our sample have been classified as family firm-year. Panel B of Table 2 shows that on average family owners hold 35% of total equity in family firms.[3] It is also apparent from the last row of the same panel that on average 78% of sponsors/promoters and directors equity holdings belongs to family owners.

Family firms report lower AB_CFO, AB_DISC, and REM_1 than their non-family counterparts. Since lower values of these REMs proxies indicate higher magnitude of REMs, family firms are more likely to suppress these indicators to report higher earnings. On the other hand, AB_PROD and REM_2 (aggregate of AB_PROD and AB_DISC) are higher in family firms compared to that of in non-family firms, indicating higher likelihood of REMs. Family firms are smaller in size compared to non-family. Relative to non-family firms, family firms have lower ROA (return on assets) and lower LEV (leverage ratio). Family firms demonstrate higher sales growth (growth in sales) and are relatively younger than non-family firms in Bangladesh.

4.2. Correlation matrix

Table 3 reports the Pearson correlation estimates among the variables of this study. The correlation between the FAM and all the REMs proxies are in expected directions and they are significant for AB_DISC and REM_1. Family ownership is negatively correlated with SIZE, LEV, FIRM_AGE, and LOSS, and these correlations are statistically significant. Control variables demonstrate significant correlation with different REMs proxies except GROWTH.

4.3. Regression results for H1

Table 4 reports the regression estimates of model 1 when different REMs proxies are regressed on FAM with the industry year fixed effects. All the models for different REMs are significant at $p < 0.001$. The adjusted-R^2 for all the REMs models have values ranging from 0.08 to 0.19. We compute the variation inflation factor (VIF) to investigate the multicollinearity issue and none of the independent and control variables has VIF greater than 2.[4]

Column (1) of Table 4 suggests that family firms are more associated with lowering cash flows to report higher earnings than non-family firms. The coefficient of FAM is −0.021 and this coefficient is significant at 5% level ($t = -2.083$), which indicates that on average family firms have AB_CFO lower by 2.1% of total assets than the non-family firms. This suggests that family firms report lower abnormal cash flows from operations compared to non-family firms in Bangladesh. Moreover, the mean CFO is 6% of total assets and the median value is 5%. Under this circumstance, the aforementioned difference of 2.1% of total assets is economically significant.

It is also apparent from columns (2) and (3) that family firms have higher association with REMs compared to non-family firms, when REMs is measured by AB_DISC and REM_1 respectively. This has the effect of having higher magnitude of REMs in family firms in terms of lowering discretionary expenses and in terms of the combined impact of suppressing CFO and cutting down the discretionary expenses. We find no evidence of overproduction by family firms to report higher earnings in Bangladesh. However, family firms in Bangladesh are found to overproduce and suppress discretionary expenses contemporaneously more than the non-family firms as documented in column (5) of Table 4. Control variables for size and leverage show positive association with different REMs proxies, whereas firm performance is found to have negative relationship with REMs. Moreover, the negative associations of firm age suggest that matured firms engage less in REMs.

Overall, the regression results support the first hypothesis that family firms in Bangladesh engage more in REMs than the non-family firms. This finding differs from that of Achleintner et al. (2014) in the German context. The difference is largely attributable to the difference in the contexts. Similar contrasting findings prevail in the family firm literature with regard to accruals earnings management as well. Family firms in developed economies with effective enforcement regime demonstrate lower accruals earnings management and hence, higher earnings quality (Ali et al., 2007; Wang, 2006). In contrast, the Asian evidence show that family firms are associated with lower quality earnings (Fan and Wong, 2002) and higher accruals management (Ding et al., 2011).

4.3.1. Endogeneity of family firms and REMs

Jaggi et al. (2009) address the endogeneity issue in their earnings management study of family firms in the Hong Kong context. In a similar manner, we address the endogeneity concern in our study. The issue is whether family ownership influences REMs or the REMs facilitate families to maintain their holdings in the firms. Jaggi et al. (2009) employ the natural logarithm of total assets, the square of the natural logarithm of total assets, and the stock return volatility as instrumental variables (IV) for family ownership.

We conduct the exogeneity test of these variables to obtain assurance on the strength of them as IV. The difference-in-Hansen *J* statistics casts doubt on the strength of the stock return volatility as the exogeneity condition is not respected for this variable and accordingly, is not being used as IV. Instead, we argue that in the Bangladesh context, the diffuse ownership held by minority investors can be an instrumental variable (IV) for family ownership. The plausible argument is that this diffuse ownership can only be correlated with REMs in the presence of family owners. The association between the REMs and the diffuse ownership

[3] The un-tabulated statistics reveal that the average percentage of family equity in a firm does not change substantially during the study period.
[4] Multicollinearity is considered to be problematic when the VIF value exceeds 10 (Wooldridge, 2013).

Table 3
Pearson correlation.

	FAM	AB_CFO	AB_DISC	REM_1	AB_PROD	REM_2	SIZE	ROA	LEV	GROWTH	FIRM_AGE	LOSS
FAM	1											
AB_CFO	−0.0511	1										
AB_DISC	−0.139***	0.0340	1									
REM_1	−0.106**	0.816***	0.545***	1								
AB_PROD	0.00143	−0.378***	−0.355***	−0.528***	1							
REM_2	0.0608	−0.289***	−0.693***	−0.622***	0.905***	1						
SIZE	−0.146***	0.0104	0.0313	0.0314	−0.0173	−0.0325	1					
ROA	−0.0369	0.334***	0.0786*	0.357***	−0.293***	−0.253***	0.277***	1				
LEV	−0.149***	−0.296***	0.0957*	−0.240***	0.263***	0.165***	−0.0584	−0.582***	1			
GROWTH	0.00977	−0.00243	0.0168	0.0113	−0.000168	−0.00768	−0.00863	0.00245	0.0112	1		
FIRM_AGE	−0.117**	0.0177	0.234***	0.108**	−0.00240	−0.0997*	0.0247	0.0143	0.206***	−0.0144	1	
LOSS	−0.109**	−0.190***	0.0362	−0.156***	0.129**	0.0850*	−0.127**	−0.415***	0.355***	0.160***	−0.0220	1

Where AB_CFO is the abnormal cash flows from operations; AB_DISC is the abnormal discretionary expenses; REM_1 is the aggregate of AB_CFO and AB_DISC; AB_PROD is the abnormal production costs; REM_2 is the aggregate of A_PROD and AB_DISC;FAM is the family dummy variable coded with the value one if a firm is considered as family firm, zero otherwise; SIZE is the natural logarithm of total assets of the current period; ROA is the ratio of net income to total assets of the current period; LEV is the ratio of total debt to total asset of the current period; GROWTH is the sales growth rate for the current period; FIRM_AGE is the natural logarithm of years since the firm is incorporated; and LOSS is a dummy variable coded with the value one if the firm incurred a loss in the previous period, zero otherwise.

* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

is hence moderated by the family ownership. This provides the justification of using the total ownership held by the diffuse outside general investors as an instrument for family ownership. Moreover, the difference-in-Hansen *J* statistics of the general investors' equity holding confirms the exogeneity of the variable in Model 1. The predicted value of family firm (P_FAM) is obtained from the instrumental variables (IV): the logarithm of total assets, square of the logarithm of total assets, and general investors' equity ownership (percentage of cumulative equity shares held by outside diffuse owners).

Table 5 reports the regression results when family firm (FAM) variable is treated as a binary endogenous variable in obtaining the predicted value through maximum likelihood (ML) estimate. Instrumental variable regression estimates provide evidence that

Table 4
Multivariate analysis of REMs and family firm.

Variables	Exp Sign	(1) AB_CFO	(2) AB_DISC	(3) REM_1	Exp Sign	(4) AB_PROD	(5) REM_2
Constant	+/−	0.092*	−0.097***	0.052	+/−	−0.073	0.050
		(1.708)	(−3.134)	(0.646)		(−1.475)	(0.776)
FAM	**−**	**−0.021****	**−0.016*****	**−0.040*****	**+**	**0.009**	**0.027***
		(−2.083)	**(−3.440)**	**(−2.856)**		**(0.732)**	**(1.776)**
SIZE	+/−	−0.005**	−0.001	−0.007***	+/−	0.004**	0.004*
		(−2.263)	(−0.633)	(−2.674)		(2.193)	(1.810)
ROA	+/−	0.273***	0.142***	0.484***	+/−	−0.289***	−0.426***
		(3.163)	(3.779)	(4.626)		(−3.201)	(−4.280)
LEV	−	−0.032***	0.014*	−0.027***	+	0.033***	0.025*
		(−3.652)	(1.688)	(−2.738)		(3.080)	(1.883)
GROWTH	+/−	0.000	0.000	0.000	+/−	0.000	−0.000
		(0.042)	(0.541)	(0.678)		(0.167)	(−0.131)
FIRM_AGE	+	0.010	0.033***	0.037***	−	−0.009	−0.047***
		(1.527)	(5.951)	(3.359)		(−1.112)	(−4.059)
LOSS	−	−0.019	0.014*	−0.007	+	−0.002	−0.013
		(−1.390)	(1.771)	(−0.424)		(−0.156)	(−0.820)
Industry year fixed effect		Yes	Yes	Yes		Yes	Yes
Observations		665	666	665		648	648
R-squared		0.185	0.093	0.194		0.117	0.094
Adjusted R-squared		0.176	0.083	0.185		0.107	0.084
F value		10.71	12.67	15.54		17.64	12.08
Prob > F		0.000	0.000	0.000		0.000	0.000

$$\mathrm{REM}_{it} = \alpha_{it} + \beta_1 \mathrm{FAM}_{it} + \beta_2 \mathrm{SIZE}_{it} + \beta_3 \mathrm{ROA}_{it} + \beta_4 \mathrm{LEV}_{it} + \beta_5 \mathrm{GROWTH}_{it} + \beta_6 \mathrm{FIRM\_AGE}_{it+} \beta_7 \mathrm{LOSS}_{it} + \sum \text{Industry Year Fixed Effect} + \varepsilon_{it}$$

Where, REM is the proxies for AB_CFO, AB_DISC, REM_1, AB_PROD, and REM_2;FAM is the family dummy variable coded with the value one if a firm is considered as family firm, zero otherwise; SIZE is the natural logarithm of total assets of the current period; ROA is the ratio of net income to total assets of the current period; LEV is the ratio of total debt to total asset of the current period; GROWTH is the sales growth rate for the current period; FIRM_AGE is the natural logarithm of number of years since the firm is incorporated; LOSS is a Dummy variable coded with the value one if the firm incurred loss during the previous period, zero otherwise. Superscripts ***, **, * represent significance level at 1%, 5% and 10% respectively. T-statistics are in parentheses. T-statistics are computed using standard errors clustered for each industry year.

Table 5
Instrumental variable (IV) regression of REMs and family firm.

	Exp.	(1)	(1)	(1)	Exp.	(1)	(1)
Variables	Sign	AB_CFO	AB_DISC	REM_1	Sign	AB_PROD	REM_2
Constant	+/−	0.273***	0.075	0.327***	+/−	−0.264***	−0.249**
		(3.606)	(1.559)	(3.334)		(−3.227)	(−2.088)
P_FAM	**−**	**−0.122*** **	**−0.100*** **	**−0.188*** **	**+**	**0.124*** **	**0.192*** **
		(−3.936)	**(−6.700)**	**(−3.769)**		**(4.376)**	**(3.989)**
SIZE	+/−	−0.011***	−0.006***	−0.016***	+/−	0.010***	0.013***
		(−3.651)	(−3.073)	(−4.100)		(3.179)	(2.948)
ROA	+/−	0.236***	0.124***	0.418***	+/−	−0.263***	−0.376***
		(3.200)	(3.455)	(4.625)		(−2.946)	(−3.639)
LEV	−	−0.025***	0.013*	−0.021**	+	0.028**	0.021
		(−3.079)	(1.690)	(−2.026)		(2.357)	(1.509)
GROWTH	+/−	0.000	0.000*	0.001*	+/−	−0.000	−0.000
		(0.596)	(1.815)	(1.932)		(−0.273)	(−0.857)
FIRM_AGE	+	0.007	0.027***	0.028**	−	−0.005	−0.036***
		(0.959)	(4.765)	(2.383)		(−0.549)	(−2.654)
LOSS	−	−0.015	0.013**	−0.004	+	−0.003	−0.015
		(−1.255)	(2.007)	(−0.250)		(−0.219)	(−0.907)
Observations		665	666	665		648	648

$\mathbf{REM_{it}} = \alpha_{it} + \beta_1\mathbf{P\_FAM_{it}} + \beta_2\mathbf{SIZE_{it}} + \beta_3\mathbf{ROA_{it}} + \beta_4\mathbf{LEV_{it}} + \beta_5\mathbf{GROWTH_{it}} + \beta_6\mathbf{FIRM\_AGE_{it}} + \beta_7\mathbf{LOSS_{it}} + \varepsilon_{it}$.
Where, REM is the proxies for AB_CFO, AB_DISC, REM_1, AB_PROD, and REM_2; P_FAM is the predicted value of regressing family dummy (FAM) on the natural logarithm of total assets, the square of the natural logarithm of total assets, and general investors' equity ownership (percentage of cumulative equity shares held by outside diffuse owners); SIZE is the natural logarithm of total assets of the current period; ROA is the ratio of net income to total assets of the current period; LEV is the ratio of total debt to total asset of the current period; GROWTH is the sales growth rate for the current period; FIRM_AGE is the natural logarithm of number of years since the firm is incorporated; LOSS is a Dummy variable coded with the value one if the firm incurred loss during the previous period, zero otherwise. Superscripts ***, **, * represent significance level at 1%, 5% and 10% respectively. Z-statistics are in parentheses and are computed using White's heteroskedasticity-corrected standard errors.

family firms do engage in REMs more than the non-family firms in Bangladesh and this is evident for all the REMs proxies. These results are largely consistent with the primary analysis discussed in the previous section and hence, provide further support to those findings.

4.3.2. Additional robustness tests for H1

To check the additional robustness, Model 1 is re-estimated with a Fama–Macbeth regression. Fama–Macbeth regression estimates are used in REMs studies by Roychowdhury (2006) and Cohen and Zarowin (2010). The un-tabulated Fama-Macbeth regression results show that family firms engage more in REMs than their non-family counterparts in Bangladesh through suppressing CFO, through cutting down discretionary expenses, and through the joint effort of these REMs.

As a sensitivity analysis, we use different thresholds of family ownership in defining family firm. Un-tabulated results show that our finding of higher REMs engagement by family firms holds when 20% equity ownership is used to define family firm for AB_CFO, AB_DISC, and REM_1. However, we fail to obtain evidence of higher REMs in family firms when we set 30% equity threshold.[5]

4.4. Regression results for H2

It is evident from the presented results in Table 6 that all the REMs proxies, except AB_CFO, have curvilinear association with family ownership (FAM_OWN). For AB_DISC, the coefficient of $(FAM\_OWN)^2$ is 0.410 ($t = 2.651$), which is statistically significant at 5% level. Since the squared term bears a positive sign, the relation between family ownership and abnormal discretionary expense is U-shaped. Initially, with the increase in the percentage of family ownership, the level of AB_DISC tends to decline. This indicates that the level of REMs rises through lowering discretionary expenses at earlier family ownership thresholds. The lowest point of the curve is 0.2678.[6] Since lower the AB_DISC the higher the level of REM, at 26.78% of family ownership, firms demonstrate the highest level of REMs. Beyond this point of ownership threshold, AB_DISC rises (the level of REMs falls) with the increase in family ownership.

The sum of the roots for the relationship curve of AB_DISC and FAM_OWN is 53.55%.[7] This refers that up to 53.55% family ownership, family firms report lower AB_DISC compared to that of non-family firms. Beyond this level of ownership, family firms tend to report higher AB_DISC than the non-family firms.

[5] Table 6 shows that the levels of REMs maximize around 25% family ownership and then tend to reduce. Consequently, the magnitude of REMs at 30% family ownership is not significantly different from non-family firms.
[6] The inflection point is computed as $(\beta_1 - 2\beta_2\overline{x}) / 2\beta_2$ where $\overline{x}$ is the mean value of FAM_OWN ($\overline{x} = 0.1897$).
[7] The sum of the roots is computed as $(\beta_1 - 2\beta_2\overline{x}) / \beta_2$ where $\overline{x}$ is the mean value of FAM_OWN ($\overline{x} = 0.1897$).

Table 6
Curvilinear relationship between REMs and family ownership.

	Exp.	(1)	(2)	(3)	Exp.	(4)	(5)
Variables	Sign	AB_CFO	AB_DISC	REM_1	Sign	AB_PROD	REM_2
Constant	+/−	0.076	−0.132***	−0.004	+/−	−0.039	0.122*
		(1.444)	(−3.910)	(−0.051)		(−0.842)	(1.818)
FAM_OWN	**−**	**−0.054**	**−0.064*** **	**−0.127** **	**+**	**0.049**	**0.121** **
		(−1.548)	**(−3.052)**	**(−2.490)**		**(1.188)**	**(2.155)**
(FAM_OWN)²	**+**	**0.105**	**0.410** **	**0.565** **	**−**	**−0.441** **	**−0.915*** **
		(0.706)	**(2.651)**	**(2.278)**		**(−2.220)**	**(−2.871)**
SIZE	+/−	−0.005**	−0.000	−0.007**	+/−	0.003*	0.003
		(−2.299)	(−0.007)	(−2.404)		(1.700)	(0.977)
ROA	+/−	0.270***	0.132***	0.470***	+/−	−0.280***	−0.406***
		(3.102)	(3.426)	(4.477)		(−3.157)	(−4.143)
LEV	−	−0.032***	0.012	−0.029***	+	0.035***	0.028**
		(−3.596)	(1.437)	(−2.771)		(3.193)	(2.042)
GROWTH	+/−	0.000	0.000	0.000	+/−	−0.000	−0.000
		(0.029)	(0.841)	(0.947)		(−0.004)	(−0.570)
FIRM_AGE	+	0.010	0.032***	0.035***	−	−0.007	−0.043***
		(1.535)	(5.958)	(3.248)		(−0.841)	(−3.729)
LOSS	−	−0.018	0.012	−0.009	+	−0.000	−0.010
		(−1.374)	(1.485)	(−0.519)		(−0.020)	(−0.583)
Industry year fixed effect		Yes	Yes	Yes		Yes	Yes
Observations		665	666	665		648	648
R-squared		0.182	0.111	0.197		0.127	0.113
Adjusted R-squared		0.172	0.100	0.187		0.116	0.102
F value		9.402	11.49	13.33		15.37	10.45
Prob > F		0.000	0.000	0.000		0.000	0.000
Inflection point (%)		−	26.78	30.21		24.53	25.59
Sum of the roots (%)		−	53.55	60.42		49.05	51.16

$REM_{it} = \alpha_{it} + \beta_1 FAM\_OWN_{it} + \beta_2 (FAM\_OWN)^2_{it} + \beta_3 SIZE_{it} + \beta_4 ROA_{it} + \beta_5 LEV_{it} + \beta_6 GROWTH_{it+} \beta_7 FIRM\_AGE_{it} + \beta_8 LOSS_{it} + \sum$ Industry Year Fixed Effect $+ \varepsilon_{it}$

Where, REM is the proxies for AB_CFO, AB_DISC, REM_1, AB_PROD, and REM_2; FAM_OWN is the mean centered proportion of common stock owned by the family members; SIZE is the natural logarithm of total assets of the current period; ROA is the ratio of net income to total assets of the current period; LEV is the ratio of total debt to total asset of the current period; GROWTH is the sales growth rate for the current period; FIRM_AGE is the natural logarithm of number of years since the firm is incorporated; LOSS is a Dummy variable coded with the value one if the firm incurred loss during the previous period, zero otherwise. Superscripts ***, **, * represent significance level at 1%, 5% and 10% respectively. T-statistics are in parentheses. T-statistics are computed using standard errors clustered for each industry year.

A similar scenario exists for REM_1. At 30.21% of family equity holding, firms manifest the highest magnitude of REMs through lowering both the AB_CFO and the AB_DISC at a same time. Beyond this ownership threshold, REM_1 increases with the increase in the ownership level, implying that the magnitude of REMs falls. The relationship between family ownership and AB_PROD, and REM_2, respectively are inverted U-shaped, since the coefficients of squared FAM_OWN are statistically significant and bear negative signs. The maximum magnitude of REMs through overproduction is documented at 24.53% of family ownership in Bangladesh. For REM_2 relationship, the highest level of REMs is documented at 25.59% of family ownership. The estimates of control variables of Model 2 are consistent with that of Model 1.

Overall, our results provide evidence of existence of curvilinear relationships between different REMs proxies and family ownership in Bangladesh. The shapes of these curves show a pattern of increasing level of REMs at the earlier stages of family ownership, and after reaching certain point, the level of these REMs tend to decline with the increase in family ownership. This pattern of the curves are in contrast to that of in Wang (2006). A plausible reason for such a difference is perhaps due to the difference in the contexts. In Bangladesh, at earlier levels of family ownership, the entrenchment effect is a dominant force. However, at relatively higher ownership continuum, the alignment effect dominates the entrenchment effect. Our finding also reveals a crucial fact that the level of REMs reaches the highest magnitude within the range of family ownership from 24.53% to 30.21%.

4.4.1. Endogeneity of family ownership and REMs

The endogeneity of family ownership is addressed through an instrumental variable (IV) regression in the curvilinear model. Family ownership (FAM_OWN) is regressed on the instruments in the first stage to obtain the predicted value of the family ownership (P_FAM_OWN). We use the same instrumental variables as we did for the family dummy in Model 1. In the second stage, this P_FAM_OWN in employed in the structural equation.

Table 7 reports the IV regression results of Model 2 of the study. The curvilinear relationship between REMs and family ownership remains valid with IV regression estimates. Moreover, the IV regression estimates show that AB_CFO has a nonlinear relationship with the family ownership.

Table 7
Instrumental variable (IV) regressions of REMs and family ownership.

	Exp.	(1)	(2)	(3)	Exp.	(4)	(5)
Variables	Sign	AB_CFO	AB_DISC	REM_1	Sign	AB_PROD	REM_2
Constant	+/−	0.069	−0.214***	−0.090	+/−	0.017	0.265**
		(0.856)	(−3.841)	(−0.730)		(0.191)	(2.109)
P_FAM_OWN	−	−0.095	0.072	−0.056	−	0.123	0.034
		(−0.967)	(1.086)	(−0.395)		(1.004)	(0.203)
$(P\_FAM\_OWN)^2$	+	**0.760****	**0.947*****	**1.710*****	−	**−1.962*****	**−2.896*****
		(2.210)	**(2.855)**	**(3.454)**		**(−3.763)**	**(−3.832)**
SIZE	+/−	−0.005	0.003	−0.004	+/−	0.002	−0.002
		(−1.598)	(1.393)	(−0.796)		(0.619)	(−0.380)
ROA	+/−	0.219**	0.173***	0.445***	+/−	−0.250**	−0.424***
		(2.568)	(3.371)	(4.233)		(−2.481)	(−3.317)
LEV	−	−0.028***	0.016*	−0.022*	+	0.036***	0.025
		(−3.003)	(1.760)	(−1.795)		(2.633)	(1.495)
GROWTH	+/−	0.000	0.000	0.001*	+/−	−0.000	−0.001
		(0.900)	(1.388)	(1.861)		(−0.983)	(−1.336)
FIRM_AGE	+	0.005	0.029***	0.027**	−	0.001	−0.032**
		(0.578)	(4.503)	(2.031)		(0.062)	(−2.012)
LOSS	−	−0.021	0.023**	−0.003	+	0.005	−0.018
		(−1.342)	(2.072)	(−0.128)		(0.269)	(−0.690)
Observations		665	666	665		648	648

$$REM_{it} = \beta_0 + \beta_1 P\_FAM\_OWN_{it} + \beta_2 (P\_FAM\_OWN)^2_{it} + \beta_3 SIZE_{it} + \beta_4 ROA_{it} + \beta_5 LEV_{it} + \beta_6 GROWTH_{it+} \beta_7 FIRM\_AGE_{it} + \beta_8 LOSS_{it} + \varepsilon_{it}$$

Where, REM is the proxies for AB_CFO, AB_DISC, REM_1, AB_PROD, and REM_2; P_FAM_OWN is the predicted value of regressing family ownership(FAM_OWN) on the natural logarithm of total assets, the square of the natural logarithm of total assets, and general investors' equity ownership (percentage of cumulative equity shares held by outside diffuse owners); SIZE is the natural logarithm of total assets of the current period; ROA is the ratio of net income to total assets of the current period; LEV is the ratio of total debt to total asset of the current period; GROWTH is the sales growth rate for the current period; FIRM_AGE is the natural logarithm of number of years since the firm is incorporated; LOSS is a Dummy variable coded with the value one if the firm incurred loss during the previous period, zero otherwise. Superscripts ***, **, * represent significance level at 1%, 5% and 10% respectively. Z-statistics are in parentheses and are computed using White's heteroskedasticity-corrected standard errors.

4.5. Post performance analysis of REMs

The first column of Table 8 reports the result of Model 3 with CFO_DUM, when REM_DUM is based on the value of AB_CFO. The CFO_DUM is coded with 1 if the value of AB_CFO is less than or equal to the industry median value, zero otherwise. Similar process has been utilized for other REM_DUM variables. The negative sign of the coefficient of CFO_DUM indicates that firms with lower than or equal to the industry median value of AB_CFO suffers from lower ROA in subsequent year compared to firms with higher than the industry median value of AB_CFO. On average, the net income of firms with AB_CFO value lower than or equal to the industry median is lower by 1.5% of total assets in subsequent year than that of firms with AB_CFO more than the industry median value. This difference is statistically significant at 5% level ($t = -2.247$).

Similar evidence is documented for firms that are suspected of engaging in AB_DISC, REM_1, and AB_PROD. All these suspected firms report lower earnings in the subsequent year compared to rest of the sample. SIZE, ROA and GROWTH show significant positive associations with the subsequent year's performance. LEV has a negative association with the following year's earnings.

Overall, the regression estimates support the hypothesis that firms that are suspected to engage in REMs through suppressing cash flows from operations, through cutting down discretionary expenses, through overproducing, and through combination of lowering cash flows from operations and cutting down discretionary expenses have significantly lower reported earnings in the following year than the firms who are not suspected for such earnings management behavior.

5. Conclusion

We investigate the relationship between family ownership and REMs in an emerging economic context, Bangladesh. Our results provide support for our hypothesis that family firms in Bangladesh are more strongly associated with REMs than non-family firms. Our study also provides evidence of existence of curvilinear relationships between different REMs proxies and family ownership measured as percentage of common stock held by controlling family. Finally, we find that firms that are suspected of engaging in REMs experience lower future operating performance compared to firms that do not engage in REMs in the current period. Moreover, this shows that REMs in Bangladesh are not the result of efficient managerial actions.

The findings of our study reveal critical information regarding ownerships and the REMs association in the Bangladesh context. Family firms with direct equity ownership of 25% to 30% demonstrate the maximum level of different REMs. This suggests that the level of REMs starts to recede beyond the 30% family ownership. Hence, it provides support for BSEC's new requirement for minimum equity holding of 30% by the sponsors/promoters and directors. As family owners are also typically the sponsors/promoters and directors, the required minimum equity holding is likely to reduce REMs among the firms with concentrated ownership.

Table 8
REMs and subsequent year's performance.

Variables	Exp Sign	(1) ROA_{t+1}	(2) ROA_{t+1}	(3) ROA_{t+1}	(4) ROA_{t+1}	(5) ROA_{t+1}
Constant	+/−	−0.114***	−0.117***	−0.112**	−0.126***	−0.128***
		(−2.719)	(−2.698)	(−2.671)	(−2.846)	(−2.843)
CFO_DUM	**−**	**−0.015****				
		(−2.247)				
DISC_DUM	**−**		**−0.013****			
			(−2.365)			
REM1_DUM	**−**			**−0.014****		
				(−2.215)		
PROD_DUM	**−**				**−0.012***	
					(−1.915)	
REM2_DUM	**−**					**−0.006**
						(−1.147)
SIZE	+	0.008***	0.008***	0.008***	0.008***	0.008***
		(3.602)	(3.600)	(3.551)	(3.542)	(3.518)
ROA	+	0.509***	0.509***	0.506***	0.505***	0.508***
		(4.570)	(4.518)	(4.463)	(4.400)	(4.390)
LEV	−	−0.065***	−0.067***	−0.066***	−0.066***	−0.067***
		(−6.738)	(−6.946)	(−6.711)	(−7.004)	(−6.867)
GROWTH	+	0.001***	0.001**	0.001***	0.001***	0.001***
		(3.018)	(2.631)	(3.120)	(2.783)	(2.832)
FIRM_AGE	+/−	0.012*	0.010	0.011	0.014*	0.014*
		(1.824)	(1.545)	(1.587)	(1.941)	(1.936)
LOSS	−	−0.005	−0.006	−0.005	−0.005	−0.005
		(−0.515)	(−0.587)	(−0.501)	(−0.504)	(−0.440)
Industry year fixed effect		Yes	Yes	Yes	Yes	Yes
Observations		554	554	554	533	533
R-squared		0.632	0.630	0.631	0.634	0.632
Adjusted R-squared		0.627	0.626	0.627	0.629	0.627
F value		98.42	122.8	99.72	98.89	99.72
Prob > F		0.000	0.000	0.000	0.000	0.000

$ROA_{it+1}=\alpha_{it}+\beta_1 REM\_DUM_{it}+\beta_2 SIZE_{it}+\beta_3 ROA_{it}+\beta_4 LEV_{it}+\beta_5 GROWTH_{it}+\beta_6 FIRM\_AGE_{it}+\beta_7 LOSS_{it}+\sum$ Industry Year Fixed Effect$+\varepsilon_{it}$.

Where: ROA is the ratio of net income to total assets of the current period; REM_DUM is the dummy variable coded with the value one if the REM is lesser (greater) or equals to industry median for AB_CFO, AB_DISC and REM_1 (AB_PROD and REM_2) respectively, zero otherwise; SIZE is the natural logarithm of total assets of the current period; LEV is the ratio of total debt to total asset of the current period; GROWTH is the sales growth rate for the current period; FIRM_AGE is the natural logarithm of number of years since the firm is incorporated; LOSS is a Dummy variable coded with the value one if the firm incurred loss during the previous period, zero otherwise. Superscripts ***, **, * represent significance level at 1%, 5% and 10% respectively. T-statistics are in parentheses. T-statistics are computed using standard errors clustered for each industry year.

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