

Analysis of incentive effects of managers' bonuses on real activities manipulation relevant to future operating performance

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Abstract

Purpose – The purpose of this paper is to analyze the effect of managers' incentive bonuses on both accrual and real earnings management.

Design/methodology/approach – First, the authors investigate the relationship between managers' bonuses and both accrual earnings management (measured by a modified Jones model) and real earnings management (measured by Roychowdhury proxies). Next, the authors examine whether management has any preferences for earnings management methods to enhance its bonuses. Finally, the authors investigate the possible effects of earnings management on future operating performance. The sample consists of compositional data in the period from 2006 to 2012.

Findings – The authors find a negative relationship between real earnings management and managers' bonuses and detect that managers prefer to use accrual earnings management to earn more bonuses. The results also show that real earnings management will reduce a firm's performance in future periods, and on the other hand that increasing managers' bonuses links to improvement of the firm's future performance. The results suggest that managers are typically aware of the negative effects of real earnings management on the firm's future performance and thus prefer to improve the firm's performance in securing their bonuses when their ability to manage accruals is constrained.

Originality/value – The implications of this paper provide further evidence on how managers' bonuses affect their discretion in using accrual and real earnings management. This finding is important to investors and regulators.

Keywords Accounts management, Accounting, Accounting Research

Paper type Research paper

1. Introduction

In this paper, we separately examine the association between managers' bonuses and two methods of earnings management: accrual earnings management and real earnings management. Then, the results are compared to demonstrate that managers prefer the earnings management method, which enhances their bonuses. Prior research shows that managers use means of accrual earnings management and real earnings management to achieve their goals (Roychowdhury, 2006; Cohen *et al.*, 2008; Zang, 2012). In accrual earnings management, managers use their authority to choose accounting methods (Scott, 1997); and in real earnings management, they try to achieve their goals by manipulation of real activities. So far, many studies have addressed accrual earnings management (e.g. Schipper, 1989; Jones, 1991; Dechow *et al.*, 1995; Teoh *et al.*, 1998) and we can claim that investors, creditors, capital market observers, and other organizations have enough knowledge about it. The findings of Enomoto *et al.* (2012) in 38 countries have shown that accrual earnings management is controlled in these countries. Although managers' opportunistic behaviors are decreased by this knowledge, it is not through attention to this issue that managers' motivation to



gain more benefits and their restrictions in the manipulation of accrual items cause them to tend to choose alternative ways such as real activities manipulation. In this regard, recent studies show that managers use real activities manipulation to achieve their goals (Bens *et al.*, 2002; Roychowdhury, 2006; Cohen and Zarowin, 2010; Kim *et al.*, 2010). However, we argue that managers prefer to use accrual earnings management to earn more bonuses. It is for this reason that real earnings management will reduce a firm's performance in future periods (Gunny, 2005) and, on the other hand, that increasing managers' bonuses is associated with an improvement of the firm's performance (Chaubey and Kulkarni, 1988; Mehran, 1995). Generally, managers are aware of the negative effects of real earnings management on the firm's future performance and, for this reason, they prefer to improve the firm's performance to achieve more bonuses when their ability to manage accruals is constrained; therefore, they avoid real earnings management.

Managers could cause wrong decisions in measuring the firm's real performance by accruals manipulation and create a loss for stockholders and other beneficiaries. Still, real earnings management potentially imposes greater long-term costs on shareholders than accrual earnings management, because it has negative consequences for future cash flows and might hurt the firm's value in the long run (Roychowdhury, 2006; Cohen *et al.*, 2008; Cohen and Zarowin, 2010). These long-term costs are driven by methods that are used in real earnings management, such as temporary price discounts or more lenient credit terms that lower margins on future sales, reductions in valuable investments in research and development and SG&A activities, and/or increasing investments in unneeded inventories via inventory over-production (Roychowdhury, 2006; Gunny, 2010; Gupta *et al.*, 2010). However, managing real activities is less costly to managers because it is less likely to draw auditor or regulatory scrutiny (Cohen *et al.*, 2008). Real earnings management, as long as it is properly disclosed in the financial statements, cannot influence auditors' opinions or regulators' actions (Kim *et al.*, 2010). Hence, Roychowdhury (2006) argues that managers prefer real earnings management to accrual earnings management.

Factors such as receiving more bonuses (Healy, 1985; Moses, 1987; Guidry *et al.*, 1999) and achieving a position and job security (Fama, 1980; Fudenberg and Tirole, 1995; Arya *et al.*, 1998) can increase managers' motivations to manipulate operating results. As already mentioned, research shows that managers use real earnings management to achieve their goals, including more bonuses if they are constrained in accrual earnings management. Real earnings management as a method helps the manager to increase current-period earnings by real activities manipulation and they gain more bonuses, but in this way they decrease the firm's performance in future periods (Gunny, 2005). Therefore, with consideration of the current and future effects of real earnings management and, on the other hand, the results of prior research showing that managers resort to real earnings management to achieve their goals when their ability to manage accruals is constrained, we face the question of whether managers increase current earnings through real activities manipulation to gain more bonuses or whether they have a long-term view of their benefits and, since real earnings management therefore has negative consequences for future performance, they avoid it so that it does not threaten their future benefits. So, we try in this study to find an answer to this question. We analyze the subject and find an answer to it in two stages: first we examine the effect of managers' bonus incentives on methods of accrual earnings management and real earnings management; and second, we consider the

influences that managers' bonuses and real earnings management will have on future operating performance.

We focus on a sample of 672 firm-year observations from 2006 to 2012. Our primary finding is that within that sample, higher managers' bonuses are associated with higher levels of overall accrual earnings management. We also find that higher managers' bonuses are associated with lower overall levels of the real earnings management index and the components of that index; that is, higher levels of abnormal cash flows and lower levels of abnormal production costs. Collectively, our findings are consistent with our predictions that managers' bonuses are associated positively with accrual earnings management and negatively with real earnings management. In addition, we analyze these conclusions by examining the relationships between managers' bonuses, real earnings management, and future operating performance. When we use managers' bonuses and real earnings management as the independent variables, we find that the coefficients on level of future operating performance are positive and negative, respectively. These findings show that managers prefer to gain more bonuses by manipulating the accrual items and avoid real earnings management, because it has negative consequences for future operating performance and might deprive them of future benefits. A positive relationship between managers' bonuses and future operating performance shows that managers are looking to gain more bonuses by improving the performance of the firm.

2. Literature review and hypothesis development

2.1 Literature review

Initially, it was assumed that incentive contracts including compensation plans can be aligned in the interests of owners and managers. However, the perspective of agency theory proved that such contracts may sometimes motivate managers to manipulate performance results. In other words, without the firm's performance providing favorable results for owners, managers show the results that are favorable to them, despite the facts. In this regard, prior research in the field of accrual earnings management describes many reasons for manipulating the results of operations, one of which is a bonus plan (e.g. Healy, 1985; McNichols and Wilson, 1988; Gaver *et al.*, 1995; Holthausen *et al.*, 1995; Cheng and Warfield, 2005; Bergstresser and Philippon, 2006; Houmes and Skantz, 2010). Healy (1985) provides primary evidence indicating that bonus contracts are motivational for accrual earnings management. Since managers have access to inter-organizational information, this provides opportunities for them to manage earnings and maximize their bonuses. In particular, Davidson *et al.* (2007), Cornett *et al.* (2009), and Jiang *et al.* (2010) suggest that the bonuses of senior managers are associated with the firm's performance and that this relationship is strengthened through accrual earnings management. In addition, companies whose senior managers are close to retirement, as well as companies that have larger bonus plans, have greater discretionary accruals. Bergstresser and Philippon (2006) also find evidence that managers use discretionary accruals in order to manipulate reported earnings in companies in which potentially all advantages and plans of managers' compensation are based on the value of stock or stock options.

The research mentioned shows that managers manipulate reported earnings to earn more benefits. On the other hand, Enomoto *et al.* (2012) prove that accrual earnings management is relatively controlled in different countries. On this condition, according to Roychowdhury (2006), Cohen and Zarowin (2010), Gunny (2010), and Chi *et al.* (2011), it should be expected that when managers are restricted in their manipulation

of discretionary accruals, they have a tendency to manipulate real activities. Although these studies show that managers seek to achieve their goals with real earnings management if they are constrained in accrual earnings management, two categories of research express different results, which will be referred to in the rest of this paper.

The first group of these studies indicate that bonus plans can be a combination of cash, stock, and other options that are calculated based on the function of managers' performance in earnings and stock returns (Healy, 1985; Jensen and Murphy, 1990; Ely, 1991; Dechow *et al.*, 1994; Gaver *et al.*, 1995; Murphy, 1999; Jensen *et al.*, 2004). Natarajan (1996) explains that accruals and cash from operations have different weights in the compensation package and that in addition to earnings, cash flow from operations can also influence the calculation of bonuses payable to managers. The proof of this claim can be hidden in the answer to this question: Why is the capital market's perception of the efforts of management that is reflected in the framework of stock prices sometimes different from the reported accounting earnings?

Ronen and Yaari (2008) argue that stakeholders are aware of the fact that accounting earnings may have undergone distortion as a result of managers' choices in the adoption of accounting methods or their estimates of options. In other words, accounting measurement issues may distort the link between the actual efforts of managers and the firm's performance that is shown in the form of accounting earnings (Basu, 1997; Barclay *et al.*, 2000). Hence, in addition to the reported earnings of the firm, shareholders must pay attention to stock returns and cash flows to determine managers' bonuses. The stock return is equal to the net present values of the stock price and cash proceeds in future periods (Lehn and Zhao, 2006) and represents the response of the capital market to the firm's future performance (Barclay *et al.*, 2000). For this reason, the pricing of shares might vary with the firm's performance results that are reflected in the form of accrual earnings. Therefore, based on these studies, it is expected that when both cash and accrual earnings are effective in the calculation of payable bonuses, managers tend to create debt rather than paying cash, or use cash sales instead of credit sales (Ronen and Yaari, 2008). Because these factors help to improve the firm's performance and its growth rate in the long run, managers can reach certain thresholds that are the expectations of investors and benefit themselves through more bonuses (Ittner *et al.*, 1997; Indjejikian and Nanda, 2002; Nagar, 2002; Prendergast, 2002). Therefore, it is not expected that the incentive to gain higher interest causes managers to manipulate real activities, because real earnings management has a negative impact on the firm's growth and operating cash flows (Gunny, 2005; Roychowdhury, 2006).

The main axis of the second category of research refers to earnings management tools and their application time. There are various tools that are available for management in order to manipulate the results of operations, such as a choice from a menu of treatments that are accepted under GAAP (Hughes and Schwartz, 1988; Malmquist, 1990; Zeff, 1993; Neill *et al.*, 1995; Aboody, 1996; Bishop and Eccher, 2000; Bowen *et al.*, 2002); a judgment call when GAAP requires estimates (Bishop and Eccher, 2000; Black *et al.*, 2000; Burgstahler *et al.*, 2002; Brown, 2004; Bergstresser *et al.*, 2006; Hann *et al.*, 2007; Riedl and Srinivasan, 2010); the classification of items as above or below the line of operating earnings (e.g. Godfrey and Jones, 1999; Dye, 2002; Lin *et al.*, 2006; McVay, 2006); timing the recognition of revenues and expenses (Bartov, 1993; Muller, 1999; Gunny, 2005); and real activities manipulation (Baber *et al.*, 1991; Hansen and Hill, 1991; Bushee, 1998; Darrough and Rangan, 2005; Roychowdhury, 2006;

Lin *et al.*, 2006; Bens and Monahan, 2008; Singer, 2008; Gunny, 2010; Zang, 2012). The selection of any one of these tools and how to apply it depend on the model that management desires. Managers use “taking a bath” and choose accounting procedures from among those that have the greater costs or consider higher estimates for types of accumulations if their purpose is income minimizing. In addition to this, managers will act in the reverse way if their purpose is earnings maximizing. Moreover, income smoothing is another pattern that may be adopted by management and be applied by them using the appropriate tools.

A notable subject is the conditions that will determine management’s goal. For example, Gaver *et al.* (1995), Holthausen *et al.* (1995), and Guidry *et al.* (1999) find that managers hoard reported outcomes when their performance exceeds the maximum performance measure that still pays a bonus. In addition, some researchers indicate that managers do not use “taking a bath” when performance is too low. Instead, they implement income smoothing (Gaver *et al.*, 1995; Holthausen *et al.*, 1995; Reitenga *et al.*, 2002). Now, by considering the characteristics and effects of real earnings management, it seems unlikely that managers attempt real activities manipulation in both conditions (high performance and low performance), because they are seeking to accumulate earnings in high performance and do not need to manipulate real activities to increase their earnings. Furthermore, since real earnings management has negative effects on the firm’s performance (Gunny, 2005; Roychowdhury, 2006), it is expected that low performance will cause managers to avoid real activities manipulation, because they do not want to worsen the firm’s performance and expose themselves to shareholder pressure. In this context, DeAngelo (1988) finds that dissident shareholders blame management for poor performance and reduction of their interests, such as shareholders causing them to try to change management.

2.2 Hypothesis development

Hence, due to the negative effects of real earnings management on a firm’s performance and future cash flows, it can be argued that this is contrary to expectations. Namely, the bonuses cannot appropriate the motivation for real activities manipulation. The first group of studies shows that managers’ bonuses in addition to accounting earnings are a function of the cash flow and growth rate of the firm, and thus that managers avoid real activities manipulation due to the negative impacts that it has on these factors. Also, according to the second category of research, the type of tool used by managers to achieve their goals depends on the conditions and incentives of the firm’s managers. If performance is low and managers’ intentions are to raise income unrealistically, they try to do this with methods other than real earnings management, because this procedure will worsen the low performance of firms and endanger the interests of managers. On the other hand, managers are not required to conduct real activities manipulation to increase earnings if the firm’s performance is sufficiently high and provides a threshold of bonus for them. It seems unlikely that managers would deprive themselves of bonuses in future years with real activities manipulation even if they do not meet these thresholds, because real earnings management by reducing the firm’s performance in the future will cause shareholders to be discontented. Therefore, we expect that managers’ bonuses will be associated with higher accrual earnings management and lower real earnings management. Hence, hypotheses are developed as follows to examine the researcher’s expectation that derives from the first and

second groups of studies, in contrast to research that shows that managers manipulate real activities to achieve their goals:

- H1. There is a significant positive association between managers' bonuses and accrual earnings management.
- H2. There is a significant negative association between managers' bonuses and real earnings management.

3. Research methodology

In order to test the research hypotheses, the methodology of compositional data were used. By following previous studies in the field of real earnings management (e.g. Roychowdhury, 2006; Cohen *et al.*, 2008; Cohen and Zarowin, 2010; Gunny, 2010; Zang, 2012), real activities manipulation patterns are examined as real earnings management measures. These patterns include manipulating sales so that the effect is a form of abnormally low levels of cash flow from operations (Abn_CFO), abnormal production costs or greater over-production than necessary (Abn_Prod), and abnormal discretionary expenses (Abn_Disccexp). In other words, managers are attempting to manage real earnings through one or all of these patterns. This study uses the extended models of Roychowdhury (2006) that are based on that of Dechow *et al.* (1998), as also applied by Gunny (2005, 2010), Cohen and Zarowin (2010), and Zang (2012), for the calculation of normal operating cash flows, normal production costs, and normal discretionary expenses. Then, the abnormal level of real activity manipulation for each pattern is measured as the residual of the relevant estimated model.

Roychowdhury (2006) defines sales manipulation as managers' efforts to accelerate the timing of sales through increased price discounts or more lenient credit terms. Such discounts and lenient credit terms will temporarily increase sales volumes, but these will result in lower cash flows in the current period. Equation (1) is used to estimate the normal level of operating cash flows:

$$CFO_t/A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \beta_1(S_t/A_{t-1}) + \beta_2(\Delta S_t/A_{t-1}) + \varepsilon_t \quad (1)$$

where CFO_t is the cash flow from operations at the end of period t , A_t is the total assets at the end of period t , S_t the sales during period t , and $\Delta S_t = S_t - S_{t-1}$.

Another type of real activities manipulation is the production of more goods than necessary. By over-production, managers can spread the fixed overhead costs over a larger number of units, thus lowering fixed costs per unit. As long as the reduction in fixed costs per unit is not offset by any increase in marginal cost per unit, total cost per unit declines. On the other hand, the surplus goods produced at the end of the period will result in the absorption of cost of goods sold (COGS). Therefore, over-production decreases COGS and leads to higher margins in operating earnings. According to Roychowdhury (2006), normal levels of production costs are calculated by Equation (2):

$$Prod_t/A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \beta_1(S_t/A_{t-1}) + \beta_2(\Delta S_t/A_{t-1}) + \beta_3(\Delta S_{t-1}/A_{t-1}) + \varepsilon_t \quad (2)$$

where $Prod_t$ is the sum of COGS and change in inventory in year t .

The third type of real activities manipulation is the reduction of discretionary expenses. If managers reduce discretionary expenses (e.g. advertising expenses, research and development expenses, and SG&A expenses), this increases the earnings

in that period by the same proportion. Therefore, it is expected that low discretionary expenses would be a way of achieving the desired earnings. According to Roychowdhury (2006), the normal level of discretionary expenses is estimated based on the linear function of sales in Equation (3):

$$Discexp_t/A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \beta(S_{t-1}/A_{t-1}) + \varepsilon_t \quad (3)$$

where $Discexp_t$ is the sum of advertising expenses, R&D expenses, and SG&A expenses.

Also, in order to further the analysis the real earnings management index (REM_Index) is used, a method of calculation that has been described in Chi *et al.* (2011). Higher levels of REM_Index indicate higher levels of overall real earnings management. Following Chi *et al.* (2011), we compute REM_Index as the sum of the three standardized individual components, i.e., – standardized Abn_CFO + standardized Abn_Prod – standardized Abn_Discexp. Because the three individual variables provide richer information regarding real earnings management than using REM_Index alone (Chi *et al.*, 2011), we report results corresponding to the comprehensive real earnings management index (REM_Index) as well as the three individual real earnings management proxies (Abn_CFO, Abn_Prod, and Abn_Discexp).

After estimating real earnings management, the relationships of the independent variables with any of the real earnings management patterns are examined by cross-sectional regression:

$$REM_t = \alpha_0 + \alpha_1 \times COMP_t + \alpha_2 \times BRDS_t + \alpha_3 \times OutDir_t + \alpha_4 \times IndExp_t + \alpha_5 \times Size_{t-1} + \alpha_6 \times Lev_{t-1} + \alpha_7 \times ROE_{t-1} + \alpha_8 \times \Delta E_{t-1} + \varepsilon_t \quad (4)$$

where the dependent and independent variables are defined as follows.

REM is the real earnings management patterns that are proxies for: Abn_CFO the abnormal cash flows (negative measure of real earnings management); Abn_Prod the abnormal inventory over-production (positive measure of real earnings management); $Abn_Discexp$ the abnormal discretionary expenses (negative measure of real earnings management); REM_Index the – standardized Abn_CFO + standardized Abn_Prod – standardized Abn_Discexp. Standardized measure for each variable = [variable-mean (variable)]/standard deviation (variable); $COMP$ the natural log of managers' bonuses for a firm.

Also, we use other variables whose associations with earnings management are proved in prior research:

$BRDS$ is the natural log of the number of board members; $OutDir$ the proportion of directors that are non-executive on the board; $IndExp$ the 1 if auditor is an industry expertise audit firm, and 0 otherwise. According to Palmrose (1986), the market share of the auditor is calculated and it is determined as an industry expertise audit firm if it reaches the threshold specified in this study; $Size$ is the the natural log of total value of assets for a firm; Lev the a firm's financial leverage, defined as the ratio of total debt to total assets; ROE the a firm's return on equity, defined as the ratio of net income deflated by prior-period equity; ΔE the change in a firm's annual earnings, deflated by prior-year assets.

Managers will avoid real earnings management if it endangers their benefits with a reduction in the firm's performance in future periods. In this case, it is expected that by increasing the amount of the bonus, management will feel more responsibility toward shareholders' interests and will try to improve the firm's performance. Therefore, our

forecast is that managers' bonuses will have a negative relationship with the real earnings management index (REM_Index) and we would expect positive, negative, and positive coefficients between managers' bonuses with abnormal operating cash flows (Abn_CFO), abnormal production costs (Abn_Prod), and abnormal discretionary expenses (Abn_Discexp), respectively, if real earnings management proxies are used.

We use the size of the board and the proportion of non-executive managers in order to control for the effects of board structure, and we also use industry expertise of the auditor as measured based on auditor market share to control for the effects of the type of auditor as controlling variables in the regression model. According to Visvanathan (2008), and Hashemi and Rabiee (2011), a higher size of board and proportion of non-executive managers will result in a reduction in real earnings management. On the other hand, Chi *et al.* (2011) find that management is restricted in accrual earnings management and resorts to real activities manipulation when the auditor has industry expertise. Also, we use other variables such as firm size, financial leverage, return on equity, and earnings variation, whose associations with earnings management are proved in prior research.

4. Sample selection and data descriptions

We start with all listed companies for the period 2005-2012, yielding 2,415 firm-year observations. We then exclude: firms with missing data to calculate real earnings management measures (540); firms in the financial sector (286); firms whose fiscal year is inconsistent with others (322); and firms that had a change in fiscal year over the research period (308). These exclusions leave a total of 959 firm-year observations. Next, in order to achieve reliable results in this study, the appropriate statistical software has been used for estimation of sample size for the remaining observations. One of the appropriate statistical software packages is PASS, which is used for the estimation of sample size in the studies that focus on decision-making. By using the results of this software, 672 firm-year observations were selected in ranges from 2005 to 2012. Table I presents the sample selection procedures.

Table II provides descriptive statistics for the variables. The mean REM_Index is -0.491 . The means of its three components, Abn_CFO, Abn_Prod, and Abn_Discexp, are 0.029, -0.035 , and 0.002, respectively. These results are relatively consistent with those reported in Cohen *et al.* (2008) and Chi *et al.* (2011). On average, the bonus logarithm (COMP) is 6.569. In addition, the minimum and maximum of the bonus logarithm are 3.738 and 9.200, respectively, and a figure of 0.868 is obtained as the standard deviation for this variable.

Table III represents the Pearson correlations. Abnormal operating cash flow (Abn_CFO), abnormal production costs (Abn_Prod), and abnormal discretionary

	Firm-year obs.
Total of firm-year observations from 2005 to 2012	2,415
Missing data to calculate real earnings management measures	(540)
Financial institutions	(286)
Observations that their fiscal year are inconsistency with others	(322)
Observations that have change in fiscal year over the period 2005 to 2012	(308)
Observations are qualified for examination	959
Number of selected sample from the observations are qualified for examination	672

Table I.
Sample selection

Table II.
Descriptive statistics

	Mean	SD	Minimum	Median	Maximum
REM _t	-0.491	2.075	-8.997	-0.140	3.629
Abn_CFO _t	0.029	0.148	-0.542	0.007	0.545
Abn_Prod _t	-0.035	0.138	-0.565	-0.008	0.249
Abn_Discexp _t	0.002	0.043	-0.062	-0.009	0.255
COMP _t	6.569	0.868	3.738	6.588	9.200
BRDS _t	1.618	0.049	1.386	1.609	1.946
OutDir _t	0.662	0.175	0.000	0.600	1.000
IndExp _t	0.440	0.497	0.000	0.000	1.000
Size _{t-1}	13.023	1.151	9.821	12.930	17.636
Lev _{t-1}	0.618	0.155	0.118	0.636	0.913
ROE _{t-1}	38.892	48.565	-190.012	33.927	446.025
ΔE _{t-1}	0.022	0.134	-0.627	0.011	1.143

expenses (Abn_Discexp) are negatively, positively, and negatively correlated with the real earnings management index (REM_Index), respectively. These results are also similar to the findings of Cohen *et al.* (2008) and Chi *et al.* (2011) as well as researcher expectations, because the increase in real earnings management is accompanied by a reduction in operating cash flows, increase in production costs, and reduction in discretionary expenses. Other notable results are negative coefficients between bonuses, proportion of non-executive managers, and auditors' industry expertise with REM_Index. This indicates that these factors have a negative relationship with real earnings management.

5. Empirical findings

In order to prove that management bonuses are a motivation for the manipulation of operating results, first it is necessary to examine the relationship between managers' bonuses and accrual earnings management. This is done using Equation (5), developed by Cohen *et al.* (2008) and Chi *et al.* (2011) as follows:

$$DA_t = \alpha_0 + \alpha_1 \times COMP_t + \alpha_2 \times BRDS_t + \alpha_3 \times OutDir_t + \alpha_4 \times IndExp_t + \alpha_5 \times Size_{t-1} + \alpha_6 \times Lev_{t-1} + \alpha_7 \times ROE_{t-1} + \alpha_8 \times \Delta E_{t-1} + \varepsilon_t \quad (5)$$

where DA_t is the modified Jones (1991) model of discretionary accruals.

All other variables are as defined before. The estimation results of the above regression are provided in Table IV. As we had expected, there is a significant positive relationship between managers' bonuses and accrual earnings management at the 99 percent level and therefore $H1$ is not rejected. This relationship shows that by increasing the amount of bonus payable, managers have more incentive to undertake accrual earnings management in order to maximize their benefits. These findings are similar to prior studies (e.g. Barton, 2001; Gao and Shrieves, 2002; Marquardt and Wiedman, 2005). Thus, managers are trying to raise the firm's performance by accrual earnings management and thereby to achieve greater bonuses.

It has been proven that there is a positive relationship between bonuses and accrual earnings management. Now, we can examine the claim that in the same way as managers resort to accrual earnings manipulation to increase their benefits, real earnings management can be another way to achieve this goal; or whether because real earnings management only increases current period earnings and on the other hand

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)
REM_Index (A)											
Abn_CFO (B)	-0.722**										
Abn_Prod (C)	0.807**	-0.522**									
Abn_Discexp (D)	-0.545**	-0.023	-0.152**								
COMP (E)	-0.229**	0.179**	-0.239**	0.058							
BRDS (F)	0.034	-0.028	0.026	-0.018	0.089*						
OutDir (G)	-0.124**	0.168**	-0.164**	-0.073	0.097*	0.097*					
IndExp (H)	-0.066	0.019	-0.042	0.075	0.025	0.039	-0.032				
Size (I)	0.071	-0.006	0.055	-0.086*	0.106**	0.084*	-0.089*	0.379**			
Lev (J)	0.202**	-0.237**	0.215**	0.032	-0.26**	-0.142**	-0.129**	0.059	-0.075		
ROE (K)	-0.220**	0.198**	-0.228**	0.032	0.133**	-0.006	0.034	0.077*	0.018	-0.035	
ΔE (-)	-0.249**	0.163**	-0.258**	0.096*	0.032	-0.003	0.046	0.000	-0.051	0.054	0.225**

Note: ***,**Significant at 0.05 and 0.01 levels, respectively

Table III. Correlation matrix

Table IV.
Bonus and accrual
earnings
management

	Coefficient	<i>t</i> -statistic	Prob.
Intercept	-0.333	-1.264	0.207
COMP _{<i>t</i>}	0.031	2.849	0.005
BRDS _{<i>t</i>}	0.319	2.153	0.032
OutDir _{<i>t</i>}	-0.038	-0.948	0.344
IndExp _{<i>t</i>}	0.025	1.628	0.105
Size _{<i>t-1</i>}	-0.022	-2.589	0.010
Lev _{<i>t-1</i>}	-0.068	-1.402	0.162
ROE _{<i>t-1</i>}	6.18E-5	0.367	0.714
ΔE _{<i>t-1</i>}	0.256	4.324	0.000
<i>Model fit</i>			
<i>n</i>	672		
<i>R</i> ²	0.143		
Adj. <i>R</i> ²	0.121		
<i>F</i> -stat	6.711		
<i>p</i> -value	0.000		

will reduce the firm's performance in future periods, managers avoid it and will not endanger their bonuses in future years by the manipulation of real activities.

Table V presents our main results. After controlling for the effects of the control variables, we find a significant negative coefficient of -0.568 for COMP in the

Table V.
Bonus and real
earnings
management

	REM_Index	Abn_CFO	Abn_Prod	Abn_Discexp
Intercept	-4.736 (-1.276)	0.083 (0.313)	-0.383 (-1.617)	-0.000 (-0.003)
COMP _{<i>t</i>}	-0.568** (-3.716)	0.028** (2.621)	-0.055** (-5.647)	-0.002 (-0.567)
BRDS _{<i>t</i>}	2.727 (1.305)	-0.131 (-0.882)	0.189 (1.414)	-0.002 (-0.043)
OutDir _{<i>t</i>}	-1.235* (-2.160)	0.089* (2.285)	-0.084* (-2.303)	0.025* (2.120)
IndExp _{<i>t</i>}	-0.266 (-1.224)	-0.017 (-1.131)	-0.010 (-0.726)	0.008* (1.815)
Size _{<i>t-1</i>}	0.337** (2.864)	0.002 (0.219)	0.034** (4.472)	-0.002 (-0.812)
Lev _{<i>t-1</i>}	1.052 (1.542)	-0.227** (-4.773)	0.101* (2.324)	0.033* (2.261)
ROE _{<i>t-1</i>}	-0.012** (-5.002)	0.001** (5.874)	-0.001** (-5.138)	4.94E-6 (0.090)
ΔE _{<i>t-1</i>}	-3.101** (-3.716)	0.081 (1.436)	-0.187** (-3.518)	0.031* (1.915)
<i>Model fit</i>				
<i>n</i>	672	672	672	672
<i>R</i> ²	0.274	0.309	0.329	0.251
Adj. <i>R</i> ²	0.256	0.279	0.312	0.212
<i>F</i> -stat	15.208	10.124	19.790	6.579
<i>p</i> -value	0.000	0.000	0.000	0.000

Notes: The regression models of Abn_CFO and Abn_Discexp are based on fixed-effects and other regressions have been estimated by the pool method. Also, the *t*-statistics are provided in parentheses.
*, **Significant at 0.05 and 0.01 levels, respectively

REM_Index regression. In other words, managers' bonuses are negatively associated with real earnings management. We also present regression results in the next three columns using each of the three components of REM_Index as dependent variables. We find a positive coefficient of 0.028 ($t=2.621$), a negative coefficient of -0.055 ($t=-5.647$), and a negative coefficient of -0.002 ($t=-0.567$) for COMP in the Abn_CFO, Abn_Prod, and Abn_Discepx regressions, respectively. Significant relationships between COMP and Abn_CFO and Abn_Prod show that this variable has a significant effect on abnormal operating cash flows and abnormal production costs. However, we do not detect a significant relationship between Abn_Discepx and COMP. These results prove that the increase in managers' bonuses will be accompanied by higher operating cash flows and lower production costs. In general, findings show that the increase in managers' bonuses is associated with lower levels of real earnings management and that managers resort to improvement of the firm's performance in order to increase their bonuses. Also, they avoid real activities manipulation such as manipulation in sales and over-production that damages the firm's future performance. It is clear that managers are aware of the negative effects of real earnings management on the firm's future performance and also of the possibility of a reduction of their interests in future years as the result of these effects. These results are consistent with Holthausen *et al.* (1995), who proved that managers do not manipulate real activities to increase managerial bonuses.

Although real earnings management increases the firm's earnings in the current period and will be accompanied by higher levels of bonuses, it seems unlikely that managers would agree to the acquisition of current interests on the condition that they would lose future interests. It is expected that managers are continually looking to increase and earn bonuses and will not disrupt this trend by real earnings management. As pointed out before, in addition to the firm's earnings, cash flows, and the firm's growth rate are the determinative indexes for the amount of managers' bonuses and, therefore, managers are forced to avoid real activities manipulation. They will try to satisfy shareholders by improvement of the firm's performance; on the other hand, they prefer to achieve their goals by accruals manipulation techniques if the firm's earnings do not meet their thresholds. These results are indirectly consistent with the findings of Natarajan (1996) and Gunny (2005). Thus, the results show that higher managers' bonuses are associated with lower levels of real earnings management.

Another result is a significant negative relationship between the proportion of non-executive managers and the overall level of real earnings management. We also find significant positive, negative, and positive coefficients for OutDir in the Abn_CFO, Abn_Prod, and Abn_Discepx regressions, respectively. Non-executive managers have incentives to be efficient monitors in order to maintain their validity. They have more independence compared to other members and this means that they are in a better position to protect the interests of shareholders. This finding is similar to the results of Hashemi and Rabiee (2011), because both of them show that the effectiveness of the board in supporting shareholders' interests increases when the ratio of non-executive managers is increased and will prevent the real activities manipulation that endangers the interests of shareholders.

The results indicate that there is not a significant relationship between the size of the board (BRDS) and real earnings management. Also, despite expectations, there is a significant positive relationship between auditor industry expertise (IndExp) and Abn_Discepx; significant relationships are not found between this variable and the other real earnings management proxies. This result indicates that auditor industry

expertise has a significant effect only on abnormal discretionary expenses and that this effect is incremental. In other words, auditor industry expertise is associated with lower levels of real earnings management. Chi *et al.* (2011) find evidence that firms resort to real earnings management when their ability to manage accruals is constrained by the higher industry expertise of the auditor. Perhaps we can analyze the results in this study, which are contrary to the findings of Chi *et al.*, based on the studies of Bar-Yosef and Livnat (1984), Firth and Smith (1992), and Abbott and Parker (2000). They showed that according to signaling theory, firms with higher performance resort to conveying this signal to the capital market and employing industry expertise auditors is a tool for this purpose. Therefore, it could not be expected that the managers of such firms have a tendency to real earnings management, because they earn more bonuses for their high performance and also meet investors' expectations. Under this condition, managers do not weaken the firm's performance by real activities manipulation.

5.1 Additional analyses

As has been seen, an increase in bonuses will result in lower real earnings management. Apparently, managers who receive higher bonuses have more motivation to satisfy the expectations of investors and this provides more responsibility for them. This issue makes it completely clear that managers have a long-term perspective to their interests and do not endanger their interests in the long term with momentary decisions. Based on this approach, we can claim that managers avoid real activities manipulation, because real earnings management increases current-period earnings and will result in an increase in managers' bonuses. However, it will create many problems between managers and shareholders after the weakening of the firm's performance and also will deprive management of bonuses in future years.

The above expressions are the researcher's expectations. Therefore, in order to examine this claim, we will pay attention to the relationship between managers' bonuses and firm's performance. If the foregoing is correct, we predict that increases in bonuses and real earnings management will have positive and negative relationships with the firm's future performance, respectively. To analyze this issue, in accordance with Gunny (2010) we examine the relationship between these factors with adjusted return on assets (Adj. ROA) in each of the future three years and the total of the three years in Equation (6). Adjusted return on assets is an index of the firm's performance:

$$\begin{aligned} Adj.ROA_t = & \alpha_0 + \alpha_1 \times COMP_t + \alpha_2 \times BRDS_t + \alpha_3 \times OutDir_t + \alpha_4 \\ & \times IndExp_t + \alpha_5 \times Size_{t-1} + \alpha_6 \times Lev_{t-1} + \alpha_7 \times ROE_{t-1} + \alpha_8 \\ & \times \Delta E_{t-1} + \alpha_9 \times REM_t + \varepsilon_t \end{aligned} \quad (6)$$

where $Adj. ROA_t$ is the adjusted return on assets; it equals the difference between firm-specific ROA and the average ROA for the same year and industry.

All other variables are as defined before. Table VI presents our results. As expected, there is a significant positive relationship between the amount of bonuses and the firm's performance in each of the next two years and also the firm's total performance in the next three years, which is measured by the adjusted return on assets. In addition, there is a significant negative relationship between the overall level of real earnings management (REM_Index) and the firm's performance in each of the next three years and the total performance of the firm in the next three years.

These results are consistent with the findings of Gunny (2005) about the negative effects of real earnings management on the firm's future performance. In summary,

	$\sum_{i=1}^3 \text{Adj.ROA}_i$	Adj.ROA ₊₁	Adj.ROA ₊₂	Adj.ROA ₊₃
Intercept	84.110* (2.123)	25.867 (1.849)	17.836 (0.884)	18.777 (0.736)
COMP _t	3.715* (2.206)	2.157** (3.734)	1.712* (2.022)	1.269 (1.176)
BRDS _t	-32.764 (-1.476)	-8.808 (-1.116)	-6.377 (-0.562)	-9.698 (-0.668)
OutDir _t	13.265* (2.073)	2.714 (1.280)	3.292 (1.040)	8.001* (2.051)
IndExp _t	3.170 (1.314)	0.633 (0.789)	-0.219 (-0.184)	-0.035 (-0.024)
Size _{t-1}	-0.173 (-0.130)	-0.486 (-1.113)	-0.156 (-0.241)	0.149 (0.184)
Lev _{t-1}	-61.183** (-7.944)	-19.962** (-7.907)	-15.364** (-4.126)	-15.541** (-3.261)
ROE _{t-1}	0.188** (6.443)	0.099** (9.950)	0.067** (5.004)	0.059** (3.758)
ΔE _{t-1}	46.438** (4.708)	29.020** (8.993)	23.053** (4.991)	-7.136 (-1.307)
REM _t	-3.532** (-5.865)	-0.949** (-4.590)	-1.328** (-4.383)	-1.295** (-3.353)
<i>Model fit</i>				
<i>n</i>	672	672	672	672
<i>R</i> ²	0.631	0.709	0.407	0.210
Adj. <i>R</i> ²	0.607	0.697	0.390	0.184
<i>F</i> -stat	26.572	59.462	24.102	7.870
<i>p</i> -value	0.000	0.000	0.000	0.000

Table VI.
Effects of the real earnings management and managers' bonus on the future operating performance

Notes: The regression model of $\sum_{i=1}^3 \text{Adj.ROA}_i$ is based on fixed-effects and other regressions have been estimated by the pool method. Also, the *t*-statistics are provided in parentheses. *, **Significant at 0.05 and 0.01 levels, respectively

managers are motivated to improve the firm's performance by increasing their bonuses and, finally, they avoid real activities manipulation, because the results show that real earnings management will reduce the firm's performance in future years.

6. Conclusions

The literature in the field of accrual earnings management suggests that bonuses are a very strong incentive for managers to manipulate operational results. In recent years, new dimensions of managers' approach have been discovered in firms' earnings management by bringing the phenomenon of real earnings management to the field of financial research.

Most researchers have noted that managers' incentive to earn more bonuses through the distortion of earnings and, on the other hand, the restriction of accruals manipulation will cause them to use real activities manipulation for achieving their goals. However, real earnings management has negative effects on the future performance of the firm. So far, this issue has not been seen from the perspective of whether managers deprive themselves of future bonuses by real activities manipulation. Real earnings management will weaken the firm's performance and shareholders will blame managers for the poor performance.

Therefore, this research examines this issue through two hypotheses. By testing the first hypothesis, we find that there is a positive relationship between managers' bonuses and accrual earnings management. In other words, managers resort to earning more bonuses through accruals manipulation. Then we have examined the second hypothesis, contrary to the findings of researchers suggesting that managers resort to real earnings management when their ability to manage accruals is constrained.

By considering the negative effects of real earnings management on the firm's future performance, we expect to achieve different results to previous studies. Namely, we predict that a higher level of managers' bonuses will be associated with lower real earnings management. The testing of the second hypothesis proves this relationship. In other words, the results show that managers do not use real activities manipulation to further their interests and earn more bonuses. In addition, they have more motivation to improve the firm's performance with an increase in their bonuses. At the end of the study, we examine the claim that real earnings management reduces the firm's performance in future periods. We find a negative relationship between real earnings management and the firm's future performance; we also discover a positive relationship between managers' bonuses and the firm's future performance.

The results of this study along with other findings in this field create a substantial understanding for investors and other capital market institutions and also for auditors and observers. Although recent studies have shown that managers resort to real earnings management if they are restricted in accrual earnings management, the negative effects of this phenomenon on the firm's future performance should be considered. In other words, from the managers' perspective the issue should be considered of whether managers endanger the firm's performance in future periods by real activities manipulation in order to enhance current-year earnings and expose themselves to the shareholders' pessimism. For this reason, it is suggested that shareholders prepare bonus plans in accordance with performance, in order for managers really to improve the firm's performance.

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