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Managerial ability and real earnings management

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ABSTRACT

Prior studies investigate the determinants and consequences of real earnings management (REM) as a function of firm-specific characteristics. In this study, we examine how managerial ability relates to the use of REM and future firm performance. We find that higher-ability managers engage in less REM. Furthermore, we find that managers with superior ability reduce the negative impact of REM on future firm performance. This is consistent with prior studies, which link higher-ability managers to better management of firm resources and more positive outcomes.

1. Introduction

This study examines the role of managerial ability in real earnings management (REM). REM is manager's purposeful action that deviates from the optimal business practice to alter reported earnings in a particular direction (Roychowdhury, 2006). Prior studies (e.g., Cohen & Zarowin, 2010; Zang, 2012) focus on firm-level characteristics (e.g., the relative costs and constraints of REM and accrual-based earnings management) that lead to manager's choice of REM. However, in addition to firm-level characteristics, executive characteristics may affect the use of REM. Our study investigates the relation between managerial ability and the use of REM. Furthermore, prior studies (e.g. Bhojraj, Hribar, Picconi, & McInnis, 2009; Cohen & Zarowin, 2010) suggest that REM is a value-destroying activity and has a negative impact on future firm performance. Our study sheds new light on the role of managerial ability in the relation between REM and future firm performance.

We predict that managers' ability to efficiently convert firm resources into sales is negatively related to REM for the following reasons. First, for a given set of resources the company owns, higher-ability managers are capable of generating higher sales revenue and thus are less likely to be under the pressure of earnings management. Next, high-ability managers understand the negative impact of REM on future firm performance (Cohen & Zarowin, 2010; Roychowdhury, 2006), and therefore they are more reluctant to engage in REM. Finally, the opportunity cost is a significant factor in managers' decision-making model. Because managers have limited time and effort, more-talented managers would rather devote greater effort to the normal operations than to REM.

However, a negative relation between managerial ability and the use of REM may not exist. First, all else equal, all managers face the pressure of meeting or beating the earnings benchmarks. Given the high reputation cost of the high-ability managers,[1] they might face even more pressure if they miss the earnings benchmarks. Therefore, when facing the earnings benchmarks, more-talented managers might engage in REM. Second, higher-ability managers have a superior knowledge of their firms' operating environment (Demerjian, Lewis, Lev, & McVay, 2013), which enables them to align REM with their reporting strategies. Third, if the majority of variation of REM is driven by these firm characteristics identified in the prior literature, we might fail to find a meaningful effect of managerial ability on REM. Collectively, the relation between managerial ability and REM is still an empirical question.

Some studies (e.g., Roychowdhury, 2006) document a negative relation between REM and future firm performance. We expect high-ability managers to reduce the negative effect of REM on future firm performance for the following two reasons. First, given the superior understanding of their firms and their firms' operating environment, higher-ability managers can better align the firms' operating decisions with financial reporting strategies and therefore choose less value-destroying REM. Second, as noted in the prior literature, REM is a complex task that requires managers to forecast the firm's future earnings and identify the shortfalls between the unmanaged future earnings and the ideal thresholds (Roychowdhury, 2006). Given the superior knowledge of more-able managers, it is expected that they are able to estimate the future earnings and identify shortfalls earlier than are less-able managers, therefore more-able managers have more choices and thus are less likely to choose the costly REM.

We follow Roychowdhury (2006) and Kothari, Mizik, and Roychowdhury

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[1] Demerjian et al. (2013) suggest that managerial ability is positively associated with CEO reputation.

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(2016) to calculate abnormal production costs and abnormal discretionary expenses, which are proxies of our REM measures. Consistent with Zang (2012), we also use an aggregate REM measure, which combines the abnormal production costs and abnormal discretionary expenses. We operationalize managerial ability by using a measure developed by Demerjian, Lev, and McVay (2012). This measure captures managers' ability to efficiently convert firm resources into sales revenue relative to their industry peers. In other words, higher-ability managers are more likely to generate more sales revenue for a given set of resources compared to lower-ability managers. Using a panel sample of 69,429 firm-year observations from 1987 to 2012, we find that (1) managerial ability is negatively related to the use of REM, and (2) higher-ability managers better reduce the negative impact of REM on future firm performance. In addition, we also test our two hypotheses using three alternative managerial ability measures: CEO tenure, lagged managerial ability rank, and the rolling average of managerial ability rank of the most recent two years. We still find similar results. Furthermore, we find that higher-ability managers prefer to use accrual-based earnings management or classification shifting earnings management than REM. These results suggest that higher-ability managers better understand the negative impact of REM on future firm performance and tend to use other methods of earnings management instead of REM. We further find that when these higher-ability managers use accrual-based earnings management and classification shifting earnings management, their earnings management is associated with better future firm performance, relative to low-ability managers.

Our study makes several contributions. First, most prior studies on REM focus on firm-level characteristics as determinants and fail to examine the influence of individual managers. Our study extends managerial ability framework to the REM setting. To the best of our knowledge, this study is the first study that examines the relation between managerial ability and the use of REM. Second, prior research documents a negative impact of REM on future firm performance. This study sheds new light on the role of managerial ability in the relation between REM and future firm performance. Third, this study contributes to the literature linking managerial ability to financial reporting quality (Demerjian et al., 2013; Demerjian, Lewis-Western, & McVay, 2017) and other managerial decision-making outcomes (Koester, Shevlin, & Wangerin, 2016).

The remainder of this paper is organized as follows. Section 2 reviews related studies and presents the hypotheses development. Section 3 presents the research design, including the measurement of primary variables and the empirical specification. Section 4 discusses the sample selection and descriptive statistics. Section 5 discusses the results of our main analysis, and Section 6 presents the results of additional tests. Section 7 concludes the paper.

2. Literature review and hypothesis development

2.1. Real earnings management and firm performance

Real earnings management (REM) is defined as management operational activities to alter reported earnings in a particular direction, which is achieved by overproducing inventory to lower the cost of goods sold (COGS) or cutting discretionary expenses (i.e., advertising expenditures, research and development expenditures, selling, general and administrative expenditures) to improve reported margins. In other words, REM is the management action that deviates from normal business practices and has suboptimal business consequences.

Using a survey of top executives, Graham, Harvey, and Rajgopal (2005) find that managers have stronger willingness to manage earnings through REM than through accruals. This is the case for at least two reasons. First, REM is less likely to be scrutinized by auditors and regulators, and therefore has a high probability of not being detected. Second, accrual-based earnings management is constrained by the accounting flexibility within the firm. For example, due to the reversing nature of accruals, firms' aggressive estimates and judgments used in the previous periods prevent them from making similar estimates and judgments in the subsequent periods. Consistent with the suggestions in Graham et al. (2005), Cohen, Dey, and Lys (2008) find that firms switch from accrual-based earnings management to REM following the passage of Sarbanes-Oxley Act (SOX) in 2002. This result implies that the need to avoid the detection of accrual-based earnings management is greater in the post-SOX period than in the pre-SOX period, which induces managers to switch from accrual-based earnings management to REM.

Early REM research focuses on the manipulation of R & D expenditures (e.g., Baber, Fairfield, & Haggard, 1991; Bushee, 1998; Dechow & Sloan, 1991). Roychowdhury (2006) finds that managers engage in other types of operational activities in addition to cutting R & D expenditures (i.e., overproduce to lower COGS and cut discretionary expenditures) to avoid reporting losses or missing analyst forecasts. In addition, alternative REM activities documented in the prior literature include cutting advertising expenditures (Cohen, Dey, Mashruwala, & Zach, 2010), sale of profitable assets (Bartov, 1993), sales price reductions (Jackson & Wilcox, 2000), derivative hedging (Barton, 2001), and stock repurchase (Hribar, Jenkins, & Johnson, 2006).

Given the increased use of REM since the passage of SOX in 2002, numerous studies have examined the relation between REM and future firm performance. Roychowdhury (2006) suggests that REM has a negative effect on a firm's performance by stating that “real activities manipulation can reduce firm value because actions taken in the current period to increase earnings can have a negative effect on cash flows in future periods” (p. 338). Cohen and Zarowin (2010) examine the relation between real earnings management activities of Seasoned Equity Offerings (SEO) firms and post-SEO firm performance, and they find that the decline in post-SEO operating performance is largely due to REM activities. Eldenburg, Gunny, Hee, and Soderstrom (2011) investigate the REM in a nonprofit setting and find weak evidence suggesting the use of REM in hospitals and a possible negative impact of REM on future performance. Abernathy, Beyer, and Rapley (2014) argue that the use of REM may hurt a firm's future performance. For example, if managers cut R & D expenditures to increase current year earnings, the future performance may be hurt due to the lost opportunities from reduced R & D activities. Taken together, the above-mentioned studies suggest a negative relation[2] between REM and future firm performance. However, most prior studies examine the effect of REM on future firm performance as a function of firm-level characteristics and fail to examine the influence of individual managers.

2.2. Management style and managerial ability

Most corporate decisions research focuses on firm-level characteristics as determinants. A separate stream of research investigates the influence of individual managers on corporate decisions. Upper echelons theory (i.e., Hambrick, 2007; Hambrick & Mason, 1984) states that managerial characteristics (at least) partially influence organizational outcomes. Following this theory, Bertrand and Schoar (2003) find that CEOs have different styles of management, which affect a wide range of corporate decisions. Bertrand and Schoar (2003) set up the foundation for the ‘management style’ literature. The management style research continues to examine the relation between CFO expertise and restatements (Aier, Comprix, Gunlock, & Lee, 2005), CEO reputation and earnings quality (Francis, Huang, Rajgopal, & Zang, 2008), managerial style and firm voluntary disclosure (Bamber, Jiang, & Wang, 2010), managerial style and corporate tax avoidance (Dyreng, Hanlon, & Maydew, 2010), and CFO style and accounting policies (Ge, Matsumoto, & Zhang, 2011). Collectively, these studies provide evidence supporting the importance of managerial characteristics in corporate decisions and performance.

[2] Gunny (2010) suggests that managers who engage in REM to just meet earnings benchmarks have better subsequent performance than firms that do not engage in REM and miss earnings benchmarks.

Managerial ability, as an important managerial characteristic, has received renowned attention recently. Kor (2003) states that managerial ability refers to the knowledge, skills, and experience embedded within a manager. Managerial ability mainly derives from domain experience, including managers' understanding of the markets, the firms' strategies, and the technology (Boeker, 1989; Kor, 2003). As managers accumulate domain expertise, they become more experienced at managing firm resources (Coff, 1997,1999). Prior studies suggest that it is difficult to measure managerial ability because the ability to efficiently manage firm resources is not directly observable. Therefore, managerial ability must be inferred from observable outcomes, such as managers' decisions of resource allocations. Aligned with this intuition, Demerjian et al. (2012) introduce a quantitative measure of managerial ability, which captures how efficiently managers can convert firm resources into sales relative to their peers in the same industry. This measure is constructed under the intuition that more-able managers can generate more sales revenue for a given set of inputs (e.g., labor, capital, and intangible assets). Demerjian et al. (2012) validate this measure as a proxy of managerial ability by showing that (1) their measure is highly correlated with manager fixed effects, (2) and has superior explaining power of the price reaction to CEO turnover announcements and subsequent firm performance than alternative ability measures (e.g., CEO media mentions, and CEO tenures, etc.).

The accounting and finance literature has investigated the importance of managerial ability. For example, Hayes and Schaefer (1999) examine the relation between managerial ability and abnormal returns, and find that firms losing more-able managers experience significantly negative stock returns. Berk and Green (2004) and Berk and Stanton (2007) find that managerial ability plays an important role in the performance of both open-end and close-end funds. Similarly, Baker, Litov, Wachter, and Wurgler (2005) find evidence supporting the importance of managerial ability in a firm's investing activities and performance. Baik, Farber, and Lee (2011) find a positive relation between CEO ability and management earnings forecasts' frequency and accuracy. Wang (2013) finds that more-able managers achieve greater net insider sales before the earnings break than less-able managers. Francis, Sun, and Wu (2015) and Koester et al. (2016) find that more-able managers engage in less tax avoidance activities than less-able managers. Krishnan and Wang (2015) find a negative relation between managerial ability and both audit fees and going-concern opinions, suggesting that managerial ability plays an important role in auditors' judgment and efficiency. Cornaggia, Krishnan, and Wang (2016) and Bonsall, Holzman, and Miller (2017) suggest that firms with more-able mangers receive higher bond credit ratings, relative to firms with less-able managers. Collectively, these studies show that managerial ability influences firms' decisions and performance.

2.3. Hypotheses development

Although there is a growing number of studies that examine the determinants of REM, most of these studies focus on firm-level characteristics (e.g., Cohen & Zarowin, 2010; Roychowdhury, 2006) and ignore the impact of individual managers. However, Bertrand and Schoar (2003) suggest that the underlying decisions of the company (e.g., aggressive R & D, merger and acquisition) reflect managers' different styles. Following the literature of management style, specifically managerial ability, we contend that managerial ability might have an impact on REM.

On one hand, we predict that more-able managers are associated with less REM based on the following arguments. First, high ability managers can generate higher sales revenue for a given set of resources the company owns (Demerjian et al., 2012). Therefore they are less likely to be associated with the need of earnings management. Second, high ability managers understand the value-destroying consequences of REM on future firm performance (Cohen & Zarowin, 2010; Roychowdhury, 2006). Thus they are less likely to engage in REM. Finally, opportunity cost is a significant factor in managers' decision-making model. Because managers have limited time and effort, more talent managers would rather devote greater effort to the normal operations than to REM. Consistent with this argument, Francis et al. (2015) suggest that, given the opportunity cost of tax avoidance, more talent managers have less incentive to pursue tax avoidance than the less talent managers.

However, there are several reasons why we may fail to find the negative relation between managerial ability and the use of REM. First, all else equal, all managers have the pressure of meeting the earnings benchmarks. Given the higher reputation cost of the high-ability managers, they might face even more pressure if they miss the earnings benchmarks. Therefore, when facing the earnings benchmarks, more talent managers might engage in REM as well. Second, the prior literature shows that the financial flexibility of accrual manipulation and the scrutiny from outsiders constrain the use of accrual-based earnings management, leading to the use of REM (Cohen & Zarowin, 2010; Zang, 2012). If the majority of variation of REM is driven by these firm characteristics identified in the prior literature, we might fail to find a meaningful effect of managerial ability on REM. Third, higher-ability managers have a superior knowledge of their firms' operating environment (Demerjian et al., 2013), which enables them to align REM with their reporting strategies. Similar to this intuition, Koester et al. (2016) suggest that more talent managers' superior knowledge of their firms and their firms' operating environment allows them to pursue more tax avoidance strategies. Similarly, Demerjian et al. (2017) suggest that high-ability managers are significantly more likely to engage in intentional income smoothing.

Taken together, the relation between managerial ability and the use of REM is still an empirical question. Thus, we propose the following null hypothesis:

H1. There is no relation between managerial ability and REM.

Prior studies suggest a negative relationship between REM and future firm performance (e.g., Graham et al., 2005; Roychowdhury, 2006), however, most of these studies examine this relationship as a function of firm-level characteristics and failed to examine the influence of individual managers. Our study tries to add managerial ability in the examination of this relationship.

We expect high-ability managers to reduce the negative effect of REM on future firm performance for the following two reasons. First, Demerjian et al. (2012) suggest that high-ability managers have superior knowledge of their firm and their firm's operating environment, which enables them to better align the firms' operating decisions with financial reporting strategies. Thus, if high-ability managers choose to manage earnings using REM, these managers should be able to choose less value-destroying REM compared to those chosen by less talent managers. Second, as noted in the prior literature, REM is a complex task that requires managers to be able to forecast the firm's future earnings and figure out the shortfalls between the unmanaged future earnings and the ideal thresholds (Roychowdhury, 2006). The earlier the managers could figure out these, the more operational choices managers have in terms of REM. Given the superior understanding of high-ability managers, we expect them to be able to estimate the future earnings and shortfalls earlier than do less-able managers, therefore more-able managers have more choices, and they are less likely to choose the costly REM.

If more-able managers are more knowledgeable and make better decisions that lead to a lower level of opportunistic behavior, superior future firm performance, and more efficient firm resources management, then we predict that their decisions can also mitigate the negative impact of REM on future firm performance. Therefore, we propose the following hypothesis:

H2. Managerial ability mitigates the negative effect of REM on future firm performance.

3. Research design

3.1. Measurement of REM

Following prior studies (e.g., Brown, Chen, & Kim, 2015; Kim, Park, & Wier, 2012; McGuire, Omer, & Sharp, 2012; Roychowdhury, 2006), we examine the following two manipulations of real activities: (1) reducing production costs (i.e., cost of goods sold) through overproducing inventory, and (2) cutting discretionary expenditures, including research and development, advertising, and selling, and general administrative expenses. To capture these two real activities manipulations, we measure the former by using the abnormal level of production costs and the latter by using the abnormal level of discretionary expenditures.

To measure the overproduction (RM_{PROD}), we first estimate the normal level of production costs using the following model developed by Roychowdhury (2006):

$$\frac{PROD_{it}}{ASSETS_{i,t-1}} = k_1\frac{1}{ASSETS_{i,t-1}} + k_2\frac{SALES_{it}}{ASSETS_{i,t-1}} + k_3\frac{\Delta SALES_{it}}{ASSETS_{i,t-1}} + k_4\frac{\Delta SALES_{i,t-1}}{ASSETS_{i,t-1}} + \varepsilon_{it} \quad \text{(Model 1)}$$

Production costs (*PROD*) are defined as the sum of the cost of goods sold (*COGS*) and the change in inventory during the year. We estimate Model 1 for each (two-digit SIC) industry[3] and year and require at least 15 observations for each industry-year. Kothari et al. (2016) suggest that this model suffers from misspecification because some firms may systematically deviate from industry-year "norms" due to their differentiation strategy. To mitigate the above misspecification concern, we follow the steps suggested in Kothari et al. (2016). Specifically, we first calculate the deviation in a firm's production costs (*PROD*) from the cross-sectional mean for each year. Then, we calculate the changes between the above deviations of production costs in year t and year $t-1$. Next, we run the production model (Model 1) and obtain the residual for each firm-year observation. Finally, consistent with Kothari et al. (2016), we calculate the abnormal level of production costs (RM_{PROD}) as the difference between the firm-year residual and the mean value of the residuals across all years of the same firm. A high value of this measure (RM_{PROD}) suggests the existence of abnormally higher overproduction costs, which results in increased earnings due to reduced cost of goods sold.

To measure the abnormal cut of discretionary expenditures (RM_{DISX}), we estimate the normal levels of discretionary expenditures following Roychowdhury (2006):

$$\frac{DISX_{it}}{ASSETS_{i,t-1}} = k_1\frac{1}{ASSETS_{i,t-1}} + k_2\frac{SALES_{i,t-1}}{ASSETS_{i,t-1}} + \varepsilon_{it} \quad \text{(Model 2)}$$

Discretionary expenditures (*DISX*) are defined as the sum of research and development expenses, advertising expenses, and selling, general, and administrative expenses. Similar to RM_{PROD}, we estimate Model 2 employing the steps in Kothari et al. (2016). The abnormal level of discretionary expenditures (RM_{DISX}) is measured as the difference between the estimated residual and the mean value of the residuals across all years for the same firm. Following Zang (2012), we multiply the residual by negative one. The higher the value of the discretionary expenditure measure, the more cut of discretionary expenditures to increase earnings.

Prior studies (e.g., Cohen & Zarowin, 2010; McGuire et al., 2012) suggest that firms that manage earnings through REM are likely to use one or both REM methods. To capture the total effects of two REM methods, we also use an aggregate REM measure ($RM_{AGGREGATE}$), which is the sum of abnormal production costs and abnormal discretionary expenditures ($RM_{AGGREGATE} = RM_{PROD} + RM_{DISX}$). The higher the value of the aggregate measure, the more likely the firm engages in REM activities. In sum, we use three REM proxies: two individual proxies (RM_{PROD} and RM_{DISX}) and one aggregate proxy ($RM_{AGGREGATE}$) in our study.

3.2. Measurement of managerial ability

Our managerial ability measure is developed by Demerjian et al. (2012), which measures managerial ability based on the managers' efficiency in generating revenues and is available for a large sample of firms. Demerjian et al. (2012) adopt two steps to formulate their measure of managerial ability. First, they rely on data envelopment analysis (DEA) to estimate total firm efficiency by industry and year. DEA fits a piecewise linear envelope or frontier to the given data in a multidimensional space. The envelope indicates a normative ideal given all existing data. Points located on the envelope/frontier are optimally efficient with a value of 1, while points below the envelope/frontier are inefficient with a value less than 1. DEA evaluates all points with respect to their deviation from the frontier. DEA requires identifying input and output variables. Demerjian et al. (2012) use seven input variables: (1) cost of goods sold, (2) selling, general, and administrative expenses, (3) property, plant, and equipment, (4) operating lease, (5) research and development cost, (6) goodwill, and (7) other intangibles. The output variable is net sales. Specifically, they first solve the following optimization problem in DEA:

$$max_y\theta = \frac{Sales}{v_1 COGS + v_2 SG\&A + v_3 PPE + v_4 OpsLease + v_5 R\&D + v_6 Goodwill + v_7 OtherIntan} \quad \text{(Model 3)}$$

The efficiency measure (calculated in optimization Model 3), θ, can take the value between zero and one. Because the total firm efficiency scores can be attributed to both the manager and the firm, Demerjian et al. (2012) then partition total firm efficiency between the firm and the management. They regress total firm efficiency on six firm characteristics that either aid or hinder management's efforts: firm size, market share, positive cash flow, and firm age (these four factors likely aid management), and complex multi-segment and international operations (these two likely hinder management). They estimate the following Tobit regression:

$$Firm\ Efficiency = \beta_0 + \beta_1 Ln(Total\ Assets) + \beta_2 MarketShare + \beta_3 PositiveFreeCashFlow + \beta_4 Ln(Age) + \beta_5 BusinessSegmentConcentration + \beta_6 ForeignCurrencyIndicator + Year\ Indicators + \epsilon \quad \text{(Model 4)}$$

The residual from Model 4 captures managerial ability. Based on this measure, Demerjian et al. (2012) create decile ranks of managerial ability (*MANAGER_ABILITY_RANK*) by year and industry to make the score more comparable across time and industries and to mitigate the influence of outliers. We use *MANAGER_ABILITY_RANK* as our managerial ability measure in our analysis.

3.3. Empirical specification

To explore the relation between managerial ability and real earnings management, we employ the following pooled cross-sectional model using firm fixed-effects regression:

$$RM_{i,t} = \delta_0 + \delta_1 MANAGERABILITY\,RANK_{i,t} + \delta_n Controls_{i,t} + \epsilon_{i,t} \quad \text{(Model 5)}$$

The dependent variable, *RM*, alternatively represent one of the three REM proxies: RM_{PROD}, RM_{DISX}, and $RM_{AGGREGATE}$. The main variable of

[3] We also use Fama and French 48 industries classification and still obtain similar results.

interest is *MANAGER_ABILITY_RANK*, which is a decile rank of the residual estimated in Model 4.

To test our hypothesis 1, we analyze the coefficient (δ_1) on *MANAGER_ABILITY_RANK* in Model 5. We propose H1 as a null hypothesis because the relation between managerial ability and REM is still an empirical question. Positive coefficient would signal that managerial ability is associated with more use of REM. Negative coefficient would signal that managerial ability is associated with less use of REM.

Following Cohen and Zarowin (2010) and Zang (2012), we assume that the scrutiny from the auditors increases with the presence of Big 8 auditor, and with the length of audit tenure. Thus, we include *BIG8*, which is a dummy variable indicating whether the firm has a Big 8 auditor. In addition, we include *AUDIT_TENURE*, the natural logarithm of the number of the years the firm has the same auditor. Furthermore, because accruals earnings management is more likely to be detected and penalized than REM, we argue that firms in the industries that have high litigation risk are more likely to use REM. Thus, we include *LITIGATION*, a dummy variable that equals one if a firm is in a high litigation industry and zero otherwise. Following Barton and Simko (2002), Zang (2012), and Cohen and Zarowin (2010), we classify high litigation industries are industries with SIC codes 2833–2836, 8731–8734, 7371–7379, 3570–3577, and 3600–3674. These industries are pharmaceuticals/biotechnology, computers, and electronics.

Following Barton and Simko (2002), we use net operating assets (*NOA*) to control for firm's financial flexibility to use accrual-based earnings management: the higher the *NOA,* the less likelihood of accrual-based earnings management. Given the substitutive relation between REM and accrual-based earnings management, we predict that the use of REM is increasing with *NOA*. Moreover, to address the possibility that the abnormal operating activities are correlated with firm performance, firm size, growth opportunities, and financial health, we follow Roychowdhury (2006) to include *ROA*, *SIZE*, *MTB* and *ZSCORE* as control variables. *ROA* is the return on assets. *SIZE* is calculated as the natural logarithm of the firm's total assets. *MTB* is the market-to-book value. *ZSCORE* is Altman's *Z*-score. Industry and year effects are also included to control for the effect at the industry and time levels. We winsorize the variables at the levels 1% and 99% and include year- and industry-dummies (by the first 2-digit of SIC industry classification) in the regression analysis. Please refer to Appendix 1 for detailed variable definition.

To explore the impact of managerial ability on the relation between REM and future firm performance, we employ the following pooled cross-sectional model using firm fixed-effects regression:

$$\begin{aligned} \textit{Future Performance}_{i,t+n} = {} & \theta_0 + \theta_1 RM_{i,t} + \theta_2 MANAGERABILITY\,RANK_{i,t} \\ & + \theta_3 RM_{i,t} \times MANAGERABILITY\,RANK_{i,t} \\ & + \theta_n Controls_{i,t} + \epsilon_{i,t+1} \end{aligned} \quad \text{(Model 6)}$$

Following Gunny (2010), we use return on assets (*ROA*) and cash flow from operations (*CFO*) in years 1, 2, and 3 as proxies for future firm performance.[4] To capture the real activities manipulation (*RM*), we use three proxies to measure REM: abnormal production activities (RM_{PROD}), abnormal cut off discretionary expenditures (RM_{DISX}), and aggregate REM ($RM_{AGGREGATE}$). We use *MANAGER_ABILITY_RANK* from Demerjian et al. (2012) to measure managerial ability.

To test our hypothesis, we analyze the coefficient (θ_3) on *RM* × *MANAGER_ABILITY_RANK* in Model 6. If managerial ability mitigates the negative impact of REM, we expect a positive and significant coefficient (θ_3). In addition to the variable of interest, we also control for factors that prior research suggests are associated with firm performance in Model 6. Specifically, following prior research (e.g., Gunny, 2010), we use current year ROA to control for current firm performance, log of total assets (*SIZE*) to control for size effect, market-to-book ratio (*MTB*) to control for growth opportunities, Altman's *Z*-score (*ZSCORE*) to control for the financial health of the firm, and size-adjusted abnormal returns (*RETURN*) to control for the relation between stock performance and future earnings. In addition, prior studies (Cohen & Zarowin, 2010; Zang, 2012) suggest a substitutive relation between *Accruals* and REM, we include *Accruals* as another control variable. Following Cohen and Zarowin (2010), we also include the growth in sales and capital expenditures (*SALES_GROWTH* and *CAPEX_GROWTH*) as our last two control variables. Industry and year effects are also included to control for the effect at the industry and time levels. We winsorize the variables at the levels 1% and 99% and include year- and industry-dummies (by the first 2-digit of SIC industry classification) in the regression analysis. Please refer to Appendix 1 for variable definition.

4. Sample selection and descriptive statistics

Our main sample is formed using three databases: COMPUSTAT database, CRSP database, and Managerial Ability database. We obtain financial statement data from the COMPUSTAT Fundamentals Annual database. We obtain the stock return information from the CRSP database. We obtain managerial ability measure from Dr. Sarah McVay's website.[5] We start our sample from all firms in COMPUSTAT between 1987 and 2012 with sufficient data available to calculate all COMPUSTAT-based variables for our tests. Our sample starts from 1987 because we use cash flow from operations from the Statement of Cash Flows which becomes available in COMPUSTAT in 1987. We end our sample in 2012, so there are three years of subsequent performance to examine future firm performance. We exclude financial institutions (SIC 6000–6999) and utility companies (SIC 4000–4999) because those firms are in highly regulated industries that follow very different accounting standards. In addition, we require at least 15 observations for each industry-year group since we estimate the normal production and discretionary expenditures models (Models 1 and 2) by every industry-year. We merge our COMPUSTAT sample with the CRSP sample and the managerial ability sample, yielding a final sample of 69,429 firm-year observations during 1987–2012.

Table 1 presents sample descriptive statistics for all the variables employed in the main analyses. Table 1 shows that the means of all three proxies of REM are zero, suggesting that on average firms are not engaging in any kind of REM. This is consistent with the intuition of the estimation model and is comparable to the findings in the prior studies (i.e., Gunny, 2010). Overall, the production cost is 95.1% of total firm assets, and the discretionary expense is 44% of total firm assets in our sample, which are comparable to those in Roychowdhury (2006). The mean total assets of the sample firm-years are around $1.337 billion, and the mean total sales revenue of the sample firm-years are about $1.394 billion. The firm-years have an average ROA of − 0.004 and an average cash flow from operations relative to total assets of 0.056. As expected, 82.6% of the sample firms are audited by Big 8 Auditors and the average number of years the auditor has been with the firm is approximately eight years (1.826 exponential).

Table 2 shows the Pearson and Spearman correlations among the variables. All correlations statistically significant at 0.10 level or lower are highlighted and italicized. The correlations among the REM proxies are significantly positive. For example, abnormal productions costs (RM_{PROD}) are positively related to abnormal discretionary expenses (RM_{DISX}) at a significant level. This suggests that managers engaging in abnormal production activities and abnormal discretionary expenditures cut simultaneously, consistent with Cohen and Zarowin (2010) and Zang (2012). The total REM ($RM_{AGGREGATE}$) is highly

[4] ROA is calculated as income before extraordinary item scaled by lagged total assets, and CFO is calculated as cash flow from operating activities scaled by lagged total assets.

[5] We thank Dr. Sarah McVay for providing managerial ability data. http://faculty.washington.edu/smcvay/research.html

Table 1
Descriptive statistics.

Panel A: the full sample (1987 (cfo DATA starts from 1987)-2012)								
	N	Mean	Std. dev.	10th %tile	25th %tile	Median	75th %tile	90th %tile
PRODUCTION COSTS/A	69,429	0.951	0.999	0.180	0.391	0.736	1.217	1.886
DISCRETIONARY EXPENSES/A	69,429	0.440	0.405	0.081	0.184	0.352	0.586	0.879
RM_{PROD}	69,429	0.000	0.147	− 0.138	− 0.060	0.000	0.058	0.134
RM_{DISX}	69,429	0.000	0.162	− 0.134	− 0.046	0.003	0.058	0.143
$RM_{AGGREGATE}$	69,429	0.000	0.250	− 0.225	− 0.088	0.002	0.099	0.228
MANAGER_ABILITY_RANK	69,429	0.556	0.276	0.200	0.300	0.600	0.800	0.900
BIG8	69,429	0.826	0.379	0.000	1.000	1.000	1.000	1.000
AUDIT_TENURE	69,429	1.826	0.883	0.693	1.099	1.792	2.565	2.944
LITIGATION	69,429	0.267	0.443	0.000	0.000	0.000	1.000	1.000
NOA	69,429	0.919	0.859	0.318	0.471	0.683	1.011	1.680
SIZE	69,429	5.208	2.026	2.618	3.725	5.096	6.586	7.957
MTB	69,429	2.787	3.631	0.645	1.108	1.884	3.294	5.867
ZSCORE	69,429	4.661	5.941	0.810	1.980	3.260	5.360	9.599
ROA	69,429	− 0.004	0.191	− 0.215	− 0.034	0.038	0.090	0.150
CFO	69,429	0.056	0.207	− 0.120	0.006	0.080	0.145	0.219
RETURN	69,429	1.170	0.723	0.473	0.737	1.042	1.386	1.922
TOTAL_ASSETS	69,429	1336.870	3847.900	13.702	41.466	163.287	724.663	2855.000
ACCRUALS	69,429	− 0.003	0.118	− 0.129	− 0.061	− 0.006	0.050	0.127
SALES_GROWTH	69,429	0.158	0.393	− 0.165	− 0.022	0.087	0.239	0.506
CAPEX_GROWTH	69,429	0.398	1.369	− 0.585	− 0.286	0.073	0.563	1.460
SALES	69,429	1394.060	3962.040	12.362	40.786	174.132	782.023	3006.530

This table reports the descriptive statistics of the variables. Specifically, this tables reports pooled mean, standard deviation, 10th percentile, 25th percentile, median, 75th percentile, and 90th percentile of all dependent variables, independent variables of interest, and control variables. All continuous variables are winsorized at 1% and 99% percentiles. Refer to Appendix 1 for variable definition.

correlated with both abnormal production costs (RM_{PROD}) and abnormal discretionary expenses (RM_{DISX}) because the total REM is the sum of these two proxies. In addition, managerial ability is significantly and negatively related to all three REM proxies, suggesting that higher-ability managers engage in less REM. Finally, most of the control variables are significantly correlated with REM proxies and firm performance, highlighting the importance of testing our research question using a multivariate approach and control for these variables in our analysis.

Although both the abnormal level of cost of goods sold (RM_{PROD}) and the abnormal level of discretionary expenditures (RM_{DISX}) are commonly-used measures in REM studies, it is possible that both measures are correlated with the managerial ability measure in Demerjian et al. (2012). Demerjian et al. (2012) assume that managers with greater ability generate more sales. Hence, holding all else constant, managerial ability increases (decreases) with sales (cost of goods sold). For example, if a firm has a low cost of goods sold (high discretional expenditures) relative to its sales, it will assign a high value of error term, which captures managerial ability. Therefore, it is possible that RM_{PROD} and RM_{DISX} are related to managerial ability by construct. The above two correlations should be opposite for the two REM measures. For example, if a firm has a relatively low level of cost of goods sold, its REM measure (measured as the error term) will be high. Hence, the correlation between RM_{PROD} and *MANAGER_ABILITY_RANK* is positive. If a firm has a relatively low level of discretionary expenditures, its REM measure (RM_{PROD}) will be low. Thus, the correlation between RM_{PROD} and *MANAGER_ABILITY_RANK* is negative. We check for multicollinearity in the regression by calculating the value of variance inflation factors (VIF) for each variable. It appears that multicollinearity is not a major concern in our study. Results are not tabulated for brevity.

5. Results

Table 3 presents results of testing our first hypothesis. We employ Model 5 to test the relation between managerial ability and REM. Column 1 utilizes abnormal production costs (RM_{PROD}) as REM proxy, Column 2 utilizes abnormal discretionary expenditures (RM_{DISX}) as REM proxy, and Column 3 utilizes total REM ($RM_{AGGREGATE}$) as REM proxy. The results show that *MANAGER_ABILITY_RANK* is negatively related to all three REM proxies at statistically significance level 0.01. This suggests that higher-ability managers are associated with less abnormal productions costs and less abnormal discretionary expenses, which indicates less use of REM.

Many of the control variables included in the regressions are related to REM as expected. *BIG8* is negatively related to REM proxies, suggesting that firms audited by Big 8 auditors have less abnormal operating activities than firms audited by non-Big 8 auditors. We do not find any significant relation between *AUDIT_TENURE* and REM proxies. However, as expected, we find that *LITIGATION* is significantly and positively related to REM proxies, suggesting that firms in the high litigation industries use real activities manipulations as a substitute for accruals manipulations because accruals manipulations are more likely to be detected and penalized in these industries. In addition, consistent with the prior literature, we find that *NOA* is positively related to REM proxies, which suggests the substitutive relation between REM and accruals manipulations. Because firms with higher NOA have less opportunity to use accruals to manage earnings, therefore use more abnormal operating activities to meet the earnings benchmarks.

Table 4 provides results of testing our Hypothesis 2. Our Hypothesis 2 predicts that managerial ability mitigates the negative effect of REM on future firm performance. Panel A, Panel B and Panel C show the results of testing H2 using abnormal production costs (RM_{PROD}), abnormal discretionary expenditures (RM_{DISX}), and aggregate REM ($RM_{AGGREGATE}$), respectively.

Panel A employs abnormal production costs (RM_{PROD}) as REM proxy. We test our H2 using two different future firm performance proxies: return on assets (*ROA*) and cash flow from operations (*CFO*). These two performance proxies have been widely used in the accounting and finance literature (i.e., Gunny, 2010). We test the future firm performance using the subsequent three years, so our Columns 1–3 show results using ROA in years $t + 1$, $t + 2$, and $t + 3$ as dependent variable while Columns 4–6 show results using CFO in years $t + 1$, $t + 2$, and $t + 3$ as dependent variables. Consistent with the prior literature, our results show that MANAGER_ABILITY_RANK is significantly positively related to the all six future firm performance

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Table 2
Correlation matrix.

	RM_{PROD}	RM_{DISX}	$RM_{AGGREGATE}$	MANAGER_ABILITY_RANK	BIG8	AUDIT_TENURE	LITIGATION	NOA	SIZE	MTB	ZSCORE	ROA	CFO	RETURN	SALES	ACCRUALS	SALES_GROWTH	CAPEX_GROWTH
RM_{PROD}		***0.327***	***0.792***	***−0.121***	0.002	***0.012***	0.003	***0.064***	***0.030***	***−0.080***	***−0.080***	***−0.174***	***−0.203***	***−0.084***	***0.009***	***0.070***	***−0.032***	***−0.021***
RM_{DISX}	***0.303***		***0.773***	***−0.122***	***−0.009***	***0.007***	***0.030***	***0.051***	***0.007***	***−0.063***	***−0.028***	***−0.067***	***−0.030***	***−0.085***	***−0.012***	***−0.018***	***−0.235***	***−0.129***
$RM_{AGGREGATE}$	***0.786***	***0.827***		***−0.145***	−0.005	***0.010***	***0.020***	***0.064***	***0.020***	***−0.085***	***−0.066***	***−0.142***	***−0.141***	***−0.098***	−0.004	***0.036***	***−0.159***	***−0.090***
MANAGER_ABILITY_RANK	***−0.120***	***−0.123***	***−0.151***		***−0.024***	***0.015***	***0.043***	***−0.249***	***−0.026***	***0.189***	***0.280***	***0.311***	***0.189***	***0.094***	***0.036***	***−0.020***	***0.172***	***0.140***
BIG8	0.002	−0.006	−0.003	***−0.024***		***0.227***	0.003	***0.007***	***0.351***	***0.077***	***0.025***	***0.091***	***0.121***	***0.050***	***0.336***	***−0.108***	***0.022***	***0.015***
AUDIT_TENURE	0.005	***0.017***	***0.014***	***0.027***	***0.198***		***−0.089***	***0.023***	***0.329***	0.002	***0.029***	***0.132***	***0.144***	***0.062***	***0.344***	***−0.043***	***−0.090***	−0.005
LITIGATION	0.000	0.000	0.000	***0.043***	0.003	***−0.105***		***0.014***	***−0.129***	***0.150***	***0.081***	***−0.110***	***−0.091***	***−0.028***	***−0.197***	***−0.048***	***0.027***	***−0.012***
NOA	***0.042***	***0.044***	***0.053***	***−0.219***	***−0.022***	***−0.034***	***−0.010***		***0.154***	***−0.052***	***−0.283***	***−0.182***	***−0.070***	***−0.025***	***−0.056***	***−0.009***	***0.010***	***−0.047***
SIZE	***0.018***	***0.019***	***0.023***	***−0.008***	***0.345***	***0.359***	***−0.119***	***0.059***		***0.095***	***−0.041***	***0.268***	***0.323***	***0.087***	***0.941***	***−0.145***	***0.023***	***0.050***
MTB	***−0.055***	***−0.085***	***−0.088***	***0.118***	***0.025***	***−0.030***	***0.121***	−0.018	***−0.013***		***0.378***	***0.282***	***0.195***	***0.326***	***0.065***	***−0.038***	***0.294***	***0.153***
ZSCORE	***−0.061***	***−0.055***	***−0.072***	***0.189***	0.008	***−0.044***	***0.117***	***−0.052***	***−0.077***	***0.313***		***0.472***	***0.302***	***0.248***	0.005	***−0.016***	***0.208***	***0.137***
ROA	***−0.168***	***0.069***	***−0.054***	***0.261***	***0.091***	***0.147***	***−0.162***	***−0.201***	***0.302***	***−0.062***	***0.200***		***0.663***	***0.318***	***0.337***	***0.041***	***0.304***	***0.213***
CFO	***−0.192***	***0.094***	***−0.052***	***0.181***	***0.092***	***0.121***	***−0.116***	***−0.107***	***0.292***	***−0.046***	***0.105***	***0.707***		***0.244***	***0.368***	***−0.432***	***0.137***	***0.108***
RETURN	***−0.071***	***−0.092***	***−0.101***	***0.081***	***0.013***	−0.010	***0.022***	***−0.026***	−0.013	***0.228***	***0.210***	***0.171***	***0.116***		***0.099***	***−0.013***	***0.191***	***0.100***
SALES	***0.008***	***0.014***	***0.014***	***0.123***	***0.144***	***0.269***	***−0.070***	***−0.044***	***0.592***	***0.041***	***−0.048***	***0.124***	***0.110***	***−0.013***		***−0.143***	***0.010***	***0.042***
ACCRUALS	***0.041***	***0.015***	***0.034***	−0.005	***−0.104***	***−0.036***	***−0.038***	−0.001	***−0.137***	***−0.016***	***0.016***	***0.113***	***−0.338***	***0.012***	***−0.043***		***0.024***	***0.030***
SALES_GROWTH	−0.005	***−0.254***	***−0.168***	***0.128***	−0.003	***−0.118***	***0.044***	***0.180***	***−0.035***	***0.174***	***0.174***	***0.011***	***−0.045***	***0.139***	***−0.043***	***0.028***		***0.328***
CAPEX_GROWTH	0.000	***−0.123***	***−0.080***	***0.089***	***−0.061***	***−0.070***	***0.015***	***0.040***	***−0.096***	***0.076***	***0.107***	−0.004	***−0.051***	***0.072***	***−0.061***	***0.050***	***0.278***	

This table reports the Pearson (below the diagonal) and Spearman (above the diagonal) correlations based on the sample over the period of 1987–2012. For each pair of variables, the Pearson and Spearman correlation coefficients are provided. Bold and italicized values indicate significance at the 0.10 level or stronger. All continuous variables are winsorized at the 1% and 99% percentiles before the correlation analysis. Refer to Appendix 1 for variable definitions.
Spearman above the diagonal.

Table 3
The relation between managerial ability and REM (H1).

	(1) RM_{PROD}	(2) RM_{DISX}	(3) $RM_{AGGREGATE}$
MANAGER_ABILITY_RANK	**−0.033*** **	**−0.031*** **	**−0.063*** **
	(−13.07)	**(−10.950)**	**(−13.780)**
BIG8	−0.004**	−0.016***	−0.020***
	(−2.320)	(−7.780)	(−6.070)
AUDIT_TENURE	0.001	−0.001	0.000
	(1.350)	(−0.720)	(0.310)
LITIGATION	0.004***	0.007***	0.011***
	(5.340)	(6.830)	(7.250)
NOA	0.003***	0.007***	0.010***
	(2.960)	(6.000)	(5.920)
ROA	−0.042***	0.039***	−0.003
	(−9.890)	(6.870)	(−0.400)
SIZE	0.003***	0.007***	0.010***
	(9.310)	(15.860)	(14.660)
MTB	−0.001***	−0.004***	−0.006***
	(−5.360)	(11.840)	(−11.170)
ZSCORE	0.0003**	0.000	0.001**
	(2.510)	(1.020)	(2.050)
INDUSTRY F.E.'s	Yes	Yes	Yes
YEAR F.E.'s	Yes	Yes	Yes
FIRM FIXED EFFECTS	Yes	Yes	Yes
INTERCEPT	Yes	Yes	Yes
N	69,429	69,429	69,429
R-squared	0.013	0.026	0.022

Table presents results of the firm fixed effects regression of Model (5). The dependent variables are RM_{PROD}, RM_{DISX}, and $RM_{AGGREGATE}$ in Column (1), (2), and (3) respectively. All variables are defined in Appendix 1. Robust two-tailed *t*-statistics are presented in parentheses below the coefficients. *, **, and *** indicate significant levels at the 0.10, 0.05, and 0.01 levels, respectively. Bold values indicate the variable of interest.

proxies. This result suggests that higher-ability managers lead to better future firm performance. RM_{PROD}, as expected, is negatively related to future firm performance.

Furthermore, the results in Column 1 and Column 2 do not show statistically significant relation between the interaction term of managerial ability and overproduction (*MANAGER_ABILITY_RANK* × RM_{PROD}) and the ROA of the subsequent two years following the year of overproduction. The results in Column 3 show a marginally significant positive relation between the interaction term of managerial ability and overproduction (*MANAGER_ABILITY_RANK* × RM_{PROD}) and the subsequent ROA in year $t + 3$. Taken together, our study finds a significant influence of managerial ability on the relation between overproduction and firm's subsequent ROA only in year $t + 3$. However, when we use *CFO* as the proxy for firm performance, our results reflect a strong significantly positive relation between the interaction term of managerial ability and overproduction (*MANAGER_ABILITY_RANK* × RM_{PROD}) and the cash flows from operating in the subsequent three years, which support our Hypothesis 2. These results suggest that higher-ability managers, relative to lower-ability managers, better reduce the negative impact of REM on the cash flows from operations. Overall, our second hypothesis is weakly supported when we use return on assets as the proxy for future firm performance but is highly supported when we use CFO as a proxy for future firm performance.[6]

Similar to Panel A, Panel B employs abnormal discretionary expenditures (RM_{DISX}) as the second REM proxy and tests our hypothesis 2 using two proxies of firm performance (*ROA* and *CFO*). Table 4, Panel B, reports a significant and positive relation between the interaction term (MANAGER_ABILITY_RANK × RM_{DISX}) and both *ROA* and *CFO* in the subsequent three years. These results suggest that higher-ability managers, relative to lower-ability managers, better reduce the negative effects of the discretionary expenditures cut on future return on assets and cash flows from operations. Therefore, using abnormal discretionary expenditures as REM proxy, we provide strong support to our Hypothesis 2.

Table 4, Panel C, reports the results when we employ the aggregate REM ($RM_{AGGREGATE}$) as REM proxy. Similar to results in Panel A, we do not find a significant relation between the interaction term (MANAGER_ABILITY_RANK × $RM_{AGGREGATE}$) and *ROA* in the subsequent years $t + 1$ and $t + 2$ as the coefficient is positive but not statistically significant in Column 1 and Column 2. In Column 3, we find a weak positive relation in the subsequent year $t + 3$. However, we find a significantly positive relation between the interaction term (MANAGER_ABILITY_RANK × $RM_{AGGREGATE}$) and *CFO* for all the subsequent three years. These results are not surprising given the mechanical relation between $RM_{AGGREGATE}$ and RM_{PROD}. Overall, our Hypothesis 2 is strongly supported when we use CFO to proxy for firm performance and is weakly supported when we use ROA to proxy for firm performance. Taken together, the results of Table 4 suggest that higher-ability managers help mitigate the negative impact of REM on future firm performance, relative to lower-ability managers. The results are stronger when we use cash flow from operating activities (*CFO*) as a proxy for firm performance, suggesting that these managers better reduce the negative impact of both overproduction and abnormal discretionary expenditures cut on firm's future cash flows.

6. Additional tests

6.1. Alternative managerial ability measures

Prior research (e.g., Milbourn, 2003) has also used CEO tenure as a proxy of managerial ability. Hence, as a robustness check, we use CEO tenure as an alternative managerial ability measure to re-examine our two hypotheses. Following the prior literature, we collect the CEO tenure data from the Execucomp database and calculate *CEO_TENURE* as the natural log of the number of years an executive has been listed as CEO at the end of year t. Table 5 presents the results of re-estimating Models (5) and (6) using *CEO_TENURE* instead of *MANAGER_ABILITY_RANK* to proxy for managerial ability. Table 5, Panel A, shows the results investigating the relation between *CEO_TENURE* and REM. Overall, we find that *CEO_TENURE* is negatively related to the abnormal production and abnormal discretionary expenditures, which is consistent with our findings in Table 3 and further suggests that higher-ability managers are less likely to engage in operating activities manipulations.

Table 5, Panel B, presents results of investigating the moderating role of *CEO_TENURE* on the relation between REM and future firm performance. For brevity, we only report the results using ROA_{t+1} to proxy for future firm performance. In this analysis, we find weak evidence that *CEO_TENURE* reduces the negative impact of abnormal discretionary expenditures (RM_{DISX}) on future firm performance. However, the coefficient on the interaction term is positive but not statistically significant. As a result, we fail to find a significant moderating role of *CEO_TENURE* in the negative impact of aggregate REM. Furthermore, in the untabulated analysis, we repeat the same analysis using ROA_{t+2}, ROA_{t+3}, CFO_{t+1}, CFO_{t+2}, and CFO_{t+3} as proxies of future firm performance. We find similar results for abnormal discretionary expenditures and mixed results for abnormal production costs. We also use lagged *MANAGER_ABILITY_RANK* and the rolling average of *MANAGER_ABILITY_RANK* of the most recent two years as alternative managerial ability measures. The untabulated results of this analysis are similar to our primary findings in Tables 3 and 4 when we use *MANAGER_ABILITY_RANK* to measure managerial ability.

[6] An alternate explanation of our findings is that to high-ability managers, REM (higher-than-expected levels of production or lower-than-expected levels of expenditures) might be legitimate activities to improve the operations of the company, therefore not value-destroying. For example, high-ability managers make better investing and financing decisions than low-ability managers. Thus, when these talent managers realize the shortfall between the forecast earnings and ideal benchmarks, instead of manipulating operational activities just to meet current year's benchmarks, they might take this opportunity to review their firm's operational efficiency and make improvements.

Table 4
The conditional effect of external monitoring (analysts coverage and institutional holding) on the relation between managerial ability and investment efficiency.

	(1)	(2)	(3)	(4)	(5)	(6)
	ROA_{t+1}	ROA_{t+2}	ROA_{t+3}	CFO_{t+1}	CFO_{t+2}	CFO_{t+3}
Panel A - RM_{PROD} as REM proxy						
MANAGER_ABILITY_RANK	**0.024*** **	**0.027*** **	**0.027*** **	**0.024*** **	**0.022*** **	**0.020*** **
	(10.870)	**(9.270)**	**(8.140)**	**(11.020)**	**(8.580)**	**(6.870)**
RM_{PROD}	**−0.065*** **	**−0.109*** **	**−0.130** **	**−0.078*** **	**−0.113*** **	**−0.125*** **
	(−4.610)	**(−7.180)**	**(−7.370)**	**(−6.870)**	**(−9.160)**	**(−8.800)**
MANAGER_ABILITY_RANK*RM_{PROD}	**0.021**	**0.046**	**0.063***	**0.063*** **	**0.071*** **	**0.067*** **
	(1.050)	**(1.330)**	**(2.080)**	**(3.840)**	**(3.950)**	**(3.260)**
ROA	0.668***	0.559***	0.503***	0.521***	0.463***	0.431***
	(101.860)	(64.750)	(48.050)	(87.920)	(64.240)	(50.890)
SIZE	0.007***	0.010***	0.012***	0.008***	0.009***	0.010***
	(20.100)	(20.050)	(19.440)	(19.340)	(19.330)	(18.510)
MTB	−0.001***	−0.001**	−0.001**	0.000	0.000	0.000
	(−3.750)	(−2.320)	(−2.020)	(−0.630)	(0.780)	(0.630)
ZSCORE	0.0004**	0.000	0.000	0.001***	0.000	−0.000
	(2.430)	(0.250)	(−0.840)	(3.690)	(0.350)	(−1.050)
RETURN	0.015***	0.006***	−0.000	−0.001	−0.001	−0.002
	(12.550)	(4.380)	(−0.260)	(−0.600)	(−1.240)	(−1.590)
ACCRUALS	−0.227***	−0.218***	−0.197***	−0.271***	−0.244***	−0.223***
	(−32.740)	(−25.950)	(−20.220)	(−39.190)	(−33.210)	(−27.580)
SALES_GROWTH	−0.016***	−0.022***	−0.020***	−0.009***	−0.012***	−0.013***
	(−7.190)	(−8.210)	(−6.480)	(−4.730)	(−5.530)	(−5.320)
CAPEX_GROWTH	−0.002***	−0.003***	−0.003***	−0.004***	−0.003***	−0.002***
	(−3.940)	(−4.290)	(−3.810)	(−7.550)	(−4.800)	(−3.320)
INDUSTRY F.E.'s	Yes	Yes	Yes	Yes	Yes	Yes
YEAR F.E.'s	Yes	Yes	Yes	Yes	Yes	Yes
FIRM CLUSTER	Yes	Yes	Yes	Yes	Yes	Yes
INTERCEPT	Yes	Yes	Yes	Yes	Yes	Yes
N	69,429	64,352	59,312	69,341	64,264	59,237
R-squared	0.525	0.391	0.325	0.490	0.403	0.352
Panel B - RM_{DISX} as REM proxy						
MANAGER_ABILITY_RANK	**0.017*** **	**0.019*** **	**0.019*** **	**0.020*** **	**0.016*** **	**0.013*** **
	(7.810)	**(6.570)**	**(5.650)**	**(9.150)**	**(6.140)**	**(4.390)**
RM_{DISX}	**−0.100*** **	**−0.103*** **	**−0.103*** **	**−0.077*** **	**−0.072*** **	**−0.098*** **
	(−6.970)	**(−6.670)**	**(−5.660)**	**(−6.640)**	**(−6.170)**	**(−6.830)**
MANAGER_ABILITY_RANK*RM_{DISX}	**0.055*** **	**0.058*** **	**0.057** **	**0.062*** **	**0.030***	**0.063*** **
	(2.790)	**(2.700)**	**(2.430)**	**(3.870)**	**(1.840)**	**(3.310)**
ROA	0.669***	0.554***	0.496	0.519***	0.458***	0.424***
	(101.520)	(63.550)	(47.000)	(87.240)	(63.140)	(49.820)
SIZE	0.008***	0.010***	0.012***	0.008***	0.009***	0.010***
	(20.640)	(20.630)	(19.980)	(19.540)	(19.840)	(18.990)
MTB	−0.001***	−0.001***	−0.001**	−0.000	0.000	0.000
	(−4.320)	(−2.890)	(−2.550)	(−0.910)	(0.240)	(0.080)
ZSCORE	0.000**	0.000	−0.000	0.001***	0.000	−0.000
	(2.430)	(0.290)	(−0.800)	(3.840)	(0.540)	(−0.980)
RETURN	0.014***	0.004***	−0.002	−0.001	−0.002**	−0.003***
	(11.400)	(3.210)	(−1.390)	(−1.330)	(−2.400)	(−2.790)
ACCRUALS	−0.223***	−0.210***	−0.189***	−0.269***	−0.238***	−0.216***
	(−32.110)	(−25.180)	(−19.430)	(−38.850)	(−32.470)	(−26.630)
SALES_GROWTH	−0.022***	−0.027***	−0.025***	−0.012***	−0.016***	−0.017***
	(−9.340)	(−9.810)	(−7.700)	(−5.940)	(−7.050)	(−6.590)
CAPEX_GROWTH	−0.003***	−0.003***	−0.003***	−0.004***	−0.003***	−0.002***
	(−4.600)	(−4.840)	(−4.220)	(−7.970)	(−5.270)	(−3.750)
INDUSTRY F.E.'s	Yes	Yes	Yes	Yes	Yes	Yes
YEAR F.E.'s	Yes	Yes	Yes	Yes	Yes	Yes
FIRM CLUSTER	Yes	Yes	Yes	Yes	Yes	Yes
INTERCEPT	Yes	Yes	Yes	Yes	Yes	Yes
N	69,429	64,352	59,312	69,341	64,264	59,237
R-squared	0.526	0.390	0.323	0.490	0.402	0.350
Panel C - $RM_{AGGREGATE}$ as REM proxy						
MANAGER_ABILITY_RANK	**0.021*** **	**0.024*** **	**0.024*** **	**0.023*** **	**0.020*** **	**0.018*** **
	(9.580)	**(8.280)**	**(7.280)**	**(10.300)**	**(7.740)**	**(6.050)**
$RM_{AGGREGATE}$	**−0.016** **	**−0.003*** **	**−0.012***	**−0.002*** **	**−0.017** **	**−0.011***
	(−1.930)	**(−3.890)**	**(−1.860)**	**(−3.910)**	**(−2.350)**	**(−1.70)**
MANAGER_ABILITY_RANK*$RM_{AGGREGATE}$	**0.012**	**0.001**	**0.009***	**0.001*** **	**0.021** **	**0.007*** **
	(1.050)	**(0.960)**	**(1.700)**	**(4.707)**	**(1.990)**	**(3.660)**
ROA	0.660***	0.545***	0.486***	0.513***	0.451***	0.416***
	(101.580)	(63.410)	(46.870)	(87.560)	(62.960)	(49.620)
SIZE	0.008***	0.011***	0.012***	0.008***	0.010***	0.011***
	(20.840)	(20.780)	(20.100)	(19.840)	(20.080)	(19.260)
MTB	−0.001***	−0.001***	−0.001**	−0.000	0.000	0.000
	(−4.230)	(−2.800)	(−2.460)	(−0.910)	(0.280)	(0.170)

(continued on next page)

Table 4 *(continued)*

	(1)	(2)	(3)	(4)	(5)	(6)
	ROA_{t+1}	ROA_{t+2}	ROA_{t+3}	CFO_{t+1}	CFO_{t+2}	CFO_{t+3}
ZSCORE	0.000***	0.000	− 0.000	0.001***	0.000	− 0.000
	(− 2.670)	(0.510)	(− 0.610)	(4.040)	(0.680)	(− 0.760)
RETURN	0.014***	0.005***	− 0.001	− 0.001	− 0.002	− 0.002*
	(12.090)	(4.000)	(− 0.550)	(− 0.820)	(− 1.570)	(− 1.870)
ACCRUALS	− 0.222***	− 0.211***	− 0.189***	− 0.268***	− 0.238***	− 0.217***
	(− 31.840)	(− 25.070)	(− 19.460)	(− 38.700)	(− 32.380)	(− 26.660)
SALES_GROWTH	− 0.016***	− 0.021***	− 0.018***	− 0.009***	− 0.011***	− 0.011***
	(− 7.170)	(− 7.620)	(− 5.740)	(− 4.440)	(− 4.900)	(− 4.460)
CAPEX_GROWTH	− 0.002***	− 0.003***	− 0.002***	− 0.004***	− 0.002***	− 0.002***
	(− 3.870)	(− 4.080)	(− 3.530)	(− 7.400)	(− 4.520)	(− 3.000)
INDUSTRY F.E.'s	Yes	Yes	Yes	Yes	Yes	Yes
YEAR F.E.'s	Yes	Yes	Yes	Yes	Yes	Yes
FIRM FIXED EFFECTS	Yes	Yes	Yes	Yes	Yes	Yes
INTERCEPT	Yes	Yes	Yes	Yes	Yes	Yes
N	69,429	64,352	59,312	69,341	64,264	59,237
R-squared	0.524	0.387	0.321	0.488	0.399	0.346

Panel A presents the results of the firm fixed effects regression of Model (6) using RM_{PROD} to proxy for real earnings management. The table reports the analysis of the impact of managerial ability on the relation between overproduction and future firm performance. The dependent variables are ROA_{t+1}, ROA_{t+2}, ROA_{t+3}, CFO_{t+1}, CFO_{t+2}, and CFO_{t+3} in Column (1), (2), (3), (4), (5), and (6) respectively.

Panel B presents the results of the firm fixed effects regression of Model (6) using RM_{DISX} to proxy for real earnings management. The table reports the analysis of the impact of managerial ability on the relation between abnormal discretionary expenses cut and future firm performance. The dependent variables are ROA_{t+1}, ROA_{t+2}, ROA_{t+3}, CFO_{t+1}, CFO_{t+2}, and CFO_{t+3} in Column (1), (2), (3), (4), (5), and (6) respectively.

Panel C presents the results of the firm fixed effects regression of Model (6) using $RM_{AGGREGATE}$ to proxy for real earnings management. The table reports the analysis of the impact of managerial ability on the relation between overall REM and future firm performance. The dependent variables are ROA_{t+1}, ROA_{t+2}, ROA_{t+3}, CFO_{t+1}, CFO_{t+2}, and CFO_{t+3} in Column (1), (2), (3), (4), (5), and (6) respectively.

All variables are defined in Appendix 1. Robust two-tailed *t*-statistics are presented in parentheses below the coefficients. *, **, and *** indicate significant levels at the 0.10, 0.05, and 0.01 levels, respectively. Bold values indicate the variable of interest.

6.2. Managerial ability and the choice of earnings management

Given our results regarding the relation between managerial ability and real activities manipulations, it would be interesting to investigate how managerial ability influences the choice of earnings management. Prior literature (e.g., Abernathy et al., 2014; Dechow & Dichev, 2002; Fan, Barua, Cready, & Thomas, 2010; Jones, 1991; Kothari, Leone, & Wasley, 2005; McVay, 2006) has widely documented earnings management through accrual-based activities and classification shifting activities, in addition to REM. Accruals manipulations include choosing reporting methods and estimate that either accelerate revenue or decelerate expense in order to increase current period earnings. Examples of accrual-based earnings management include changing the estimate for provision for bad debt expense and changing the depreciation method for fixed assets. Given the reversing nature of the accruals, this method borrows earnings from future period to improve current earning. As a result, this method of earnings management has high detection risk and one-to-one cost of earnings reduction in the future periods. The third type of earnings management is classification shifting, which misclassifies items within the income statement to increase core earnings (McVay, 2006). Different from accrual-based earnings management and activities-based earnings management, the classification shifting does not change the bottom-line income number. However, it has low detection risk and will not reverse later.

Given the differences in accruals manipulation, activities manipulation, and classification shifting, managers make trade-off decisions among these three different methods based on costs and constraints. Cohen et al. (2008) document that firms tend to use more real earnings management and less accrual-based earnings management in the post-SOX period compared to similar firms in the pre-SOX period. In addition, Cohen and Zarowin (2010) examine how firms tradeoff activities-versus accrual-based earnings management method around seasoned equity offerings (SEOs). Furthermore, Zang (2012) shows a direct substitutive relation between real and accrual-based earnings management and managers tradeoff these two strategies based on the cost of determinants. Abernathy et al. (2014) takes one-step further and examines whether managers use classification shifting when their ability to use real and accrual-based earnings management are constrained.

To capture accrual-based earnings management, we follow Kothari et al. (2005) that use performance-matched discretionary accruals. The higher values of *ACCRUALS* indicate higher-degree of accrual-based earnings management to increase earnings. To capture classification shifting, we first estimate core earnings for every firm in our sample using McVay (2006) model and calculate the unexpected core earnings as the residual from this estimation model. Then, we follow Athanasakou, Strong, and Walker (2009) and Abernathy et al. (2014) and classify firms as classification shifting firms if their unexpected core earnings are positive and they miss the analyst forecasts.

Following Cohen and Zarowin (2010), we run a two-stage Heckman (1979) model to control for firms' self-selection of earnings management. In the first stage, we use a probit model to estimate a firm's decision of earnings management and to obtain the inverse mills ratio to include in the second stage to correct the sample selection bias. The dependent variable of this model is a dummy variable that takes the value of one if either $RM_{AGGREGATE}$ or *ACCRUALS* is above the industry-year median (Column 1) or if either $RM_{AGGREGATE}$ or *CLS_SFT* is above the industry-year median (Column 2), and zero otherwise. In the second stage, we only focus on the suspect firms and examine the impact of *MANAGER_ABILITY_RANK* on the choice of REM vs. accrual-based earnings management (Column 1) and the choice of REM vs. classification shifting (Column 2). To do so, We explore a probit model to test the likelihood of higher-ability managers engaging in REM instead of accrual-based earnings management (or classification shifting). The dependent variable of the model is a dummy variable coded as one if $RM_{AGGREGATE}$ is higher than the industry-year median $RM_{AGGREGATE}$ of the sample, and zero otherwise.

Table 6 reports the results analyzing how managerial ability affects managers' preference of earnings management strategy. The results of estimating the first stage model are presented in Panel A. Many of the coefficients in this estimation are consistent with prior literature. The results of estimating the choice model (the second stage) are presented

Table 5
The relation between CEO tenure and REM (robust check).

	(1) RM_{PROD}	(2) RM_{DISX}	(3) $RM_{AGGREGATE}$
Panel A: H1 robustness check with CEO Tenure			
CEO_TENURE	**−0.0003***		
	(−1.770)		
CEO_TENURE		**−0.001***	
		(−1.860)	
CEO_TENURE			**−0.0004***
			(−1.850)
CONTROL VARIABLES	INCLUDED	INCLUDED	INCLUDED
INDUSTRY F.E.'s	Yes	Yes	Yes
YEAR F.E.'s	Yes	Yes	Yes
FIRM FIXED EFFECTS	Yes	Yes	Yes
INTERCEPT	Yes	Yes	Yes
N	19,672	19,672	19,672
R-squared	0.034	0.0355	0.0329
	(1) ROA_{t+1}	(2) ROA_{t+1}	(3) ROA_{t+1}
Panel B: H2 robustness check with CEO tenure			
CEO_TENURE	0.0003		
	(1.600)		
RM_{PROD}	−0.014*		
	(−1.640)		
CEO_TENURE*RM_PROD	**0.002***		
	(1.870)		
CEO_TENURE		0.0003	
		(1.500)	
RM_{DISX}		−0.002*	
		(1.770)	
CEO_TENURE*RM_DISX		**0.0002***	
		(1.940)	
CEO_TENURE			0.000
			(1.610)
$RM_{AGGREGATE}$			−0.003*
			(1.880)
CEO_TENURE*RM_AGGREGATE			**0.0004**
			(1.010)
CONTROL VARIABLES	INCLUDED	INCLUDED	INCLUDED
INDUSTRY F.E.'s	Yes	Yes	Yes
YEAR F.E.'s	Yes	Yes	Yes
FIRM FIXED EFFECTS	Yes	Yes	Yes
INTERCEPT	Yes	Yes	Yes
N	22,156	22,156	22,156
R-squared	0.414	0.413	0.413

Panel A presents results of the firm fixed effects regression of Model (5) using *CEO_TENURE* to proxy for managerial ability. The dependent variables are RM_{PROD}, RM_{DISX}, and $RM_{AGGREGATE}$ in Column (1), (2), and (3) respectively.
Panel B presents the results of the firm fixed effects regression of Model (6) using *CEO_TENURE* to proxy for managerial ability and RM_{PROD}, RM_{DISX}, and $RM_{AGGREGATE}$ to proxy for real earnings management in Column (1), (2), and (3). The table reports the analysis of the impact of *CEO_TENURE* on the relation between REM and future firm performance. The dependent variables are ROA_{t+1}.
All variables are defined in Appendix 1. Robust two-tailed *t*-statistics are presented in parentheses below the coefficients. *, **, and *** indicate significant levels at the 0.10, 0.05, and 0.01 levels, respectively. Bold values indicate the variable of interest.

Table 6
Additional test – Bushee (1998) institutional investor classification – External monitoring.

	(1) *REM* vs. *discretionary accruals*	(2) *REM* vs. *classification shifting*
Panel A: determinants of overall earnings management activities (the first stage)		
HAB_BEAT	0.005	0.055***
	(0.310)	(3.320)
SHARES	0.059***	0.070***
	(10.700)	(11.110)
ANALYST	0.078***	0.042*
	(3.400)	(1.660)
BONUS	−0.149**	0.018
	(−2.180)	(0.240)
OPTION	0.176***	0.246***
	(4.930)	(6.180)
ROA	0.663***	0.842***
	(15.160)	(16.900)
BTM	−0.010	−0.029**
	(0.760)	(−2.110)
LEVERAGE	−0.165***	−0.232
	(−4.870)	(−6.110)
INTERCEPT	−1.488***	−1.513***
	(−66.480)	(−61.550)
N	69,429	54,239
Log Likelihood	−2539	−1970
Panel B: determinants of real earnings management (the second stage)		
MANAGER_ABILITY_RANK	**−0.159***	**−0.141****
	(−2.650)	**(−2.320)**
BIG8	0.102**	−0.030
	(2.260)	(−0.670)
AUDIT_TENURE	0.007***	0.003
	(2.780)	(1.420)
LITIGATION	0.041	(0.030)
	(1.140)	(−0.870)
NOA	(0.019)	0.039**
	(−1.250)	(2.380)
INVERSE MILLS RATIO	0.158*	0.573***
	(−1.810)	(8.520)
INTERCEPT	0.661**	−0.594***
	(2.470)	(−3.650)
YEAR F.E.'s	Yes	Yes
N	69,429	54,239
Log likelihood	−3019	−2011

Panel A presents the results of the probit model that is used as the Heckman first stage to explain earnings management suspect firms. For Column (1), the dependent variable takes the value of 1 if either the aggregate real earnings management proxy or discretionary accruals are above the industry-year median and zero otherwise. For Column (2), the dependent variable takes the value of 1 if either the aggregate real earnings management proxy is above the industry-year median or classification shifting is identified and zero otherwise.
Panel B presents the results of the probit model that is used as the Heckman second stage to explain managers' choice of using real earnings management. For Column (1) and (2), the dependent variable takes the value of 1 if the aggregate real earnings management proxy is above the industry-year median and zero otherwise.
All variables are defined in Appendix 1. Robust two-tailed *t*-statistics are presented in parentheses below the coefficients. *, **, and *** indicate significant levels at the 0.10, 0.05, and 0.01 levels, respectively. Bold values indicate the variable of interest.

in Panel B. Our variable of interest is *MANAGER_ABILITY_RANK* in Panel B. We present two columns in each table: Column 1 examines managers' preference between REM vs. accrual-based earnings management, and Column 2 examines managers' preference between REM vs. classification shifting. In Column 1, *MANAGER_ABILITY_RANK* exhibit relatively strong negative relation to the choice of REM (coefficient = −0.159) and this relation is statistically significant at the 0.01 level (*t*-statistics = −2.650). This result suggests that higher-ability managers are less likely to choose REM over accrual-based earnings management. Similar to Column 1, when we examine the choice of REM versus classification shifting in Column 2, we also find a negative relation between *MANAGER_ABILITY_RANK* and the choice of REM (coefficient = −0.141) and statistically significant at 0.05 level (*t*-statistics = −2.320). This finding suggests that higher-ability managers are less likely to choose REM over classification shifting. These results appear to support prior literature about the value-destroying nature of REM and higher-ability managers' superior knowledge of the firm's operation and financial reporting.

Table 7
The impact of other types of earnings management on future firm performance.

	(1) ROA_{t+1}	(2) CFO_{t+1}
Panel A - discretionary accruals		
MANAGER_ABILITY_RANK	**0.022*****	**0.023*****
	(10.190)	**(10.430)**
ACCRUALS	**− 0.277*****	**− 0.283*****
	(− 16.970)	**(− 19.180)**
MANAGER_ABILITY_RANK*ACCRUALS	**0.094*****	**0.026**
	(3.750)	**(1.100)**
ROA	0.660***	0.514***
	(101.910)	(87.660)
SIZE	0.008***	0.008***
	(21.160)	(19.870)
MTB	− 0.001***	− 0.0002
	(− 4.100)	(− 0.870)
ZSCORE	0.0004***	0.001***
	(2.760)	(4.070)
RETURN	0.015***	− 0.001
	(12.230)	(− 0.800)
SALES_GROWTH	− 0.016***	− 0.009***
	(− 6.920)	(− 4.400)
CAPEX_GROWTH	− 0.002***	− 0.004***
	(− 3.810)	(− 7.380)
INDUSTRY F.E.'s	Yes	Yes
YEAR F.E.'s	Yes	Yes
FIRM FIXED EFFECTS	Yes	Yes
INTERCEPT	Yes	Yes
N	69,429	69,341
R-squared	0.524	0.488
Panel B - classification shifting		
MANAGER_ABILITY_RANK	**0.023*****	**0.032*****
	(8.790)	**(11.550)**
CLS_SFT	**0.008***	**0.009****
	(1.680)	**(2.110)**
MANAGER_ABILITY_RANK*CLS_SFT	**0.004**	**0.014****
	(0.560)	**(2.090)**
ROA	0.664***	0.475***
	(93.940)	(69.850)
SIZE	0.008***	0.012***
	(18.020)	(23.360)
MTB	− 0.001***	− 0.000
	(− 4.180)	(− 1.250)
ZSCORE	0.000**	0.000**
	(2.160)	(2.210)
RETURN	0.015***	0.001
	(11.270)	(0.600)
SALES_GROWTH	− 0.015***	− 0.010***
	(− 5.780)	(− 4.200)
CAPEX_GROWTH	− 0.002***	− 0.005***
	(− 3.720)	(− 9.110)
INDUSTRY F.E.'s	Yes	Yes
YEAR F.E.'s	Yes	Yes
FIRM FIXED EFFECTS	Yes	Yes
INTERCEPT	Yes	Yes
N	54,239	54,170
R-squared	0.502	0.448

Panel A presents the results of the firm fixed regression analyzing the impact of managerial ability on the relation between accrual-based earnings management and future firm performance.
Panel B presents the results of the firm fixed regression analyzing the impact of managerial ability on the relation between classification shifting earnings management and future firm performance.
The dependent variables are ROA_{t+1} and CFO_{t+1} in Column (1) and (2), respectively. All variables are defined in Appendix 1. Robust two-tailed *t*-statistics are presented in parentheses below the coefficients. *, **, and *** indicate significant levels at the 0.10, 0.05, and 0.01 levels, respectively. Bold values indicate the variable of interest.

6.3. The impact of managerial ability on the relation between other forms of earnings management and future firm performance

For completeness, we re-estimate Model 6 using *ACCRUALS/CLS_SFT* instead of REM proxies and analyze the coefficient on the interaction term of *MANAGER_ABILITY_RANK* × *ACCRUALS* in Panel A, and *MANAGER_ABILITY_RANK* × *CLS_SFT* in Panel B. Panel A shows that *MANAGER_ABILITY_RANK* is positively related to ROA_{t+1} and CFO_{t+1}, and *ACCRUALS* is negatively related to ROA_{t+1} and CFO_{t+1}. These findings are consistent with prior literature on accrual-based earnings management and managerial ability (Cohen & Zarowin, 2010; Demerjian et al., 2012). Furthermore, we find a significant positive relation between *MANAGER_ABILITY_RANK* × *ACCRUALS* and ROA_{t+1}, indicating that higher-ability managers better reduce the negative influence of discretionary accruals on the subsequent period's ROA. We fail to find similar results when we use CFO_{t+1} to proxy for future firm performance.

Panel B of Table 7 shows that *MANAGER_ABILITY_RANK* is positively related to ROA_1 and CFO_{t+1}, and this relation is highly statistically significant at 0.01 level (*t*-statistics = 8.790 and 11.550 for ROA_{t+1} and CFO_{t+1}, respectively). We find a significant positive relation between classification shifting and future firm performance. This result makes sense given that classification shifting differed from activities- and accrual-based earnings management that classification is shifting earnings management is not reversing (not borrowing future earnings to increase current earnings), and not changing the bottom line income number. Moreover, we find that *MANAGER_ABILITY_RANK* × *CLS_SFT* is positively related to CFO_{t+1}. This result suggests that higher-ability managers better increase the subsequent period's operating cash flows of classification shifters. We fail to find similar results when we use ROA_{t+1} to proxy for future firm performance.

7. Conclusion

In this study, we examine the relation between managerial ability and REM, and the impact of managerial ability on the relation between REM and future firm performance. To capture REM, we follow Roychowdhury (2006) and Kothari et al. (2016) and estimate the abnormal production costs and abnormal discretionary expenditures. Our results show that higher-ability managers use less activities-based earnings management. More interestingly, we find that higher-ability managers better reduce the negative impact of REM on future firm performance. In our additional tests, we find that high-ability managers appear to choose accrual-based earnings management or classification shifting over REM. We further find that when these high-ability managers use accrual-based earnings management and classification shifting earnings management, their earnings management is associated with better future firm performance, relative to low-ability managers.

To the best of our knowledge, this is the first study that extends the managerial ability to the real earnings management settings and tests the relation between managerial ability and the use of REM. Our findings highlight the importance of having high-ability managers and strengthen the argument in Francis et al. (2015) that more-able managers engage in less opportunistic behavior (i.e., questionable accounting practice). However, our study still has its limitations. For example, it is difficult to measure managerial ability because it is multi-dimensional and unobservable in nature. The managerial ability ranks by Demerjian et al. (2012) are an approximate measure of management performance. More precise measures of management performance may yield stronger results. Readers need to exercise caution when they attempt to generalize the findings.

Data availability

Data are available from sources identified in the paper.

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Appendix 1. Variable definition

Future firm performance measures.

ROA	=	Firm-specific return on assets in the next three years $t + 1$, $t + 2$ and $t + 3$, calculated as income before extraordinary items (IB, #18) scaled by total assets (AT, #6) at the beginning of year *t*.
CFO	=	Firm-specific cash flow from operations (OANCF, #308) scaled by total assets (AT, #6) at the beginning of year t in the next three years $t + 1$, $t + 2$ and $t + 3$.

Real earnings management measures.

RM_{PROD}	=	The estimated residual from the regression of production costs on sales revenue (SALE, #12) in year t, change in sales revenue in year t, and change in sales revenue in year t-1. The production cost is calculated as the sum of costs of goods sold (COGS, #41) and change in inventory (INVT, #3). All variables are scaled by total assets. The higher value of RM_{PROD} indicates that managers engage in more overproduction to increase current earnings.
RM_{DISX}	=	$(-1) \times$ the estimated residual from the regression of discretionary expenditures on sales revenue in year t-1. The discretionary expenditures are calculated as the sum of advertising expenditures (XAD, #45), research and development expenditures (XRD, #46), and general administrative expenditures (XSGA, #132). All variables are scaled by total assets. The higher value of RM_{DISX} indicates that managers engage in more discretionary expenses cut to increase current earnings.
$RM_{AGGREGATE}$	=	$RM_{PROD} + RM_{DISX}$. The higher value of $RM_{AGGREGATE}$ indicates that managers engage in more overall activities-based earnings management.

Managerial ability measure.

MANAGER_ABILITY_RANK	=	Decile ranking of managerial ability by Demerjian et al. (2012).

Other variables.

ROA	=	The difference between firm-specific ROA and the median ROA for the same year and industry (Fama and French 48 industries). ROA is calculated as income before extraordinary items (IBADJ, #20) scaled by total assets (AT, #6) at the beginning of year t.
SIZE	=	Natural log of total assets (AT, #6).
MTB	=	[Outstanding common shares (CHSO, #25) × Stock price at fiscal yearend (PRCC_F, #24)] divided by total book value (CEQ, #60).
ZSCORE	=	3.3 × [Net income (NI, #172)/Assets (AT, #6)] + 1.0 × [Sales (SALE, #12)/Assets (AT, #6)] + 1.4 × [Retained earnings (RE, #36)/Assets (AT, #6)] + 1.2 × [Working capital (WCAP, #121)/Assets (AT, #6)].
RETURN	=	Size adjusted abnormal returns computed as the monthly buy and hold raw return minus the monthly buy and hold return on a size matched decile portfolio of firms compounded over 12 months of fiscal year t.
ACCRUALS	=	1 if discretionary accrual is above the medium and zero otherwise. We use the performance matched method in Kothari et al. (2016) to develop our discretionary accrual measure.
SALES_GROWTH	=	The first difference in sales revenues (SALE, #12) divide by the sales revenues from the prior period.
CAPES_GROWTH	=	The first difference in capital expenditures (CAPX, #128) divide by the capital expenditures from the prior period.
CLS_SFT	=	1 if abnormal core earnings is positive and IBES earnings per share is greater than GAAP net income per share (Abernathy et al., 2014), and 0 otherwise.
CEO_TENURE	=	the natural log of the number of years an executive has been listed as CEO at the end of year *t*.
BIG8	=	An indicator variable that equals 1 if the firm's auditor is one of the Big 8, and 0 otherwise.
AUDIT_TENURE	=	The log of the number of years the auditor has been with the firm.
LITIGATION	=	An indicator variable that equals 1 if a firm's SIC code is 2833–2836, 8731–8734, 7371–7379, 3570–3577, 3600–3674, and 0 otherwise.
NOA	=	The net operating assets, which is calculated as the sum of shareholders' equity less cash and marketable securities and plus total debt at the beginning of the year, deflated by the total assets from the previous year.
HAB_BEAT	=	The number of times of beating/meeting analysts' forecast consensus in the past four quarters.
SHARES	=	The weighted average number of common shares outstanding at the beginning of the year.
ANALYST	=	The log of 1 plus the number of analyst following the firm.
BONUS	=	The average bonus compensation as a proportion of total compensation received by the CEO and the CFO of a firm.
OPTION	=	The Black-Scholes value of option compensation as a proposition of total compensation received by the CEO and the CFO of a firm.
BTM	=	The book-to-market ration, where the book value of the common equity is divided by the market value of the equity.
LEVERAGE	=	The sum of short term and long term debit divided by average total assets.

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