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Evidence for the Existence of Downward Real Earnings Management

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Abstract

Prior studies of real-activity earnings management (*REM*) *focus on earnings-inflating abnormal activities. We seek to establish the existence of downward REM by investigating several corporate events in which managers have incentives to temporarily deflate market valuations. Specifically, we focus on, and find downward REM before, share repurchases, management buyouts* (*MBOs*), *and CEO option awards. Large-sample evidence of downward REM is also found in our general analysis of earnings smoothing. Downward REM becomes much smaller or nonexistent when there is a lack of managerial incentives in those events, such as non-carry-through repurchases, incomplete MBOs, and unexpected option awards. Following the research design of Zang* (*2012*), *we find that various REM and AEM cost factors consistently influence the magnitude of downward REM and AEM around the three corporate events.*

Keywords: downward earnings management, real earnings management, share repurchase, management buyout, CEO option grant, earnings smoothing

1. Introduction

A growing body of literature has shown the existence of upward real earnings management (REM) (e.g., Cohen & Zarowin, 2010; Cohen, Mashruwala, & Zach, 2010; Ertan, 2013; Gunny, 2010; Roychowdhury, 2006; Zang, 2012; Zhao, Chen, Zhang, & Davis, 2012). While acknowledging their importance in furthering our understanding of earnings management (EM), we notice that earnings-deflating REM is largely ignored.[1] Most of the concurrent REM studies also, by default, implicitly equate REM with upward REM. This is in contrast with the more established literature of accrual-based earnings management (AEM) where the existence of earnings-deflating manipulation is widely evident (e.g., DeAngelo, 1986; Jones, 1991; Murphy & Zimmerman, 1993; Perry & Williams, 1994; DeFond & Subramanyam, 1998; Baker, Collins, & Reitenga, 2003; 2009; Gong, Loutis, & Sun, 2008; McAnally, Srivastava, & Weaver, 2008). While REM research is still in its early stage, the lack of attention to downward REM is also likely the result of two perceptions: first, managers generally benefit from better-looking earnings and therefore lack the interest in deflating them;[2] second, REM is supposed to be costly, making AEM a more appealing tool for downward manipulation.

The above literature gap motivates us to examine the existence of downward REM under certain circumstances. Another motivation of our study comes from the cross-sectional models the literature use to estimate REM proxies: Each model employs a group of variables to predict the normal level of a certain decision variable (expenses, production costs, or cash flows). Firms' deviations from the model-predicted normal levels are proxies for REM. After necessary

[1] It is worth noting that, in his study of earnings-inflating REM, Roychowdhury (2006) briefly mentions the possibility of downward REM among suspect firms. However, he does not empirically test the existence of downward REM or discuss the issue in detail.

[2] This perception is shared by several prior studies (see Pierre & Anderson, 1984; Carcello & Palmrose, 1994; Nelson, Elliott, & Tarpley, 2002; Wright & Wright, 1997). In a recent survey by Dichev, Graham, Harvey, and Rajgopal (2013), 58.8% (mean) of income misrepresentations are through upward EM as opposed to downward EM. While upward EM seems to be in the majority, downward EM still makes up a significant portion. This is in contrast with the heavy emphasis the existing literature places on income-increasing EM, as Dichev et al. comment on this finding.

adjustments, positive deviations are supposed to have income-increasing effect and, therefore, represent upward EM in those studies. By design, this proxy-generating process automatically produces negative deviations, the interpretation of which, however, is mostly absent from prior studies.

The *downward REM* in our study refers to real operations firms intentionally implement to temporarily deflate earnings for the purpose of obtaining economic benefits. We search for the evidence of such downward REM separately in three corporate events: share repurchases, management buyouts (MBOs), and CEO option awards.[3] We hypothesize that managers engage in downward REM around announcements of repurchases and MBOs to lower acquisition costs; the downward REM before option grants can increase the intrinsic values of those options. This is the case because exercise prices of options are always set equal to share prices on the grant date.

We rely on three REM proxies provided by the existing REM literature: *discretionary expenses*, *production costs*, and *cash flows from operating activities*. In the meantime, we include in our analyses the typical measure of AEM: discretionary accruals. Our study mainly uses cross-sectional regression analyses. Siriviriyakul (2013) argue that model-predicted EM proxies are likely to have systematic biases; Cohen, Pandit, Wasley, and Zach (2013) suggest that performance-matching reduces the degree of misspecification in REM proxies. Therefore, for robustness purposes, we also implement propensity matching in our analyses of the three events.

[3] Another corporate event from which we try to find evidence of downward REM is CEO turnover. The "big bath" theory suggests that incoming CEOs have the incentive to manipulate earnings downward and implicitly blame the poor performance on the departing CEOs. This downward manipulation creates profit reserves for subsequent periods. While earlier literature suggests the existence of downward AEM by incoming CEOs (Moore, 1973; Strong & Meyer, 1987; Murphy & Zimmerman, 1993) do not find clear evidence of accruals or real operations being used by them to deflate earnings. Our analyses yield inconsistent, and, at best, very weak evidence of downward REM. Those results are available upon request.

Using a large number of actual repurchases obtained from SDC for the period 1994-2011, we find consistent evidence of downward REM around firms' repurchase announcements. The results have strong economic magnitudes and statistical significances in both the univariate and multivariate tests. In a separate analysis, we find that the identified downward REM contributes to the well-documented post-repurchase outperformance, a finding that is in line with the reversion effect Gong et al. (2008) find in pre-repurchase downward AEM. To further strengthen our argument that the downward REM reflects managers' efforts to lower acquisition costs, we examine REM in firms whose repurchase announcements are followed by trivial- and non-actual repurchases. Those firms have little economic interest in lowering share prices. As expected, there is no evidence of downward REM in those comparison groups.

MBO occurs much less frequently than share repurchase. Despite the small number of MBO observations, we are able to show the existence of downward REM before MBOs.[4] The magnitude of downward REM around MBOs is larger than that of repurchases. This is consistent with the fact that MBOs tend to be much larger in scale. We also find more pre-MBO REM than pre-MBO AEM. This is likely the result of the high litigation risks managers face due to their inherent conflicts of interest in MBOs. In a likely MBO-related lawsuit against management, REM can be justified or defended with the "business judgment rule", while AEM activities, especially those in violation of GAAP, are more susceptible to legal challenges. Similar to repurchase announcements with trivial- and non-actual buyback, incomplete MBOs are not preceded by downward REM activities.

We follow Baker et al. (2003) in analyzing the relationship between option grants and EM. They document a negative association between expected option awards and abnormal discretionary accruals. Using a large sample of firm-year observations from Execucomp, we find

[4] In a concurrent study, Mao and Renneboog (2013) have provided some evidence of downward REM before MBOs in the United Kingdom.

strong and consistent evidence of downward REM before expected stock option grants but not unexpected ones. Downward EM before option awards reflects managers' opportunistic rent-seeking to the detriment of all shareholders. Consistent with this rationale, the results show that downward REM before option awards has a negative impact on firms' future performance.

One may wonder why firms in the above three corporate events use both downward AEM and downward REM instead of simply relying on the former, the less costly one. As suggested in Badertscher (2011), each EM technique has limited capacity and/or increasing marginal cost to manipulate earnings. Therefore, firms that are about to hit the limit of AEM resort to REM to meet the earnings targets.[5] We thus predict and find strong evidence that the observed downward REM around the three corporate events concentrates in firms with large magnitude of downward AEM.

Achieving smooth earnings is an important goal in corporate financial reporting (Graham, Harvey, & Rajgopal, 2005). We are able to provide the evidence of downward REM through this angle. To that end, we construct a general measure *smooth* (following Baker et al., 2003) to capture the extent to which the actual earnings beat (miss) the target earnings. After controlling for firm characteristics, we consistently find strong negative associations between *smooth* and all of our EM proxies in the above three event analyses. Moreover, in a separate analysis, earnings smoothing is also evidenced by the large downward manipulation in top performers.

Zang (2012) has examined the influence of the various REM and AEM cost factors on suspect firms' upward manipulation. We follow her research design and find similar influences of those cost factors on the downward AEM and REM around the three corporate events. For example, *Big 8* auditor, auditor *tenure*, operating *cycle*, and financial health (*Z-score*) are

[5] This is consistent with the view briefly discussed in Cohen and Zarowin (2010) and Roychowdhury (2006) that cross-sectional variation in the desired amount of EM explains the positive correlation between REM and AEM. This is also evident in the positive coefficient before the variable *predicted REM* (*Pred_REM*) in Zang's (2012) recursive equation system.

negatively (positively) associated with the magnitude of downward AEM (REM), while *net operating assets* (*NOA*) and institutional ownership (*IO*) are positively (negatively) associated with the magnitude of downward AEM (REM).

Our contributions are fourfold: First, considering the large amount of studies that document firms' use of accruals to deflate earnings, we fill an important gap in the accounting literature by showing that firms also use real activities to deflate earnings. More importantly, finding downward REM under different circumstances indicates the pervasiveness of downward REM. Second, the existing REM literature gives little systematic analysis of the properties of REM proxies (Cohen et al., 2013). We notice that some concurrent REM studies attempt to use *absolute* (*unsigned*) values of the model-estimated proxies, a practice that is already commonly seen in the AEM-related research.[6] Our findings provide empirical support for this attempted approach. Third, we add to the understanding of operating decisions managers make around repurchases, MBOs, option awards, and outperforming years. Outsiders who analyze corporate operational strategies should use caution during those event periods: the observed levels of operating activities (e.g. increases in R&D expenses before repurchases) may be temporary and thus cannot serve as an indicator of the future long-term strategy in the company. Moreover, based on the difference in firm performance following repurchases and option awards, we argue that managers' manipulative behaviors around those two events are different in nature. While downward manipulation before option awards could be detrimental to firm value, the same manipulation before repurchases actually reduces share acquisition cost for the firm and consequently enhances firm value. Fourth, Zang (2012) has provided evidence of cost-factors-induced substitution effect between REM and AEM in the context of suspect firms. Our results suggest that this substitution effect widely exists in other contexts as well. Additionally, our

[6] Kim and Sohn (2013) and Francis, Hasan, and Li (2014) are recent examples of using absolute values of REM proxies.

results confirm the view that managers gradually lean toward REM as AEM approaches its limit (Badertscher, 2011).

The remainder of this paper is structured as follows: Section 2 discusses the literature and develops our hypotheses; Section 3 introduces the EM proxies; Section 4 presents the analyses of repurchases and tests of *H1* (actual repurchases) and *H2* (Non-carry-through repurchases); Section 5 tests *H3* (completed MBOs) and *H4* (incomplete MBOs); Section 6 tests *H5* (CEO option grants); We incorporate the analyses of earnings smoothing (*H6*) into the above sections. Section 7 provides additional results related to earnings smoothing, with a focus on top performers. We discuss in detail the models and robustness tests in the section of repurchase analyses; for brevity, we omit similar discussions in the sections of MBOs and option awards.

2. Literature Review and Hypotheses

REM is generally perceived as a costly earnings management technique. However, compared with AEM, it invites less scrutiny from auditors (no potential violation of GAAP or the spirit of GAAP) and fewer legal challenges (protection by the business judgment rule).[7] For any EM technique, being REM or AEM, the cost to manipulate each additional dollar of earnings is unlikely to stay constant. The marginal cost is likely to increase with its magnitude. Therefore, when managers have a nontrivial amount of earnings to manipulate, instead of engaging in only AEM or REM at a high level, they are more likely to use both at the same time but at moderate levels. Following this rationale, we search for the evidence of downward REM in situations where downward AEM is already found or at least expected.

2.1 Downward Earnings Management

[7] The three REM activities that are frequently analyzed by the literature are manipulations in discretionary expenses, production levels, and sales strategies. To the best of our ability, we do not find any historical SEC allegations of manipulation in production levels or discretionary expenses. We do find some SEC enforcement actions and shareholder lawsuits against “channel stuffing,” which is a typical example of REM in sales. For example, a simple search of the key word “channel stuffing” yields 82 results in SEC/AAER and 77 results in Stanford/Securities Class Action Clearing House. Even in "channel stuffing" cases, most allegations are concerned with GAAP violations.

Jones (1991) is the first widely noted paper showing that firms engage in downward AEM for economic benefits.[8] Thereafter, AEM studies have found downward manipulation under various circumstances. Those studies provide two reasons why managers sometimes deflate earnings: (I) to influence certain transaction prices; and (II) to smooth earnings.

Perry and Williams (1994) study firms' discretionary accruals before management announcing their intentions to bid for the control of the company. Using a small sample of 175 MBOs, they find negative discretionary accruals preceding those announcements. They argue that the downward AEM before MBOs results from managers' attempts to lower acquisition prices. This manipulation serves the interest of incumbent managers at the expense of shareholders. Wu (1997) provides support for this view and shows that the wealth transfer managers realize from pre-MBO manipulation amounts to almost $50 million on average based on 87 MBOs during 1980-1987.

Downward manipulation can also save firms' cost in their repurchases of shares. In support of this argument, the previous studies have provided evidence of downward AEM around share repurchase announcements (Gong et al., 2008; Badertscher, Phillips, Pincus, & Rego, 2009). While the underlying mechanism is similar to that in MBOs, the cost saving in repurchases actually serves the interest of both the managers and those long-term shareholders who do not tender their shares in repurchases. Therefore, shareholders with information advantage should actually favor such a manipulation by managers during repurchases.

Another event in which managers can use downward EM to influence transaction prices is stock option awards. This is the case because strike prices are always set at share prices as of grant dates. Managers are found to have intentionally deflated earnings before receiving options

[8] He finds such manipulation in industries that are under import-relief investigation. Those firms intentionally decrease their reported earnings because International Trade Commission (ITC) grants import reliefs based on the injuries those industries sustain from foreign imports. Since the determinations of the degree of injury call for accounting numbers, temporarily deflated earnings serve the best interests of those firms. For the same reason, downward AEM is found in oil companies during the 1990 Persian Gulf Crisis (Han & Wang, 1998).

(Coles, Hertzel, & Kalpathy, 2006; Baker et al., 2003; 2009; McAnally et al., 2008; Badertscher et al., 2009). This self-serving manipulation hurts firm value and shareholders' interests.

From a different perspective, earnings deflation is an integral part of earnings smoothing. Since managers place a high priority on stable earnings (see Graham et al., 2005), they may want to manage earnings downward in a year when there is an outperformance (Healy, 1985; Levitt, 1998; Bushee, 2001; Nelson et al., 2003). The literature has provided empirical evidence of earnings smoothing using accruals (e.g., Gaver, Gaver, & Austin, 1995; DeFond & Park, 1997; Reitenga, Buchheit, Yin, & Baker, 2002; Liu & Ryan, 2006).

The evidence of downward AEM in the above studies provides support for the use of unsigned (absolute value of) discretionary accruals as a measure of the magnitude of AEM.[9]

2.2 Share Repurchases (*H1*&*H2*)

Share repurchase is a frequently discussed issue in the boardroom nowadays. As a major payout form, share repurchase in the United States increased from around $1.5 billion (3.59% of companies' earnings) in 1972 to about $200 billion (41.79% of companies' earnings) in 2000 (Grullon & Michaely, 2002). More than 90% of those share repurchases are executed in an open-market style. In their study of open-market share repurchases, Grullon and Ikenberry (2005) find that about 70% of S&P 500 firms (index of 2000) had at least one repurchase during the last five years.

Earlier studies favor the view that repurchases are made to signal future earnings improvements. However, the empirical support for signaling is, at best, strong only for fixed-price repurchases (Lie & McConnell, 1998; Grullon & Ikenberry, 2005; Grullon & Michaely, 2004). As for open-market share repurchases, the signaling function is much weaker because of their growing popularity as a surplus-distributing channel and quiet transaction process with no

[9] Using unsigned measures also addresses the *mechanical* reversion of AEM. See Hribar and Nichols (2007) for a detailed discussion and analysis of this measure.

fixed prices (Comment & Jarrell, 1991; Grullon & Michaely, 2002; Babenko, Tserlukevich, & Vedrashko, 2012). When managers decide to repurchase for purposes other than signaling, they have incentives to temporarily deflate the repurchase prices through downward EM (Gong et al., 2008).[10] Firms' manipulation of stock prices before share purchases is also evident in the study by Cheng and Lo (2006), which shows that managers make bad news forecasts before their own purchases of shares. Our analyses start with open-market share repurchases but also extend to other types of repurchases. As long as the announcements are followed by actual repurchases, firms benefit from the lowered repurchase prices and thus have the incentive to temporarily deflate the reported earnings.

The literature also suggests that, under certain circumstances, managers repurchase shares to boost reported earnings per share (EPS) (Bens, Nagar, Skinner, & Wong, 2003; Hribar, Jenkins, & Johnson, 2006; Myers, Myers, & Skinner, 2007; Burnett, Cripe, Martin, & McAllister, 2012; Farell, Unlu, & Yu, 2014). Those earnings-increasing repurchases (accretive repurchases), if implemented by managers for upward EM purposes, bias our results against finding evidence of downward EM. However, this bias is unlikely to be severe. As described in Hribar et al. (2006), only 9.34% of repurchases are able to increase current quarter EPS by more than 1 cent.[11] In addition, some of those repurchases are accretive simply because of the pre-announcement undervaluation instead of managers' intention to manage up earnings.[12]

We make the following hypothesis:

H1*: Firms exhibit downward REM around their repurchase announcements.*

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[10] Gong et al. (2008) give the following summary of non-signaling reasons for repurchases: cash distribution (Brennan & Thakor, 1990), control of agency costs (Denis & Denis, 1993; Grullon & Michaely, 2004), optimization of financial leverage (Dittmar, 2000), expropriation of creditors (Maxwell & Stephens, 2003), employee stock option plans (Kahle, 2002), and maximization of option value (Jolls, 1998).

[11] Their approach has considered rounding due to the concern that managers may strategically round EPS for reporting purposes as documented by Das and Zhang (2003).

[12] Managers claim that undervaluation is the primary reason why they decide to repurchase (see Brav, Graham, Harvey, & Michaely, 2005). The undervaluation (low *price*) alone makes repurchases accretive because stock repurchases at cheap prices increase EPS (Guay, 2002; Bens et al., 2003; Hribar et al., 2006).

Since REM undermines firms' fundamentals, we posit that repurchasing firms engage in downward REM only when the cost savings from the lowered share-repurchase prices more than compensate the value loss due to REM. The evidence in Gunny (2010) also suggests that the direct cost associated with REM is not insurmountable. While AEM activities do not reduce firms' intrinsic values per se, they do come with costs (see Zang, 2012) and capacity constraints. Therefore, we expect the downward REM around repurchases to be strong in firms that need to manipulate a large amount of earnings and *incremental* AEM is difficult. Specifically, we locate those firms by their AEM magnitude: firms with large AEM are likely to have strong needs of EM in the first place and high cost in further AEM.

In the United States, open-market repurchase is a material corporate event requiring board approval. After obtaining the approvals, those repurchase plans need to be announced to the public. Following the initial announcements, however, firms are under no legal obligation to implement or finish those plans (Grullon & Ikenberry, 2005). Nor is there a time limit on this quiet and continuous buyback process. Usually it lasts for two to three years subsequent to the initial announcement (Stephens & Weisbach, 1998; Grullon & Ikenberry, 2005). Prior studies find that the actual repurchased amounts are always different from initially announced. In Stephens and Weisbach (1998), three years after initial announcements: 57% of firms bought back more than planned; 25% bought less than half; and, within this group of firms, a substantial portion acquired no shares at all. There could be many reasons why firms do not carry through repurchase plans. Some may opportunistically announce those plans to sustain their stock prices after they exhaust their income-increasing EM (Gong et al., 2008); and some firms' original interests in share repurchases are simply not strong enough. Since firms can obtain economic benefits through downward EM only from actual repurchases, we hypothesize that:

***H2**: Firms exhibit no downward REM around their repurchase announcements that are followed by trivial or no actual repurchases.*

Because the total cost saving through downward REM increases with the number of shares actually repurchased, another form of hypothesis *H2* is stated as follows:

***H2'**: The magnitude of downward REM is positively associated with the actual amount repurchased.*

The empirical support of *H2* (*H2*'), if found, strengthens the cost-saving argument we use for *H1*.

2.3 Management Buyouts (MBOs) (*H3*&*H4*)

Compared with share repurchase, MBO occurs much less frequently but should give managers even stronger incentives to lower market valuation temporarily. This is the case because MBOs can be regarded as large-scale repurchases made by incumbent managers, who can obtain sizeable economic benefits through deflated earnings as documented in Wu (1997). Specifically, downward EM before MBOs reduces the likelihood of the emergence of superior rival bids and lowers the price at which current shareholders are willing to accept the proposed buyout.

Moreover, incumbent managers have inevitable conflicts of interest in MBOs and, therefore, always face legal challenges from shareholders alleging their breach of fiduciary duty.[13] Reported earnings preceding MBOs can be used by incumbents to support the fairness of acquisition prices when those challenges arise (DeAngelo, 1986; Perry & Williams, 1994; Wu, 1997). Managers can use accruals to manipulate earnings downward, as documented in the literature of MBO. However, those practices are subject to scrutiny from auditors. Being aware of both managers' strong incentives to lower acquisition prices and the litigious environment

[13] For example, Dell's directors were sued over the recent $24.4 Billion MBO proposal by an investor, alleging the board of director violated their duties and intended to sell the company to the founder "on the cheap", in spite of the fact that the offer is 25% in excess of the market price right before the announcement.

surrounding MBOs, auditors are likely to become more alert to excessive downward AEM. To circumvent this constraint, managers who intend to deflate earnings may have to realize some of the intended EM in the form of real activities. Based on the above arguments, we predict that downward REM strongly exists before MBO announcements:

H3*: Firms exhibit downward REM before their MBO announcements.*

We believe, however, that managers should also exercise some restraints on using REM in this scenario. This is due to their substantial increase of ownership stakes after the completion of MBOs, and excessive REM may hurt the future performance of their firms. Therefore, the above hypothesis (*H3*) is based on the condition that potential value loss due to the impact of REM on operations is less than the savings on acquisition cost. The question becomes: How realistic is this assumption? We believe that it should easily hold for the following reason: Acquisition cost depends on outside shareholders' and competing bidders' perceptions of firm value, which, in turn, is greatly based on the projected future earnings. Without the knowledge of actual performance, outsiders estimate future earnings based on the current earnings reported by the management. One-dollar deflation in current earnings decreases the projected earnings for all future periods and thus reduces outsiders' valuation by an amount that is a multiple of one dollar (the final price/EPS ratio is between 10.5 and 14.22 in DeAngelo (1986) and Perry and Williams (1994)). On the other hand, the value loss caused by a one-dollar downward REM is less than one dollar when we consider the potential EM reversion in future periods. For example, rushing forward advertising input from the future years to the current year reduces current income but increases future income.[14]

As insiders, incumbent managers have the most knowledge of the cost and benefits, transaction complexities, resistance from shareholders, potential rival bidders, and litigation risks.

[14] Here we assume away the indirect negative impacts of REM on firm value. For example, abnormal activities in REM may affect the consistency of business operations, employee retention, customer relationship, etc.

This knowledge helps managers determine how likely they will succeed. Downward REM is costly and thus economically justifiable only when managers are confident that they can successfully buy out their firms at the end. Following the same argument we made for *H2*, we expect that only managers who have strong motivation and confidence in finishing the MBOs engage in downward manipulation before the announcements. While managers' ex-ante thoughts are unobservable, we are able to see whether the announced MBOs are actually completed later. Therefore, we make the following hypothesis:

H4*: Firms that announce but do not complete MBOs exhibit no downward REM before their MBO announcement.*

2.4 CEO Option Grants (*H5*)

Including stock options in executive compensation has been a popular practice for more than two decades. They usually make up the lion's share of CEOs' performance-based compensation (Bryan, Hwang, & Lilien, 2000; Grullon & Ikenberry, 2005). Prior research has documented the opportunistic behaviors of managers around option grants. Those studies broadly fall into two categories. First, managers time or backdate options to directly lower exercise prices (e.g., Yermack, 1997; Herron & Lie, 2007; 2009; Collins, Gong, & Li, 2009); second, managers intervene in financial reporting or information disclosure to indirectly influence the exercise prices (e.g., Aboody & Kasznik, 2000; Baker et al., 2003; 2009; McAnally et al., 2008). Both forms of manipulation increase the fair value of options. Our study belongs to the first category and follows the research design by Baker et al. (2003). They find a negative association between discretionary accruals and expected option grants, which they interpret as the downward AEM before option awards. This finding is consistent with managers' opportunistic disclosures of negative earnings forecasts before option grants (Aboody & Kasznik, 2000) and the increased likelihood of missing earnings targets before option grants (McAnally et al., 2008). To the best

of our knowledge, no study directly investigates corporate real activities before option grants. Our following hypothesis relies on the reasoning that, in an attempt to lower the exercise prices of *expected* option awards[15], managers undertake real activities that can advance future expenses to the current period or postpone the current revenues to the future periods:

H5*: Firms exhibit more downward REM when managers expect higher stock option compensation in the following period.*

2.5 Earnings smoothing (*H6*)

While corporate events like repurchases, MBOs, and option grants create incentives for managers to temporarily understate the true performance, we also search downward REM in a more general setting. Prior studies of earnings smoothing focus on accounting techniques (e.g., DeFond & Park, 1997; Gaver et al., 1995; Liu & Ryan, 2006; Reitenga et al., 2002; Tucker & Zarowin, 2006). We argue that REM can also serve this purpose: When the actual performance greatly beats the target, managers move real revenues from the current period to the future (e.g. delay the offerings of promotions and discounts in sales) or realize future expenses in the current period (e.g. implement employee training and building maintenance). Thus, our hypothesis of earnings smoothing is:

H6*: Firms exhibit more downward REM when there is a larger excess of actual performance over the targets.*

3. Measurements and Samples

3.1 REM and AEM

We use the following REM measurements provided by prior REM studies:[16] (1) *Abnormal discretionary expenditures* (*Abn_DISX*). It measures manipulation in selling, general,

[15] Following Baker et al. (2003) and McAnally et al. (2008), we use the *expected* magnitude of stock option compensation relative to other forms of pay.

[16] (1)(2)(3) are used in Roychowdhury (2006), Cohen, Dey, and Lys (2008), Cohen and Zarowin (2010), and Zhao et al. (2012); (1) (2) are used in Gunny (2010) and Zang (2012). Another measurement of REM provided by the

and administrative expenses (SG&A), research and development (R&D), and advertising expenses. A one-dollar increase in discretionary expenses leads to a one-dollar decrease in GAAP earnings before tax in the same accounting period. (2) *Abnormal production cost* (*Abn_PROD*), which captures REM in both production and sales. Because the literature so far has been focusing on upward REM, this manipulation has been termed as "overproduction." Theoretically, it can go both ways. The financial reporting system requires absorption costing, under which the fixed manufacturing overhead is allocated to all units produced in the current accounting period. Therefore, the more (fewer) units a company produces in the current period, the less (more) overhead expense each unit shares. This means firms can temporarily deflate earnings by decreasing production in the current period. However, we believe that firms can under-produce only to the extent that the supply can still meet customers' demands. Otherwise, this downward REM technique becomes too costly. It is worth emphasizing that *Abn_PROD* can also capture downward REM through increases in selling prices or decreases in sales promotions.[17] (3) *Abnormal cash flows from operating activities* (*Abn_CFO*). Managers can tighten (loosen) the credit policy to temporarily depress (stimulate) sales. These manipulations will show up as positive (negative) abnormal *CFO*.

From a long-term perspective, the above REM (1) (2) (3) can create "reserves" for firms' future earnings: Increasing the current spending on items like R&D and advertising deflates current earnings but improves firms' future sales; The total production amount in the lifespan of a firm should be bounded by the total sales; Moderate reduction in production levels will be balanced out by production increases in future periods, yielding a lower *cost of goods sold* in

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literature is (4) *Abnormal gains/losses on sales of fixed assets and long-term investments*. We do not use this measurement because managers are unlikely to sell fixed assets intentionally at a cheap price simply for the purpose of lowering income: Unlike other downward REM activities, this activity does not generate reversions in the future. In addition, we have limited number of observations based on this measurement.

[17] The variable *Sales* used in Eq. (2) is net of any discounts. When firms temporarily halt their offerings of discounts, their profit margins increase. This cut in discounts shows up as a production cost that is lower than the norm (negative residual) predicted in Eq. (2).

future periods due to absorption costing required by GAAP; Temporarily increasing product prices and tightening credit policies can move some sales from the current period to future periods, with some sales lost to competitors.

Following the literature, we estimate the three REM proxies and the AEM proxy in a cross-sectional fashion. We require each industry-year estimation to have at least 15 observations. Eq. (1) estimates the first REM measure based on *discretionary expenses* (*DISX*). [18]

$$\frac{DISX_t}{A_{t-1}} = a_0 + \beta_0(\frac{1}{A_{t-1}}) + \beta_1(\frac{S_{t-1}}{A_{t-1}}) + \beta_2(\frac{MV_t}{A_{t-1}}) + \beta_3(\frac{Q_t}{A_{t-1}}) + \beta_4(\frac{INT_t}{A_{t-1}}) + \beta_5(\frac{\Delta S_t}{A_{t-1}}) + \beta_6(\frac{\Delta S_t}{A_{t-1}} X\ DD) + \varepsilon_t \quad (1)$$

The second measure of REM relates to *production cost* (*PROD*), which is the sum of *cost of goods sold* (*COGS*) and *change in inventory* (Δ*Inventory*).[19]

$$\frac{PROD_t}{A_{t-1}} = \alpha_0 + \beta_0(\frac{1}{A_{t-1}}) + \beta_1(\frac{MV_t}{A_{t-1}}) + \beta_2(\frac{Q_t}{A_{t-1}}) + \beta_3(\frac{S_t}{A_{t-1}}) + \beta_4(\frac{\Delta S_t}{A_{t-1}}) + \beta_5(\frac{\Delta S_{t-1}}{A_{t-1}}) + \varepsilon_t \quad (2)$$

$$where\ PROD_t = COGS_t + \Delta Inventories_t$$

Eq. (3) predicts the normal level of *cash flows from operation* (CFO_t). *Abnormal* CFO_t reflects the tightness of credit terms for sales.

$$\frac{CFO_t}{A_{t-1}} = \alpha_0 + \beta_1(\frac{1}{A_{t-1}}) + \beta_1(\frac{MV_t}{A_{t-1}}) + \beta_2(\frac{Q_t}{A_{t-1}}) + \beta_3(\frac{S_t}{A_{t-1}}) + \beta_4(\frac{\Delta S_t}{A_{t-1}}) + \varepsilon_t \quad (3)$$

Abnormal CFO_t can be subject to conflicting influences by other REM activities (Roychowdhury, 2006). For example, both cutting discretionary expenses and overproduction inflate earnings, but the former reduces *abnormal* CFO_t, and the latter increases it. This inconsistency makes the proxy *Abnormal CFO* ambiguous to some extent. As a result, caution is advised when interpreting the results based on this proxy.

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[18] We draw on the model in Roychowdhury (2006) and control for additional variables in Gunny (2010): natural log of *market value* (MV_t) is used as *firm size*; *Tobins Q* (Q_t) measures the marginal benefit to cost for each unit of new investment; *internal funds* (INT_t) controls for the funds generated from within the firm that are available for investment; and *change in sales* ($\Delta S_t / A_{t-1}$) controls for the impact of trend in sales on discretionary expenses. Considering the "sticky" cost behavior (see Anderson, Banker, & Janakiraman, 2003; Anderson, Banker, Huang, & Janakiraman, 2007), Gunny (2010) interacts *change in sales* ($\Delta S_t / A_{t-1}$) with an indicator variable (DD_t) that is equal to 1 when *total sales* decrease from prior year and 0 otherwise.

[19] Most of the REM studies use variables S_t/A_{t-1}, $\Delta S_t / A_{t-1}$, and $\Delta S_{t-1} / A_{t-1}$ to predict the normal levels of production cost in other studies. We additionally control for Q_t and MV_t following Gunny (2010).

The proxies we obtain from (1), (2), and (3) are labeled as *Abn_DISX*, *Abn_PROD*, and *Abn_CFO*, respectively. For convenience, *Abn_DISX* and *Abn_CFO* have been multiplied by negative one, so, like *Abn_PROD*, a smaller (larger) value represents more downward (upward) earnings management. *Total_REM* is the sum of the three.[20] In addition to the three models used to estimate REM proxies, we use *performance-controlled modified Jones model*, Eq. (4) and (5), to estimate discretionary accruals following the literature.[21]

$$\frac{Accruals_t}{A_{t-1}} = \alpha_0 + \beta_0(\frac{1}{A_{t-1}}) + \beta_1(\frac{\Delta S_t}{A_{t-1}}) + \beta_2(\frac{PPE_{t-1}}{A_{t-1}}) + \beta_3(\frac{Net\ Income_t}{A_{t-1}}) + \varepsilon_t \quad (4)$$

$$Abn\_Accrual_t = \frac{Accruals_t}{A_{t-1}} - [\hat{\alpha}_0 + \hat{\beta}_0(\frac{1}{A_{t-1}}) + \hat{\beta}_1(\frac{\Delta S_t - \Delta AR_t}{A_{t-1}}) + \hat{\beta}_2(\frac{PPE_{t-1}}{A_{t-1}}) + \hat{\beta}_3(\frac{Net\ Income_t}{A_{t-1}})] \quad (5)$$

3.2 Sample selections and descriptive statistics

3.2.1 Share repurchases

We obtain the sample of U.S. repurchase announcements from Security Data Company's (SDC) Mergers and Acquisitions database. Following Gong et al. (2008), actual repurchase size comes from Compustat (Annual Data: #115). Considering the usual time duration of actual repurchases (see Stephens & Weisbach, 1998), we add up the two years of repurchases following the announcement (announcement year and the year after) and divide the amount repurchased by the total market value of the firm.[22] As a robustness check, we also implemented the primary method in Stephens and Weisbach (1998) to construct the variable *actual percentage of shares repurchased*. Specifically, we first retrieve the total number of shares outstanding from the CRSP monthly database adjusted by the cumulative factor provided in the same database [CRSP Monthly Data *shrout* X Data *cfacshr*]. Then we calculate the monthly decreases in the number of shares outstanding over the 12 months following each announcement (including the

[20] In our robustness checks, the aggregate *Abn_DISX_PROD* is also constructed to address the ambiguity of *Abn_CFO* as explained above.

[21] Coefficient estimates obtained from (4) are plugged into (5) to compute the *discretionary accruals* (*Abn_Accrual*). $Accruals_t$ is the *total accruals*, calculated as the difference between *net income before extraordinary items* (*Income*) and *CFO*; *PPE* is *gross property, plants and equipment;* ΔAR_t is the change in *accounts receivables*.

[22] Missing values are replaced with 0 for this variable.

announcement month). We treat months that report increases as months with zero decreases. After this, we add up the decreases over the 12 months and divide the sum by the number of shares outstanding at the end of the month right before the announcement.

Actual percentage of shares repurchased needs to be equal or larger than 1% for an observation to be included in our *actual open-market repurchase* group.[23] We construct two non-carry-through groups as comparison groups based on the following two separate criteria: (1) less than 1% of shares repurchased; (2) no shares repurchased. Table 1 reports the descriptive statistics of our whole sample and repurchase sample, and the differences between the two samples. Sample selection requirements include, first, there is at least one of the four earnings management (EM) proxies available, and, second, basic financial variables (no. 2-6 in Table 1) are available. To keep the largest possible sample for the multivariate analyses, we use firm-medians for missing values of other control variables; if firm-medians are not available, we use industry-year medians. In total, we have a large sample of 141,650 firm-year observations from the year 1994 through 2011. Within this sample, we have 9,459 firm-year observations of actual repurchases. The two samples are statistically different in financial characteristics. Compared with other firms, repurchasing firms are generally better in performance. As expected, Tobin's Q is lower in the repurchase group, which reflects their fewer growth opportunities and/or undervaluation. Both good performance (large surplus) and limited growth opportunities can induce firms' distribution of the excess cash on hand in the form of repurchases. Repurchasing firms tend to be larger and less leveraged, suggesting the sound financial conditions of those firms. All those observations are consistent Gelb's (1999) study of the determinants of repurchase decision. We also find the initial evidence of downward EM (for all four proxies) in the repurchasing sample. In Table 2, we report the number of observations by year. Multiple

[23]There is some discrepancy between the information in Compusta and SDC for some observations. When SDC shows that the actual repurchase is larger than 1%, we include that repurchase into this group as well, even if Compustat shows otherwise.

repurchase announcements in the same firm-year are treated as one announcement. We exclude repurchase announcements prior to 1994 because the number of observations from SDC is much smaller before 1994. The correlation coefficients between variables are summarized in Table 3, with significant (1% level, two-sided) ones denoted in bold.

3.2.2 Management buyouts (*MBOs*)

We retrieve MBO announcements from SDC. Since many of those buyouts are immediately followed by delisting (privatization), we lag MBO announcement year by one when implementing the merge with Compustat data. As summarized in Table 2, this corporate event occurs much less frequently than share repurchase (281 completed MBOs versus 9,459 actual repurchases). Different from repurchasing firms, our untabulated results show that MBO firms are smaller in *size*, marginally higher in *leverage*, and higher in *NOA* than the sample averages. However, similar to repurchasing firms, MBO firms have lower-than-average values in all the four EM proxies (supporting *H3*). *T*-tests of the differences, however, do not show strong statistical significances. This is likely the result of the small sample size and the relatively noisy EM measures. Actually, the economic magnitudes of downward REM here (untabulated) are even larger than in repurchases, supporting our earlier conjecture. Our MBO observations span over the period 1980-2011. We have a total of 257 incomplete MBO observations in the same period.

3.2.3 CEO option grants

The sample is from Execucomp. A firm-year observation needs to meet the following requirements to be included in our sample: (1) Variables *expected option award* and *smooth* are both available for that firm-year; (2) At least one of our four EM proxies is available; and (3) Financial variables (*ROA*, *Size*, *Leverage*, *TobinsQ*, and *Cash*) are available. *Expected option award* is the option grant to CEO (fair value) in the following period (scaled by total

compensation) based on a predicting model (see Baker et al., 2003; Aboody, 1996). Predicting variables include *options awarded* (fair value) in the current year, firm financials (those controlled in our main analyses), *smooth*, CEO *first year* dummy, CEO last *year* dummy (lead), CEO *ownership*, value realized on *option exercise*, *distance* from grant date to year-end, total *compensation* (log), *CEO tenure*, one-year *share return*, and industry dummies.[24] The residuals from this predicting model are treated as *unexpected option award.* Due to Execucomp data format, Black-Scholes values are used for Year 2005 and before, and grant-date fair values (FAS 123R) are used for Year 2006 and after. *Smooth* is calculated as *adjusted actual earnings - targeted earnings* (see Baker et al., 2003; Reitenga et al., 2002).[25] A negative correlation between *expected option award* and signed EM is consistent with the conjecture that managers deflate earnings before option grant. To provide comparison, we also investigate the association between signed EM and *unexpected option award*. We expect to see a much less significant association between these two.

3.2.4 Income smoothing

We test *H6* within our analyses of repurchases, MBOs, and option awards repeatedly. The variable of interest is *smooth*. The construction of *smooth* is described in section 3.2.3. A negative correlation between *smooth* and signed EM is consistent with the notion of earnings smoothing. Numbers presented in Table 4 are the correlation coefficients in each year. In a standalone analysis, we also expect to observe downward REM in firms that have extreme positive performance.

4. Analyses of Repurchases

[24] As explained in Baker et al. (2003), this instrumental variable approach alleviates the simultaneity between discretionary accruals and compensation structure (Gaver et al., 1995; Matsunaga, 1995). This approach also has the advantage of obtaining the expected rather than realized option awards.

[25] The adjusted actual earnings are current year earnings after the adjustments of three factors: (1) Δ (accounts receivable/revenues); (2) Δ [(current liabilities - debt in current liabilities)/(COGS+SGA)]; (3)Δ[inventories/(COGS+SGA)]. The *targeted earnings* (*target*) for year *t* are calculated as follows: if $NI_t > NI_{t-1}$, $target=[NI_{t-1}+(NI_{t-1}-NI_{t-4})/3]/Assets_t$; if $NI_t < NI_{t-1}$, $target= NI_{t-1}$.

4.1 Multivariate regression model

Repurchasing firms are different from other firms in financial characteristics. As discussed above, those financial variables are correlated with the AEM and REM proxies. We thus control for them in Model (6). We expect β_0 to be negative (*H6*), β_1 to be negative (*H1*), and β_2 and β_3 to be non- or less negative than β_1 (*H2*).

$$\begin{aligned}\text{EM Proxy}_t = {} & \alpha + \beta_0(\text{Smooth})_t + \beta_1(\text{Repurchase})_t + \beta_2(\text{Rep-small})_t + \beta_3(\text{Rep-non})_t + \beta_4(ROA)_t + \\ & \beta_5(Size)_{t-1} + \beta_6(Leverage)_{t-1} + \beta_7(TobinsQ)_{t-1} + \beta_8(Cash)_{t-1} + \beta_9(NOA)_{t-1} + \beta_{10}(Analysts)_{t-1} \\ & + \beta_{11}(IO)_{t-1} + \beta_{12}(BIG8)_t + \sum\gamma_i(EstimatingVariables) + \sum\delta_j(Industries\ \&Years) + \varepsilon_t \qquad (6)\end{aligned}$$

There are three event dummies: *Repurchase* is equal to 1 for a firm-year with repurchase announcement that is followed by non-trivial repurchases. Non-trivial repurchases are defined as repurchases that are equal to or larger than 1% of that firm's *market value*; *Rep-small* is equal to 1 for an announcement that is followed by actual repurchases between 0% and 1% of the *market value*; *Rep-non* is for announcements that are followed by no actual repurchases. To test *H2*', we replace the dummy variables with a continuous variable *purchased amount* and then limit the sample to firms that have actually repurchased shares after their announcements.

Size is the natural logarithm of *market capitalization* (*MV*); *TobinsQ is* (*MV+preferred Stock +long-term debt +current liabilities)/total assets*$_{t-1}$; *Leverage* is *total debt* divided by *total assets*$_{t-1}$; *ROA* is *net income before extraordinary items* scaled by *total assets*$_{t-1}$; *Cash* is the year-end *cash* balance scaled by *total assets*$_{t-1}$; *NOA* is *net operating assets* scaled by *total assets*$_{t-1}$ (following the computation in Hirshleifer, Hou, Teoh, & Zhang, 2004). This variable controls for the limits of AEM (Barton & Simko, 2002); *Analysts* is the number of analysts following; *Institutional ownership* (IO) is obtained from Spectrum.[26] *BIG*8 is a dummy variable for Big 8

[26] For robustness purposes, we have also divided *IO* into *IO-short* and *IO-long* based on how frequently each institutional investor changes the positions on all of the stocks in his or her portfolio. The frequency is also called "churn rate" (see Gaspar, Massa, & Matos, 2005). Our results are largely the same.

auditor. Estimating variables are those financial variables in Equations (1) to (5). Industry and year dummies are controlled.

We further divide *Repurchase* into four groups based on the firm-year's *Abn_Accrual* value: *Lg. Down AEM*, *Sm. Down AEM*, *Sm. Up AEM*, and *Lg. Up AEM*. As argued in the earlier sections, we expect that downward REM before repurchases concentrates in firms with large downward AEM.

4.2 Regressions results (*H1*&*H2*&*H6*)

We summarize the results in Table 5 (Panel A). *T*-statistics and significant levels are based on robust standard errors clustering by firm. In support of *H1*, the coefficient estimates of our variable of interest, *repurchase*, are consistently negative and highly significant. The economic impacts are large as well. After controlling for firm characteristics, an average repurchase announcement is associated with an increase of discretionary expenses, a decrease of production cost, and an increase of cash flows that are equal to 0.8%, 1.7%, and 1.7% of *total assets*. In comparison, the downward REM in *rep-small* and *rep-non* are generally insignificant, both statistically and economically (supporting *H2*). Consistent with the literature and our expectation, there is also a significant decrease of discretionary accruals (1.6% of *total assets*) in *repurchase* but not *rep-small* or *rep-non.*

Taken together, the above results suggest that insiders deflate earnings because of the economic benefits they can obtain from the actual acquisitions of shares. The negative coefficients before *smooth* provide strong support for the earnings smoothing hypothesis (*H6*). A one dollar of actual earnings in excess of the target is associated with downward REM of 3.6 cents, 6.5 cents, and 5.7 cents based on the three proxies.

4.3 Alternative specifications, aggregate measures, and other types of repurchases

In Table 5 (Panel B), we present the results from estimations with alternative specifications: (I) *No regulated industries*: observations from utilities industries and financial industries are excluded (SIC codes between 4400 and 5000 and between 6000 and 6500). We use the same full model (6). The coefficient estimates before *Repurchase* are actually even stronger compared with those in panel A. This is especially the case for *Abn_PROD* (from 1.7% to 2.5% of *total assets*). (II) *Firm-fixed effects*: the results are less significant when we include firm-fixed effects, but they are still consistent in signs. One particular reason for these lower significant levels is that repurchasing firms usually repurchase on a constant basis. Their downward REM is not just in the year of announcement. (III) *No-intercept EM models*: some prior REM studies (e.g., Cohen & Zarowin, 2010) do not control standalone intercepts in their models because $1/total\ assets_{t-1}$ (scaled intercept) is already included. We re-run our estimating models (Eq. 1-5) without those standalone intercepts to obtain the EM proxies. Then we re-estimate Eq. (6) with those new proxies. The results are consistent with our hypotheses and marginally stronger than those from our original estimations. (IV) *Yearly regressions*: Roychowdhury (2006) uses Fama-MacBeth (1973) regressions and reports the time-series means of the coefficients from the annual cross-sectional regressions over the sample period. An advantage of this approach is that coefficients of the control variables are allowed to vary across time periods. We follow their approach and report the means of the 18 years' estimates and the corresponding *t*-statistics in the table.[27] The evidence of downward-REM around repurchases remains strong in those tests. (V) *Other repurchases*. We further extend the analyses to non-open-market share repurchases from SDC. Results support both *H1* and *H2*.

We expand our focus from announcement year to four years before and after. Because non-open-market repurchases also display downward REM, we include them in our time-series

[27] Since the number of observations varies across years, the reported means are weight-adjusted accordingly. The t-statistics reported in parentheses under the means have been adjusted for autocorrelation using Newey-West procedure with one-period lag (Newey & West, 1987).

analyses as well. To implement those analyses, we create eight additional dummies: *Repurchase_lead4* to *Repurchase_lead1* and *Repurchase_lag1* to *Repurchase_lag4.* Those dummy variables are equal to 1 if the firm-year observation is 1 to 4 years before/after the announcement year and there is no other repurchase announcement in that firm-year.[28] We include those dummy variables into Eq. (6). Figure 1 summarizes the coefficient estimates for all those dummies, including *Repurchase*. Each line shows the path of one type of EM in the nine-year period around repurchase announcements. Downward REM is evident in all the years surrounding repurchase announcements, but its magnitude in the post-announcement period is small. This suggests that, in anticipation of share repurchases, firms engage in downward REM and choose to spread the EM activities to several periods. We find that the strongest downward EM is in the year of announcement.

4.4 Cost factors of EM

Following the research design in Zang (2012), we incorporate the eight cost factors into our analyses of EM around the three corporate events.[29] First, we run a probit model to predict the likelihood of repurchase announcement based on the following firm characteristics:

$$Prob[Repurchase_t = 1] = Probit[\alpha_0 + \alpha_1 Prior\ Repurchase_{(t-3)\sim(t-1)} + \alpha_2 Size_{t-1} + \alpha_3\, LEV_{t-1} + \alpha_4\, TobinsQ_{t-1} + \alpha_5\, ROA_{t-1} + \alpha_6\, Cash_{t-1} \sum_k \alpha_{7,k}\, Year\_Indicator_{k,t} + \sum_l \alpha_{8,l}\, Ind\_Indicator_{l,t} + \varepsilon_t] \quad (7)$$

Prior repurchase is an indicator variable that equals 1 if the firm announced any repurchases in the previous three years. Overall, Eq. (7) and its results are similar to those reported by Gelb (1999).[30] Following Zang (2012), I include the *inverse Mills ratio* (*IMR*)

[28] We set the value to 0 if the lead or lag year is not available.
[29] Since year dummies have been controlled, we do not have the SOX factor.
[30] The positive coefficient we find before *prior repurchases* is consistent with firms' sticky pattern of payout policy. We expect that firms with more financial constraints are less likely to repurchase. Consistently, we find that repurchases are more likely to occur in firms with larger *size* and lower *leverage*, two predictors of financial constraints (see Hadlock & Pierce, 2010). Consistent with Dittmar (2000) and Farrell et al. (2014), firms distribute excess cash or surplus through share repurchases, evidenced by the positive coefficients before *cash* and *ROA*. Firms

obtained from the above step into the following tests to correct for potential selection bias. The following tests are based on a recursive equation system and run on repurchasing firms. Both the *predicted REM* and *unpredicted REM* from the REM equation are controlled in the AEM equation. Due to the substitution effect, cost factors of one EM technique can influence the magnitude of the other EM technique. We use four AEM cost factors and four REM factors in the analyses and thus make a total of 16 predictions: (1) Firms with *big 8* auditors engage in less AEM ($\beta_{1,A}$>0) and more REM ($\beta_{1,R}$<0); It is worth noting that the opposing impact of auditors on REM and AEM is also evident in a recent study by Burnett et al. (2012). Their results suggest that high audit quality leads to less AEM and, as a substitute, more REM in the form of accretive repurchases. (2) Myers, Myers, and Omer (2003) find that the absolute value of discretionary accruals decreases as *auditor tenure* increases. They argue that auditors can better constrain AEM as their relationship with the client lengthens. We predict that longer auditor tenure is associated with less AEM ($\beta_{2,A}$ >0) and more REM ($\beta_{2,R}$ <0); (3) Firms with higher *NOA* have more room to report negative *Abn_accrual*. Therefore, we expect that higher *NOA* is associated with more downward AEM ($\beta_{3,A}$<0) and consequently less downward REM ($\beta_{3,R}$>0); (4) As explained by Zang (2012), it is easier to "justify" *positive* discretionary accruals (upward AEM) when firms have long operating cycles. The opposite side of this story is that firms should find it more difficult to justify *negative* discretionary accruals (downward AEM) when they have long operating cycles. We expect less downward AEM ($\beta_{4,A}$>0) and more REM ($\beta_{4,R}$<0) for firms with longer *cycles*; (5) Zang (2012) argues that REM is less costly for *market leaders* because management research (as summarized by Woo (1983)) shows that they enjoy competitive advantages. Therefore, we expect that firms with market leader status engage in more downward REM ($\beta_{5,R}$<0) and less downward AEM ($\beta_{5,A}$>0); (6) the marginal cost of deviating from optimal

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with lower *TobinsQ* are more likely to repurchase. This is consistent with undervaluation being an important reason why managers repurchase (see Peyer & Vermaelen, 2009; Dittmar, 2000; Li, 2015).

business operations is likely to be high for firms in poor financial health. We expect firms with worse financial health to engage in less downward REM ($\beta_{6,R}$<0) and more downward AEM ($\beta_{6,A}$>0); (7) in the general case, firms with higher institutional ownership should engage in less REM ($\beta_{7,R}$>0) and more AEM ($\beta_{7,A}$<0).[31] However, downward EM before repurchases actually benefits institutional shareholders who choose not to tender their shares. This is different from MBOs and option awards, in which managers use REM opportunistically to the detriment of all shareholders. Therefore, we make no prediction of the sign before *IO* for the case of share repurchase; (8) Downward REM (but not AEM) decreases taxable income and should be more attractive to firms when marginal tax rates are high ($\beta_{8,R}$<0 and $\beta_{8,A}$>0 for AEM).

Most of the results agree with the above predictions (Table 6). Inconsistent results are highlighted in bold ($\beta_{6,R}$ and $\beta_{7,R}$).

4.5 Repurchased amount and the magnitude of EM (*H2*')

H2' predicts a positive association between the amount repurchased and the magnitude of REM. To test it, we replace event dummies in Eq. (6) with a continuous variable *repurchased amount*. In all analyses, samples are limited to repurchasing firms. In analysis I, the sample only includes announcement-year observations of repurchasing firms. In analyses II and III, announcement-year and four years before and after are included in the samples. Furthermore, in analysis III, an observation's relative time to the announcement year is controlled by the eight lead and lag dummies created in our time-series analyses discussed above.

The actual *repurchased amount* is from Compustat and scaled by firms' market capitalization. Despite its accuracy problems (see Stephens & Weisbach, 1998; and Gong et al., 2008), this variable allows us to directly test *H2*'. We report the results in Table 7. Dependent variables are our EM proxies. The negative and significant coefficients before the variable

[31] Both Bushee (1998) and Roychowdhury (2006) find that institutional investors reduce REM. Following this finding, Zang (2012) predicts that *institutional ownership* (*IO*) is negatively (positively) associated with the extent of upward REM (AEM) among suspect firms.

Purchased Amt. provide support for *H2*'. The economic significance is especially large for *REM_DISX*. To put the results in perspective, a one percent increase in actual repurchase (in absolute term) can increase downward REM_DISX by 13% (=0.104%/0.008, where 0.008 is from Table 5 Panel A Column 1).

4.6 Matching analyses

To further support the existence of downward REM around repurchases, we employ propensity score matching (PSM) as an alternative form of analyses. An advantage of matching analysis here is that it does not impose linear relationships between control variables and EM proxies. As suggested by Cohen et al. (2013), the use of performance-matched REM measures is more reliable to draw the inferences of REM activities. The propensity score is obtained from a probit model similar to Eq. (7) (without the lag repurchase dummies). We match each event firm with a non-event firm that has the closest propensity score in the same industry-year (nearest-neighbor matching).[32]

Table 8 (A) reports the matching-adjusted EM around repurchase announcements that are followed by actual buyback of shares.[33] The number of observations is smaller in Year T-1 and T+1 than in T because our matching process is based on event year (T). In the event year (T), the magnitude of total REM is as large as 4.3% of *total assets*.[34] All other proxies are consistently negative and significant in the event year as well.

4.7 Earnings management and subsequent outperformance

The literature has well documented firms' outperformance subsequent to their repurchase announcements. Gong et al. (2008) show that the subsequent outperformance is due to the pre-

[32] As the evidence of the success of our matching process, we find that the matched firms are similar to repurchasing firms in *size, leverage, TobinsQ, cash,* and *net income.*

[33] We include all types of actual repurchases in this matching analysis because of the significant results (see Table 5 Panel (B) alternative analysis V).

[34] We also perform the following robustness test: We run Eq. (6) without the *repurchase* dummies and obtain the residuals as the unexplained portion of EM. Then we compare the unexplained EM between the repurchasing and control groups. Results remain qualitatively same and statistically strong.

repurchase downward AEM. We wonder whether pre-repurchase downward REM can partially explain repurchasing firms' subsequent outperformance. The analyses build on the propensity score matching from the section 4.6. Results are summarized in Table 8 (B). We present in the bottom of the table the mean values of matching-adjusted *ROA* from each sample. The mean values of matching-adjusted *ROA* for T+1, T+2, and T+3 are consistently positive and significant. This confirms the finding in the literature that repurchasing firms outperform other firms in the subsequent periods. We then use multivariate regressions to explain this outperformance (see Eq. (6) for control variables). Dependent variables are matching-adjusted future performance for the years T+1 to T+3. AEM and REM measures are matching-adjusted. For brevity, we only present the coefficients before our variables of interest. We notice that AEM is negatively associated with future performance *ROA* (*T+1*), which is consistent with the finding by Gong et al. (2008). We find that the coefficients before REM are also negative, suggesting the reversion of REM in subsequent periods. The reversion disappears in three years (Year T+3).

5. Analyses of Management Buyouts (MBOs) (*H3*&*H4*&*H6*)

To test *H3* and *H4*, we replace *Repurchase* variables in Eq. (6) with *MBO* variables. The dummy *Completed MBO* is equal to 1 for firm-years right before an announcement of a buyout that is completed later. The dummy *Incomplete MBO* is equal to 1 for firm-years before an announcement of a buyout that is not completed later. We only focus on pre-announcement period because many of those firms are immediately taken private after the buyouts, making the financial information unavailable since the announcement year.

We report the results in Table 9. The coefficient before *smooth* is negative, as predicted by *H6*. Downward EM before MBO announcements is evident in all four EM measures (*H3*). The statistical significance is not as strong as in our repurchase analyses. This is likely the result of the limited number of MBO observations (*MBO-completed*=1 for only 281 observations).

However, the economic magnitudes of REM reported here (and in our later MBO matching analyses) are much larger than are those in our repurchase analyses. This confirms our conjecture that managers have even stronger incentives to downplay their earnings before MBOs than repurchases. Consistent with *H4*, the evidence of downward REM before incomplete MBOs is at best weak and inconsistent.

We further examine the clustering of REM. We create two subgroups within *MBO-completed* according to the value of *AEM*.[35] *Lg. down AEM*, which is the MBO sub-group in the lowest quartile of signed *Abn_Accrual*, shows much higher total downward REM than the rest (11.1% v.s. 6.7%). This confirms our expectation that REM concentrates in firms whose AEM is approaching the upper limit.

We then follow the alternative specifications introduced in the Section 4.3 and re-run the above estimations. Results still hold.[36] We further extend our analysis to four years before MBO announcements. The detailed research design is similar to the corresponding analysis of repurchases. We find that the downward REM strongly exists in this four-year period, suggesting that managers contemplate MBOs for an extended period of time before the actual announcements. This corresponds to the description by Perry and Williams (1994) that MBO planning can last for several years before the official offering.

Table 10 reports how REM and AEM cost factors influence the magnitude of downward EM preceding MBOs. We follow the same research design as discussed in Section 4.4. The results are mostly in line with our predictions except for *Market_share* ($\beta_{5,R}$ and $\beta_{5,A}$), which captures the market leader status, and *marginal tax rate* in the AEM equation ($\beta_{8,A}$).

To address the concerns with measure validity and model specification, we use procedures similar to those in Section 4.6 and create a comparison group consisting of firms that

[35] In our earlier analyses of repurchases, we create four sub-groups; we create only two sub-groups in this section because of the extremely limited number of MBOs.
[36] Due to the extremely small number of MBOs each year, we do not run Fama-macbeth yearly regressions.

resemble our MBO firms in financial characteristics. Table 11 reports the matching-adjusted REM and AEM in the two years before MBO announcements. Consistent with our earlier results and in support of *H3*, there is a large downward REM in this two-year period. The magnitude of REM (9.5% for the aggregate REM) is even larger than that in our multivariate analyses. The magnitude of AEM is still around 1.5%. Such a large difference between the two types of EM does not show up in our analyses of share repurchases. This is likely the result of the high litigation risks managers face due to their inherent conflicts of interest in MBOs. Managers may better defend their REM than AEM activities in a legal challenge, since they can easily hide behind "business judgment rule" for the former.

6. Analyses of CEO option grants (*H5*&*H6*)

Table 12 reports the results. Compared with the general samples in Sections 4 and 5, the sample in the current section is limited to Execucomp observations. We believe the test of earnings smoothing is more appropriate in a general sample, even though the results here are also consistent with those in Tables 5 and 9. *H5* predicts a negative coefficient before our main variable, *expected option award*. We posit that the downward REM hinges on managers' prediction of option awards in the following period. The unexpected portion of future awards should have little or less significant impact on managers' EM behavior. To test this conjecture, we include *unexpected option award* (residuals from the predicting model) in our regression analyses. The model also includes inverse mills ratio (*IMR*) to control for the potential sample selection bias (S&P 1500).[37] The results are consistent with expectations: One standard deviation (0.16) increase in *expected option award* is associated with an increase in discretionary expenses equal to 0.272% of *total assets*$_{t-1}$, a decrease of production equal to 0.272% of *total assets*$_{t-1}$, and an increase in cash flows equal to 0.801% of *total assets*$_{t-1}$. As expected, downward REM before

[37] We use the financial variables and industry dummies to predict the likelihood of being selected into S&P1500, which is the coverage of Execucomp. We run such a probit model yearly to control for unobserved time-based factors.

option awards concentrates in firms with high levels of downward AEM (see Column 5 of Table 12), where further accounting manipulation is likely to be difficult or prohibitively costly.

Results in our alternative forms of tests strongly hold. In case that our results are explained by CEO backdating (see Heron & Lie, 2007) or opportunistic timing of grants (see Chauvin & Shenoy, 2001; Aboody & Kasznik, 2000), we include only fixed-date grants in one of our alternative tests. Following McAnally et al. (2008), an option grant is treated as a fixed-date one if the grant date is within 14 days of the grant date in either of the previous two years. We obtain the grant dates from two datasets in Execucomp. For the period after 2006, we use the grant date ("*grant_date*") from file "STGRTTAB"; for the period before 2006, we use the expiration date ("*EXDATE"*) from file "PLANBASEDAWARDS". For the second period, we follow McAnally et al. (2008) and infer the grant date from the expiration date based on the assumption that options have full years of life before expiration.

We then examine how cost factors influence option-awards-induced downward EM. To establish such a link, we focus on firm-years with large *expected option award* (above median). As summarized in Table 13 (Panel A), firm-years in higher quartiles of *expected option award* display larger downward REM and AEM. Panel B reports the results of our analyses of cost factors. The only result that is inconsistent with our predictions is $\beta_{8,A}$ before *MTR* in the REM equation.

We have already shown that pre-repurchase downward REM is associated with better future performance. In the context of option awards, however, downward REM is more likely to be the result of managers' rent-seeking behaviors rather than firm-value maximization. Following this logic, we expect that downward REM before option awards signals the existence of principal-agent problem and therefore leads to worse future performance.[38] We measure adjusted

[38] Results are untabulated in the current version for the sake of space but available upon request.

future performance as *ROA* (T+1, T+2, or T+3) minus *ROA* (T-1). We construct two interaction terms, *AEM*expected option award* and *REM*expected option award*, to capture the impacts of pre-option-award EM on future performance. We find positive signs before the interaction terms, which suggest negative impacts of the downward REM on future performance. Control variables include *expected option award, AEM, REM, stock holding, option holding, size, leverage, TobinsQ, analysts, IO,* and *Big8.*

7. Earnings Smoothing and top performers (*H6*)

The results in Tables 5(A), 9, and 12 have already provided strong support for *H6*. We further demonstrate the existence of earnings smoothing visually in Figures 2(A) to 2(D). We limit our sample to those firm-years that report both *ROA* and Δ*ROA* within the [-0.5, 0.5] range to exclude outliers. Within this range, we create 30 performance groups based on *ROA* (the median *ROA* is reported within Figure 2). Figure 2 presents the average EM in each performance group. Figures 2(A) to 2(C) are based on the three REM proxies, and 2(D) is based on the AEM proxy. We use two types of EM proxies: original EM proxies and model-adjusted EM proxies.[39] We have the following observations: First, both the original EM proxies and model-adjusted ones are significantly negative for those high *ROA* groups. Second, smoothing is evident only among firms that have positive earnings. The non-linearity is consistent with the suggestion by Cohen et al. (2013) that matching is likely to be a better approach than multivariate linear regressions to exclude the performance effect. Third, interestingly, we notice negative discretionary accruals but not REM for firms that are performing extremely poorly (*ROA* Group 1-4). A possible explanation is that, when the performance is extremely poor, managers may employ the so-called "big bath" accounting techniques in the current fiscal period, such as excessive write-offs, simply to build a better-looking future; on the other hand, the marginal cost

[39] To construct model-adjusted EM proxies, we follow the approach by Roychowdhury (2006): We run Model (6) without the event dummies and use the residuals as the adjusted EM proxies. This approach eliminates the portion of original EM proxies that can be explained by those firm characteristics.

of deviating from optimal business strategies (REM) is likely to be high for firms that are in bad financial situations (Zang, 2012). As a result, we do not observe big-bath REM.

Using the same model specification as in Section 4, we also implement a time-series analysis of EM around the outperforming year. We notice a sudden increase in the magnitude of downward REM in the outperforming year compared with the surrounding years.

8. Conclusion

We provide strong evidence of downward REM and AEM around three corporate events, namely share repurchase, management buyout, and CEO option award. Downward EM is also evident in our analyses of firms' earnings smoothing. The documented downward EM remains strong in a wide range of robustness tests.[40] The convergence of these results from different scenarios and with different EM proxies suggest that the downward REM we find is unlikely just the artifact of imperfect REM measures.

As expected, there is no downward REM around the announcements of repurchases and MBOs that are not followed by actual repurchases or completions. This supports our argument that the downward REM we observe around actual repurchases and completed MBOs is used to lower transaction prices, an economic benefit managers can obtain only when there are actual transactions after the announcements. Managers deflate earnings to lower exercise prices only when they expect the coming of option awards. Consistently, we find that *unexpected option award* has a much weaker association with pre-award downward REM than does the *expected* counterpart.

Our additional analyses show that downward REM activities around repurchase announcements, MBOs, and option awards tend to cluster in firms that also display high degrees of downward AEM. This finding suggests that firms do not simply choose REM over AEM in

[40] While we have discussed in the text several robustness and alternative tests, we are not able to provide the details for many of them in the current version due to the limitation of space. The results are available upon request.

those events. Instead, to minimize the total cost of EM, they balance the magnitudes of the two EM techniques. Following the research design of Zang (2012), we further examine the downward REM and AEM, identified above, in relation to eight EM cost factors. Due to the substitution effect, cost factors directly related to one EM technique can also influence the magnitude of the other one. Our results in the three event analyses provide support for the substitution effects identified in Zang (2012).

Overall, we broaden the understanding of REM and bridge an important gap between the literature of REM and AEM. While the prior accounting studies of repurchases, MBOs, and CEO compensation tend to focus on the process of financial disclosures, we draw attention to the real activities around those events. We also find that downward REM serves the purpose of earnings smoothing. The association appears to be non-linear, or, at least, only linear in firms with positive profits. Therefore, matching by firm characteristics, especially by performance, may be a better research design for future REM studies.

Our findings bring forward an issue that is largely ignored by many REM studies: If downward REM is widely used by managers to obtain economic benefits and smooth earnings, we need to rethink how we should use the model-estimated signed REM proxies in empirical research. Those proxies have information of both the direction and magnitude of REM activities. In light of the frequent uses of unsigned discretionary accruals as the AEM proxy in the accounting and finance literature, should we use the same approach to deal with REM proxies in cases where no presumption is made regarding the direction of EM?

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Table 1 Descriptive Statistics (Repurchase)

Sample selection requirements: (1) at least one of the four earnings management (EM) proxies is available; (2) basic financial variables (Variables (2) to (6) in this table) are available. To keep the largest possible sample for out multivariate analyses, we use firm-medians for missing values of other control variables; if firm-medians are not available, we use industry-year medians. The sample includes 9,459 open-market repurchase announcements from 1994 to 2011. We follow Baker et al. (2003) in the construction of *Smooth*, which captures the extent by which the actual earnings exceed (fall short of) the target earnings. *ROA* is *net income before extraordinary items* scaled by *total assets*$_{t-1}$. *Size* is the natural logarithm of *market capitalization* (*MV*). *TobinsQ is* (*MVE+preferred Stock + long-term debt + current liabilities*) / *total assets*$_{t-1}$. *Leverage* is *total debt* divided by *total assets*$_{t-1}$. *Cash* is the year-end cash balance scaled by *total assets*$_{t-1}$. *NOA* is net operating assets scaled by *total assets*$_{t-1}$ (Hirshleifer et al., 2004). Following Zang (2012), in the analyses of REM and AEM in relation to their cost factors, we use *NOA* as an indicator variable that equals 1 if the value is above the industry-year median. *Analysts* is the number of analysts following the firm based I/B/E/S information. *IO* is *institutional ownership* from Spectrum. *BIG8* is a dummy variable for Big 8 auditor. Following Zang (2012), we construct *Auditor_tenure* as an indicator variable that equals 1 if the number of years the auditor has audited the client is above six. *Cycle* is *receivable days* plus *inventory days* minus *payable days* (Dechow, 1994). *Market_Share* captures market leader status and equals to the ratio of a company's sales to the total sales of its industry, classified according to three-digit SIC codes (Harris, 1998). Altman's *Z_score* captures firms' financial health and equals to (3.3**net income*+1.0**sales*+1.4**retained earnings* + 1.2**working capital*) / *total assets* + 0.6 *MVE*/*total liabilities*. *MTR*, the marginal tax rates, is provided by Prof. John Graham (Duke University). *Abn_DISX* is real earnings management (REM) proxy based on the sum of *selling, general and administrative* (*SG&A*) expenses, *research and developement* (*R&D*), and *advertising expenses. Abn_PROD* is the REM proxy based on production cost. *Abn_CFO* is the REM proxy based on *cash flows from operating activities* (*CFO*). *Abn_Accrual* is *discretionary accruals*, an AEM proxy estimated using performance-adjusted modified Jones model. *Abn_DISX* and *Abn_CFO* have been multiplied by (-1), so, like *Abn_PROD* and *Abn_Accrual*, the lower (higher) the value, the more downward (upward) earnings management.

		All Observations			Repurchases				
	Variable Name	Number	Mean	Median	Number	Mean	Median	Difference	*T_Stats.*
(1)	*Smooth*	141,650	0.029	0.021	9,459	0.046	0.040	0.018	4.758
(2)	*ROA*	141,650	-0.168	0.014	9,459	0.040	0.037	0.208	26.325
(3)	*Size*	141,650	4.951	4.923	9,459	6.080	6.026	1.129	46.506
(4)	*Leverage*	141,650	0.277	0.177	9,459	0.190	0.152	-0.087	-21.145
(5)	*TobinsQ*	141,650	2.252	1.085	9,459	1.257	0.953	-0.995	-21.846
(6)	*Cash*	141,650	0.248	0.086	9,459	0.171	0.073	-0.077	-16.048
(7)	*NOA*	141,650	0.595	0.600	9,459	0.580	0.553	-0.015	-2.411
(8)	*Analysts*	141,650	2.940	0.000	9,459	6.166	3.000	3.225	62.913
(9)	*IO*	141,650	0.238	0.058	9,459	0.419	0.396	0.181	52.888
(10)	*BIG 8*	141,650	0.691	1.000	9,459	0.725	1.000	0.034	7.420
(11)	*Auditor_Tenure*	141,650	0.525	1.000	9,459	0.651	1.000	0.127	25.614
(12)	*Cycle*	141,650	1.969	1.166	9,459	2.524	1.276	0.555	26.836
(13)	*Market_Share*	141,650	0.027	0.001	9,459	0.045	0.004	0.017	22.515
(14)	*Z_score*	141,650	6.021	5.200	9,459	7.254	5.200	1.233	19.609
(15)	*MTR*	141,650	0.281	0.345	9,459	0.317	0.350	0.036	32.935
(16)	*Abn_DISX*	114,373	0.004	0.005	8,023	-0.002	0.002	-0.006	-2.143
(17)	*Abn_PROD*	138,584	-0.007	-0.007	9,289	-0.025	-0.009	-0.018	-6.876
(18)	*Abn_CFO*	134,607	-0.008	-0.011	8,181	-0.034	-0.015	-0.026	-9.698
(19)	*Abn_Accrual*	122,806	-0.002	-0.003	7,180	-0.025	-0.019	-0.022	-11.774

Table 2 Number of Observations of Repurchases and MBOs

Column (1) lists the number of open-market repurchase announcements that are followed by actual purchases of more than 1% of all the outstanding shares in a two-year period. Column (2) reports the trivial-repurchase sample, containing open-market repurchase announcements that are followed by less than 1% repurchases. Column (3) reports the non-repurchase sample, which includes those that are followed by zero repurchase. Column (4)/(5) reports the number of MBO announcements that are later completed/not completed.

Year	Actual Repurchases	Rep-small	Rep-no	Completed MBOs	Incomplete MBOs
	(1)	(2)	(3)	(4)	(5)
1980	N/A	N/A	N/A	0	1
1981	N/A	N/A	N/A	14	3
1982	N/A	N/A	N/A	23	8
1983	N/A	N/A	N/A	13	22
1984	N/A	N/A	N/A	20	11
1985	N/A	N/A	N/A	12	20
1986	N/A	N/A	N/A	31	37
1987	N/A	N/A	N/A	14	19
1988	N/A	N/A	N/A	6	6
1989	N/A	N/A	N/A	5	11
1990	N/A	N/A	N/A	2	1
1991	N/A	N/A	N/A	4	5
1992	N/A	N/A	N/A	3	5
1993	N/A	N/A	N/A	2	6
1994	468	50	26	8	3
1996	556	60	37	7	3
1997	596	65	29	14	10
1998	923	87	48	16	9
1999	769	69	39	25	17
2000	701	67	47	13	8
2001	531	124	73	14	14
2002	479	75	46	15	8
2003	371	55	35	3	4
2004	448	43	24	1	4
2005	517	36	16	4	8
2006	555	34	15	4	6
2007	642	31	28	0	3
2008	519	69	23	0	1
2009	225	34	21	2	2
2010	362	27	9	2	1
2011	414	39	26	4	1
Total	9,459	1,014	573	281	257

Table 3 Correlation Table (Repurchase)

The table presents pairwise correlation coefficients. Bolded numbers are statistically significant at the 1% level. Definitions of variables are discussed in Table 1. The sample consists of 141,650 observations (the sample for our main analyses of repurchases).

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
Smooth	(1)	1.00																		
ROA	(2)	**0.21**	1.00																	
Size	(3)	**0.03**	**0.26**	1.00																
Leverage	(4)	**0.01**	**-0.39**	**-0.19**	1.00															
TobinsQ	(5)	**0.02**	**-0.57**	**-0.11**	**0.41**	1.00														
Cash	(6)	**-0.04**	**-0.18**	**-0.11**	**-0.16**	**0.23**	1.00													
NOA	(7)	**-0.02**	**0.31**	**0.14**	**-0.10**	**-0.28**	**-0.33**	1.00												
Analysts	(8)	**0.03**	**0.13**	**0.56**	**-0.07**	**-0.05**	**-0.02**	**0.03**	1.00											
IO	(9)	**0.03**	**0.15**	**0.41**	**-0.08**	**-0.09**	**-0.03**	**0.04**	**0.50**	1.00										
BIG 8	(10)	**0.03**	**0.21**	**0.44**	**-0.11**	**-0.15**	0.00	**0.18**	**0.24**	**0.25**	1.00									
Auditor_Tenure	(11)	**0.02**	**0.04**	**0.09**	0.01	**-0.01**	**-0.02**	**-0.03**	**0.09**	**0.10**	**0.15**	1.00								
Cycle	(12)	0.01	0.01	**-0.04**	**-0.06**	**-0.08**	**-0.11**	**-0.15**	**-0.06**	**-0.08**	**-0.30**	**-0.08**	1.00							
Market_Share	(13)	**0.02**	**0.09**	**0.34**	0.01	**-0.07**	**-0.14**	**0.04**	**0.24**	**0.15**	**0.19**	**0.06**	**-0.10**	1.00						
Z_score	(14)	0.00	**0.23**	**0.14**	**-0.46**	**-0.13**	**0.18**	**0.09**	**0.09**	**0.09**	**0.11**	0.00	**-0.04**	0.00	1.00					
MTR	(15)	**0.06**	**0.20**	**0.26**	**-0.05**	**-0.15**	**-0.31**	**0.12**	**0.12**	**0.10**	**0.06**	**0.01**	**0.10**	**0.15**	0.01	1.00				
Abn_DISX	(16)	**-0.02**	**0.09**	0.01	**0.08**	**-0.02**	**-0.11**	**0.14**	**0.01**	0.00	-0.01	0.00	**-0.02**	**0.03**	**-0.03**	**0.02**	1.00			
Abn_PROD	(17)	**-0.13**	**-0.08**	**0.02**	0.01	**-0.06**	**-0.03**	**0.03**	**-0.03**	**-0.03**	**0.01**	-0.01	**-0.03**	**0.03**	**-0.03**	**-0.02**	0.50	1.00		
Abn_CFO	(18)	**-0.22**	**-0.43**	**-0.01**	**0.10**	**0.04**	**0.04**	**-0.10**	**-0.03**	**-0.04**	**-0.02**	**-0.03**	**0.03**	**0.02**	**-0.10**	**-0.06**	-0.20	0.30	1.00	
Abn_Accrual	(19)	**-0.01**	**0.07**	**-0.06**	**-0.06**	**-0.04**	**0.11**	**-0.03**	**-0.07**	**-0.05**	**-0.03**	**-0.02**	**0.05**	**-0.02**	-0.01	**-0.04**	-0.11	0.12	0.47	1.00

Table 4 Descriptive Statistics (CEO Option Awards)

The sample is consists of observations in Execucomp. A firm-year observation needs to meet the following requirements to be included in our sample: 1. Variables *Expected option award* and *Smooth* are both available for that firm-year. 2. At least one of the four EM proxies is available. 3. Financial variables (ROA, Size, Leverage, TobinsQ) are available. ***Smooth*** is calculated as *adjusted actual earnings - targeted earnings* (Reitenga et al. 2002; Baker et al. 2003). Following the approach in Baker et al. (2003), ***Expected option award*** is the predicted option award in the next period (fair value is used and scaled by total CEO compensation): Predicting variables include current year's option grant, firm financials (those controlled in our main analyses), *Smooth*, CEO *first year* dummy, CEO *last year* dummy (lead), CEO *ownership*, value realized on *option exercises*, *distance from grant date to year-end*, *total compensation* (log), *CEO tenure*, one-year share *return*, and industry dummies. Due to the way Execucomp presents data, Black-Scholes value is used for Year 2005 and before, and grant-date fair value (FAS 123R) is used for Year 2006 and after. Negative correlations between *Expected option award* and signed *EM* proxies are consistent with the conjecture that managers deflate earnings before option grant; negative correlations between *Smooth* and *EM* proxies are consistent with the notion of earnings smoothing. Correlation coefficients are presented in this table by year. Variables used are winsorized at the top and bottom 1%.

		ρ (*Smooth*, *EM proxy*)				ρ (*Expected Option Award*, *EM proxy*)			
		Expected -				***Expected -***			
Year	Number	DISX	PROD	CFO	ACCRUAL	DISX	PROD	CFO	ACCRUAL
1994	579	0.032	-0.068	-0.232	-0.165	-0.017	-0.063	-0.083	-0.157
1995	795	0.012	-0.130	-0.396	-0.155	-0.041	-0.106	0.003	-0.068
1996	788	-0.050	-0.160	-0.273	-0.238	0.047	-0.008	-0.083	-0.079
1997	784	-0.036	-0.104	-0.319	-0.132	0.076	0.043	-0.085	-0.079
1998	779	-0.050	-0.276	-0.416	-0.222	-0.019	-0.087	-0.073	-0.154
1999	787	-0.145	-0.272	-0.315	-0.028	0.040	-0.093	-0.239	-0.064
2000	852	-0.016	-0.174	-0.324	-0.108	0.046	-0.089	-0.148	-0.130
2001	937	-0.061	-0.139	-0.266	-0.097	0.030	-0.065	-0.077	-0.194
2002	924	-0.049	-0.118	-0.190	-0.153	-0.060	-0.111	-0.164	-0.224
2003	946	-0.048	-0.122	-0.274	-0.132	-0.027	-0.140	-0.184	-0.191
2004	927	-0.078	-0.147	-0.281	-0.146	0.027	-0.104	-0.168	-0.213
2005	947	-0.195	-0.255	-0.277	-0.167	-0.105	-0.129	-0.032	-0.163
2006	940	-0.064	-0.081	-0.196	-0.115	-0.023	-0.075	-0.055	-0.195
2007	1,038	-0.016	-0.133	-0.329	-0.347	-0.035	-0.055	-0.024	-0.138
2008	1,179	-0.158	-0.221	-0.236	0.085	0.004	-0.022	0.000	-0.118
2009	1,183	-0.133	-0.124	-0.199	-0.058	-0.018	-0.081	-0.074	-0.111
2010	1,117	-0.074	-0.198	-0.352	-0.165	-0.022	-0.083	-0.011	-0.075
2011	1,051	-0.022	-0.159	-0.476	-0.258	-0.040	-0.109	-0.051	-0.060

Table 5 Multivariate Analyses: Earnings management around open-market repurchases

Panel A

Results are obtained from OLS regressions. Significant levels are based on standard errors that cluster by firm. *Total_REM* is the sum of the three REM proxies. *Estimating variables* are those used in the models to estimate REM and AEM (see Model 1-5). Definitions of other variables are discussed in Table 1.

Repurchase, Rep-small, and Rep-non are dummy variables. ***Repurchase*** denotes open-market repurchases (from SDC) followed by actual repurchases in the following two years that are at least 1% of the firm's market value; ***Rep-small*** denotes repurchases followed by less than 1% of actual repurchases. Dummy variable ***Rep-non*** is for announced repurchases that are followed by no actual repurchases. We expect the coefficient before *Repurchase* is negative and more significant than those before the two comparison groups: *Rep-small* and *Rep-non*.

We further divide *Repurchase* into four groups based on the quartiles of firm-year *Abn_Accrual* value: *Lg. Down AEM*, *Sm. Down AEM*, *Sm. Up AEM*, and *Lg. Up AEM*. We expect that *Lg. Down AEM* has the most significantly negative coefficient among the four.

VARIABLES	(1) Abn_DISX	(2) Abn_PROD	(3) Abn_CFO	(4) Abn_Accrual	(5) Total_REM
Smooth	-0.036***	-0.065***	-0.057***	-0.010***	-0.162***
Repurchase	-0.008***	-0.017***	-0.017***	-0.016***	
Rep-small	-0.000	-0.002	-0.011**	-0.006	
Rep-non	-0.002	0.000	-0.006	-0.010	
Repurchase (Lg. Down AEM)					-0.076***
Repurchase (Sm. Down AEM)					-0.034***
Repurchase (Sm. Up AEM)					0.012
Repurchase (Lg. Up AEM)					0.017
Abn_Accrual					0.142***
ROA	0.598***	-0.059***	-0.202***	0.023***	0.609***
Size	0.001	0.010***	0.019***	-0.002***	0.038***
Leverage	0.056***	0.010*	0.009*	-0.003	0.082***
TobinsQ	0.003***	-0.008***	-0.017***	-0.000	-0.024***
Cash	-0.078***	0.031***	0.095***	0.108***	-0.096***
NOA	0.039***	0.024***	0.007***	-0.004***	0.089***
Analysts	0.000	-0.002***	-0.002***	-0.001***	-0.002***
IO	-0.003	-0.024***	-0.013***	-0.013***	-0.026***
BIG8	0.004	0.001	0.003	-0.006***	0.023***
Constant	0.029*	-0.068***	-0.134***	-0.005	-0.218***
Estimating Variables	YES	YES	YES	YES	YES
Observations	114,139	138,300	134,299	122,565	99,421
R-squared	0.198	0.045	0.299	0.036	0.261

Panel B

This table reports coefficient estimates before the indicator variable ***Repurchase*** under alternative model specifications.

	Abn_DISX	Abn_PROD	Abn_CFO	Abn_Accrual	Total_REM
I. No Regulated Industries	-0.009***	-0.025***	-0.022***	-0.018***	-0.042***
II. Firm-fixed Effects	-0.003*	-0.003*	-0.007***	-0.007***	-0.007**
III. Proxies from no-constant EM models	-0.006**	-0.018***	-0.020***	-0.017***	-0.041***
IV. Fama-Macbeth Yearly Regressions	-0.007***	-0.018***	-0.019***	-0.018***	-0.041***
V. Other Repurchases(*N=962*)	-0.018**	-0.022***	-0.022***	-0.015***	-0.058***
Rep-small &Rep-non (*N=136*)	0.026*	0.027**	-0.008	-0.024**	0.066**

*** p<0.01, ** p<0.05, * p<0.1

Table 6 Cost Factors and EM around Repurchases

We follow Zang's (2012) research design by using recursive equation system to analyze how cost factors affect the magnitudes of downward REM and AEM. The sample only includes repurchase observations. Definitions of variables are discussed in Table 1. Results are highlighted in bold if different from predictions.

VARIABLES	REM Equation		AEM Equation	
	Pred.		Pred.	
Cost factors related to AEM				
BIG8	$\beta_{1,R:}$ -	-0.040**	$\beta_{1,A:}$ +	0.017***
Auditor_Tenure	$\beta_{2,R:}$ -	-0.020*	$\beta_{2,A:}$ +	0.009***
NOA	$\beta_{3,R:}$ +	0.066***	$\beta_{3,A:}$ -	-0.029***
Cycle	$\beta_{4,R:}$ -	-0.020***	$\beta_{4,A:}$ +	0.013***
Cost factors related to REM				
Market_Share	$\beta_{5,R:}$ -	-0.064	**$\beta_{5,A:}$ +**	***-0.009***
Z_score	$\beta_{6,R:}$ -	-0.006***	**$\beta_{6,A:}$ +**	***0.000***
IO	$\beta_{7,R:}$?	-0.037**	$\beta_{7,A:}$?	0.020***
MTR	$\beta_{8,R:}$ -	-0.100	$\beta_{8,A:}$ +	0.029**
Other controls				
	ROA, Size, TobinsQ, Analysts, Cash, Leverage, Earn, IMR, Years		ROA, Size, TobinsQ, Analysts, Cash, Leverage, Pred_REM, Resi_REM, IMR, Years	
Observations		6,650		6,016
R-squared		0.242		0.559

Table 7 EM in Relation to the Amount of Shares Repurchased

Results are obtained from OLS regressions based on the full model (Eq. 6). Definitions of control variables are presented in Table 1. The dependent variables are the EM proxies. This table reports the coefficient estimates before the variable of interest: ***actual repurchased amount***. We expect the coefficients to be negative.
In all analyses, the sample is limited to repurchasing firms. In analysis I, the sample only includes announcement-year observations of repurchasing firms. In analysis II and III, announcement-year and four years before and after are included in the samples. In analysis III, a firm-year observation's time distance to the announcement-year is controlled by eight dummies. Standard errors are clustered by firm. Industry and fiscal year dummies are controlled.

	(1)	(2)	(3)	(4)	(5)
	Abn_DISX	Abn_PROD	Abn_CFO	Abn_Accrual	Total_REM
Analysis I	-0.104*	-0.080	-0.005*	-0.119***	-0.265**
Analysis II	-0.105***	-0.072**	-0.039**	-0.105***	-0.287***
Analysis III	-0.130***	-0.107***	-0.032*	-0.108***	-0.317***

Analysis I	*Announcement firm-year sample*
Analysis II	[*-4,+4*] *around announcement year sample*
Analysis III	[*-4,+4*] *sample and relative year dummies controlled*

*** p<0.01, ** p<0.05, * p<0.1

Table 8 Matching Analyses (Repurchase)

Panel A: N=10,428. One-to-one matching without replacement based on nearest neighbor propensity score. This table reports the mean matching-adjusted AEM and REM of repurchasing firms in the years surrounding repurchase announcement year (T). We expect those means to be all negative and significant.

	T-1	***T***	***T+1***
Diff. REM (*DISX*)	-0.008	-0.016	-0.015
T-Statistics	-2.190	-5.131	-4.376
N	6,569	6,845	5,638
Diff. REM (*PROD*)	-0.024	-0.022	-0.021
T-Statistics	-7.415	-8.049	-6.941
N	8,666	9,860	8,202
Diff. REM (*CFO*)	-0.013	-0.008	-0.005
T-Statistics	-4.890	-3.869	-2.252
N	8,135	8,514	7,231
Diff. AEM (*Accrual*)	-0.022	-0.015	-0.009
T-Statistics	-10.632	-8.410	-4.941
N	6,684	6,790	5,693
Diff. REM (*All*)	-0.043	-0.049	-0.044
T-Statistics	-4.699	-6.128	-5.174
N	4,699	5,340	4,599

Panel B: Explaining post-announcement outperformance with pre-announcement downward EM

Dependent variables are matching-adjusted future performance for Year [+1,+3] following repurchase announcement-year [Year 0]. AEM and REM measures are matching-adjusted EM measures. Results are from OLS regressions based on the full model (Eq. 6). The mean of matching-adjusted *ROA* is presented at the bottom of the table. REM is *Abn_DISX, Abn_PROD, Abn_CFO* in columns (1)-(3), (4)-(6), and (7)-(9), respectively.

VARIABLES	(1) *Adj. ROA* (*T+1*)	(2) *Adj. ROA* (*T+2*)	(3) *Adj. ROA* (*T+3*)	(4) *Adj. ROA* (*T+1*)	(5) *Adj. ROA* (*T+2*)	(6) *Adj. ROA* (*T+3*)	(7) *Adj. ROA* (*T+1*)	(8) *Adj. ROA* (*T+2*)	(9) *Adj. ROA* (*T+3*)
AEM	-0.128**	0.043	0.008	-0.193***	-0.085	0.034	-0.024	0.029	0.072
REM	-0.057**	-0.112**	0.005	-0.055**	-0.096**	-0.000	-0.232***	-0.202**	-0.068
Adj. ROA	*0.041*	*0.044*	*0.030*	*0.042*	*0.039*	*0.038*	*0.042*	*0.039*	*0.038*

*** p<0.01, ** p<0.05, * p<0.1

Table 9 Multivariate Analyses: Earnings management preceding MBOs

Results are obtained from OLS regressions. Significant levels are based on standard errors that cluster by firm. *Total_REM* is the sum of the three REM proxies. Estimating variables are variables used in our models to estimate REM and AEM (see Model 1-5). Definitions of other control variables are discussed in Table 1.

MBO-Complete (N=281) is an indicator variable that equals 1 for a MBO announcement that is followed by completion. ***MBO-Incomplete*** (N=257) is an indicator variable that equals 1 for an incomplete MBO. We expect the coefficients before *MBO-Complete* to be negative and more significant than those before the comparison group: *MBO-Incomplete*.

We further divide *MBO-Complete* into two groups based on firm-year *Abn_Accrual* value: those below the 25th percentile make up the *Lg. Down AEM* group. We expect the coefficient before *Lg. Down AEM* to be more negative than that before the *others* group

VARIABLES	(1) Abn_DISX	(2) Abn_PROD	(3) Abn_CFO	(4) Abn_Accrual	(5) Total_REM
Smooth	-0.031***	-0.025***	-0.074***	-0.083***	-0.209***
MBO-Complete	-0.012*	-0.036***	-0.030**	-0.008	
MBO-Incomplete	0.001	-0.028*	-0.017	0.010	
***MBO-Complete* (*Lg. Down AEM*)**					-0.111**
***MBO-Complete* (*Others*)**					-0.067**
Control Variables	YES	YES	YES	YES	YES
Estimating Variables	YES	YES	YES	YES	YES
Observations	165,162	201,539	195,124	181,863	147,675
R-squared	0.144	0.034	0.263	0.025	0.150

*** p<0.01, ** p<0.05, * p<0.1

Table 10 Cost Factors and EM Preceding MBOs

We follow Zang's (2012) research design by using recursive equation system to analyze how cost factors affect the magnitude of downward REM and AEM. The sample only includes MBO observations. Definitions of variables are provided in Table 1. Results are highlighted in bold if different from predictions.

VARIABLES	REM Equation		AEM Equation	
	Pred.		Pred.	
Cost factors related to AEM				
BIG8	$\beta_{1,R:}$ -	-0.028	$\beta_{1,A:}$ +	0.022**
Auditor_Tenure	$\beta_{2,R:}$ -	-0.036	$\beta_{2,A:}$ +	0.034***
NOA	$\beta_{3,R:}$ +	0.131**	$\beta_{3,A:}$ -	-0.082***
Cycle	$\beta_{4,R:}$ -	-0.025	$\beta_{4,A:}$ +	0.015***
Cost factors related to REM				
Market_Share	**$\beta_{5,R:}$ -**	**0.205**	**$\beta_{5,A:}$ +**	**-0.171*** **
Z_score	$\beta_{6,R:}$ -	-0.008	$\beta_{6,A:}$ +	0.005***
IO	$\beta_{7,R:}$ +	0.072	$\beta_{7,A:}$ -	-0.044**
MTR	$\beta_{8,R:}$ -	-0.082	**$\beta_{8,A:}$ +**	**-0.030**
Other controls				
	ROA, Size, TobinsQ, Analysts, Cash, Leverage, Earn, IMR		ROA, Size, TobinsQ, Analysts, Cash, Leverage, Pred_REM, Resi_REM, IMR	
Observations	238		236	
R-squared	0.182		0.742	

*** p<0.01, ** p<0.05, * p<0.1

Table 11 Matching Analyses (MBO)

N=281. One-to-one matching without replacement based on nearest neighbor propensity score. This table reports the mean matching-adjusted AEM and REM of MBO firms in the two years before. We expect those means to be all negative.

	T-2	***T-1***
Diff. REM(*DISX*)	-0.013	-0.041
T-Statistics	-0.588	-1.953
N	195	210
Diff. REM(*PROD*)	-0.026	-0.037
T-Statistics	-1.158	-1.881
N	215	274
Diff. REM(*CFO*)	-0.006	-0.015
T-Statistics	-0.344	-1.181
N	236	256
Diff. AEM(*Accrual*)	-0.016	-0.015
T-Statistics	-1.349	-1.166
N	231	236
Diff. REM(*All*)	-0.054	-0.095
T-Statistics	-1.011	-2.079
N	149	188

Table 12 Multivariate Analyses: Earnings management preceding CEO option awards

Results are obtained from OLS regressions. Significant levels are based on standard errors that cluster by firm. *Total_REM* is the sum of the three REM proxies. Estimating variables are those used in the models to estimate REM and AEM proxies (see Models 1-5). Definitions of other control variables are discussed in Table 1. *MIR* is inverse mills ratio to control for the potential sample selection bias (Execucomp's sample selection).

Following the approach in Baker et al. (2003), we construct the following three variables: ***Expected option award*** is the predicted option award in the next period (based on fair value and scaled by total compensation). Predicting variables include current year's *option grant*, firm financials (those controlled in our main analyses), *Smooth*, CEO *first year* dummy, CEO *last year* dummy (lead), *CEO ownership*, *value realized on option exercises*, *distance* between grant date and year-end, *total compensation* (log), CEO *tenure*, one-year share *return*, and industry dummies. To provide comparison, we construct ***unexpected option award*** as the residuals from the above predicting model. We expect the impact of *unexpected option award* on EM is less significant than that of *expected option award*. Due to Execucomp's data format, Black-Scholes value is used for Year 2005 and before, and grant-date fair value (FAS 123R) is used for Year 2006 and after. Following Baker et al. (2003), ***Smooth*** is calculated as ratios-adjusted *actual earnings* minus *targeted earnings*. We expect the coefficient estimates to be negative before *Smooth*.

In Column (5), we interact *Expected option award* with four group dummies created according to quartiles of firm-year *Abn_Accrual* value. We expect that ***Lg. Down AEM*** has the most negative coefficient among the four.

VARIABLES	(1) Abn_DISX	(2) Abn_PROD	(3) Abn_CFO	(4) Abn_Accrual	(5) Total_REM
Smooth	-0.016	-0.038**	-0.069***	-0.037***	-0.114***
Expected Option Award (T+1)	-0.017***	-0.017	-0.050***	-0.035***	
Unexpected Option Award (T+1)	0.001	-0.008	-0.019**	-0.006	
Exp. Opt. Award (T+1)(Lg. Down AEM)					-0.334***
Exp. Opt. Award (T+1)(Sm. Down AEM)					-0.167***
Exp. Opt. Award (T+1)(Sm. Up AEM)					0.130***
Exp. Opt. Award (T+1)(Lg. Up AEM)					0.256***
Stock holding	0.005	0.048	0.077	0.025	0.163
Option holding	-0.001***	0.002**	0.001	-0.001	0.002
IMR	-0.002	-0.001	-0.022	-0.021***	-0.047
Control variables	YES	YES	YES	YES	YES
Observations	16,541	16,467	16,508	16,519	16,460
R-squared	0.101	0.038	0.110	0.344	0.174

*** p<0.01, ** p<0.05, * p<0.1

Table 13 Cost Factors and EM Preceding CEO Option Awards

Pane A Descriptive statistics by quartiles of *Predicted Option Awards*

Award Quartile:	*Q1*			*Q2*			*Q3*			*Q4*	
	Mean	*Obs.*	*T-stat. of* Δ	*Mean*	*Obs.*	*T-stat. of* Δ	*Mean*	*Obs.*	*T-stat. of* Δ	*Mean*	*Obs.*
REM	-0.023	4,095	1.799	-0.038	4,116	0.908	-0.046	4,124	4.980	-0.091	4,125
AEM	-0.017	4,138	3.208	-0.023	4,134	3.178	-0.028	4,136	7.652	-0.043	4,133

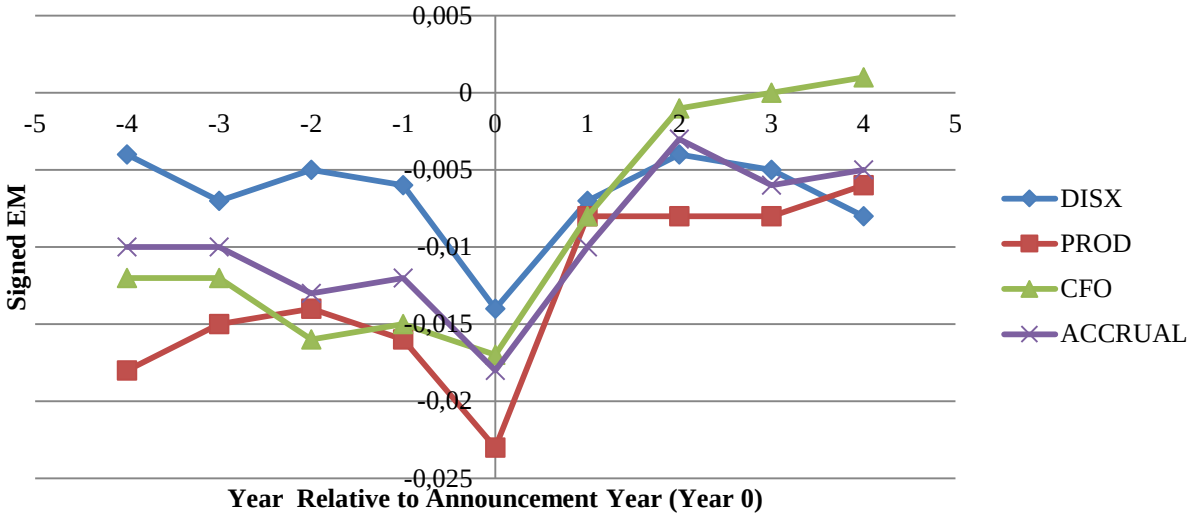
Panel B

We follow Zang's (2012) research design by using recursive equation system to analyze how cost factors affect the magnitudes of downward REM and AEM. The sample only includes observations with large *expected option award* (above median) in the next period. Definitions of variables are discussed in Table 1. Results are highlighted in bold if different from predictions.

VARIABLES	REM Equation		AEM Equation	
	Pred.		Pred.	
Cost factors related to AEM				
BIG8	$\beta_{1,R:}$ -	-0.050	$\beta_{1,A:}$ +	0.032***
Auditor_Tenure	$\beta_{2,R:}$ -	-0.005	$\beta_{2,A:}$ +	0.004***
NOA	$\beta_{3,R:}$ +	0.072***	$\beta_{3,A:}$ -	-0.036***
Cycle	$\beta_{4,R:}$ -	-0.060***	$\beta_{4,A:}$ +	0.027***
Cost factors related to REM				
Market_Share	$\beta_{5,R:}$ -	-0.156***	$\beta_{5,A:}$ +	0.032***
Z_score	$\beta_{6,R:}$ -	-0.009***	$\beta_{6,A:}$ +	0.001***
IO	$\beta_{7,R:}$ +	0.023*	$\beta_{7,A:}$ -	-0.020***
MTR	$\beta_{8,R:}$ -	-0.027	**$\beta_{8,A:}$ +**	***-0.016****
Other controls				
	ROA, Size, TobinsQ, Analysts, Cash, Leverage, Earn (2), IMR, Years		ROA, Size, TobinsQ, Analysts, Cash, Leverage, Pred_REM, Resi_REM, IMR, Years	
Observations		8,249		8,241
R-squared		0.284		0.571

*** p<0.01, ** p<0.05, * p<0.1

Figure 1. Earnings Management around Repurchase Announcement



Group No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
ROA	-0.397	-0.271	-0.190	-0.133	-0.092	-0.062	-0.039	-0.021	-0.008	0.002	0.006	0.010	0.013	0.017	0.022
Group No.	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
ROA	0.028	0.034	0.040	0.045	0.052	0.058	0.065	0.073	0.082	0.093	0.106	0.122	0.144	0.179	0.264

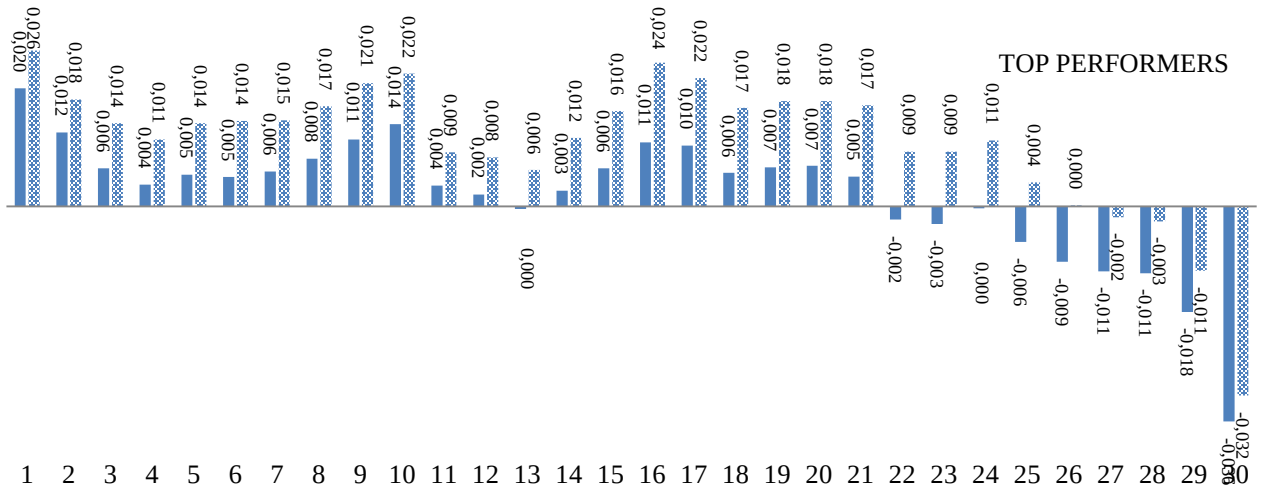


Figure 2 (A) REM by Performance Group

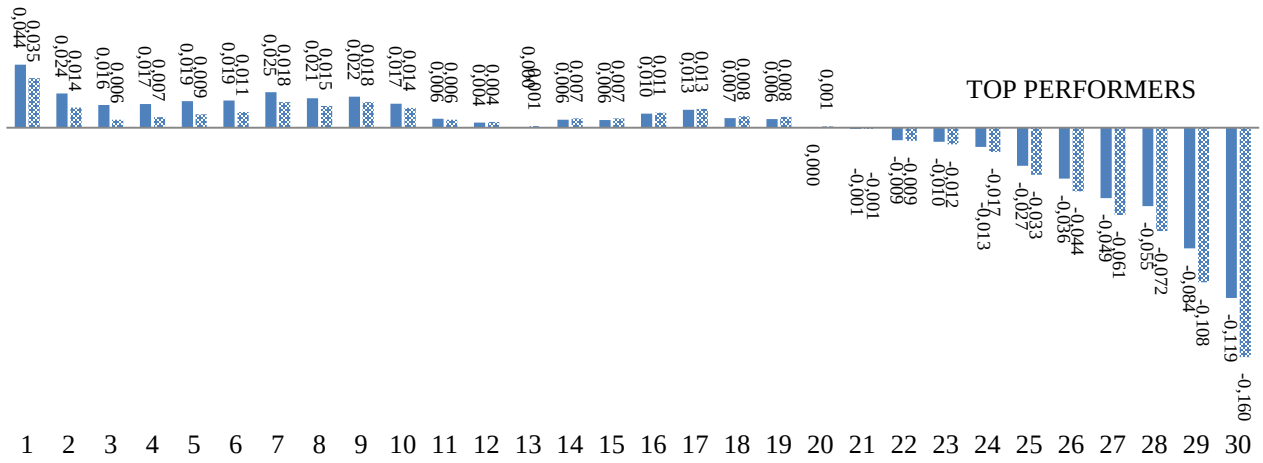


Figure 2 (B) REM by Performance Group

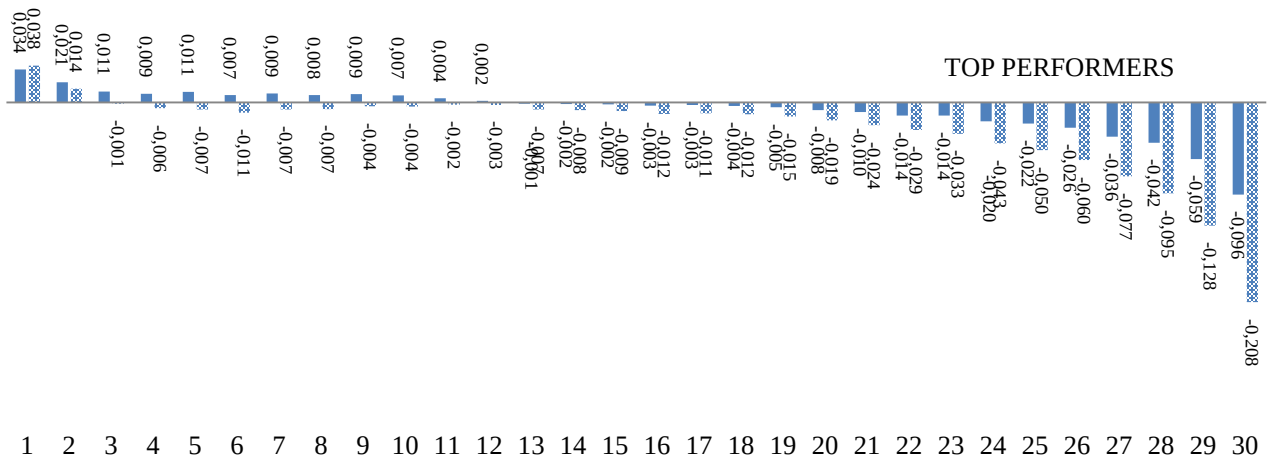


Figure 2 (C) REM by Performance Group

Abn-CFO

Model Adjusted Abn-CFO

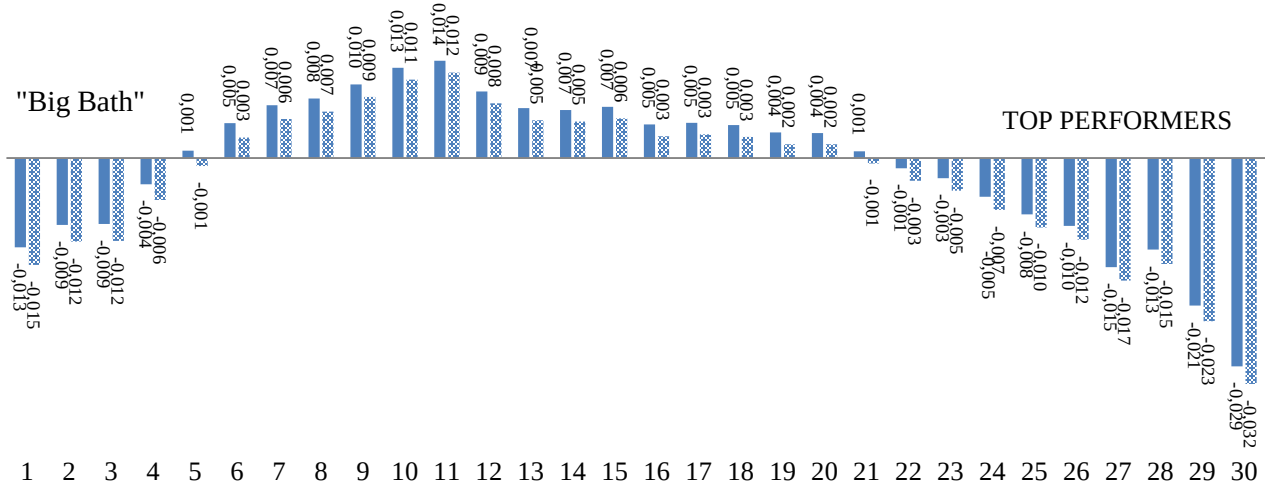


Figure 2 (D) AEM by Performance Group

Abn-ACCRUAL

Model Adjusted Abn-ACCRUAL

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