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The effects of the 2006 SEC executive compensation disclosure rules on managerial incentives

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ABSTRACT

In 2006, the SEC amended the disclosure requirements for executive compensation and stock ownership. This paper examines the effects of these amendments on (1) the association between equity-based executive incentives and firm payout choice, and (2) the association between executive compensation and earnings management. We find that after the effective date of the SEC rules, the positive associations between executive stock option holdings and firm open-market repurchases, and between executive shareholdings and firm dividend payouts, have weakened. In addition, the positive associations between bonus and discretionary accruals, between bonus and real earnings management, and between equity compensation and real earnings management, have decreased. In general, these findings are consistent with the notion that the 2006 SEC disclosure rules lowered management's self-interested actions by mitigating the information asymmetry between investors and managers.

1. Introduction

Concerned that the 1992 executive compensation disclosure rules were serving to conceal the true picture of executive compensation,[1] and following a series of options-related scandals, in 2006, the Securities and Exchange Commission (SEC) adopted extensive amendments to the disclosure requirements for executive and director compensation[2] and stock ownership.[3] The amendments were intended to provide investors with more detailed and comprehensive disclosure about the compensation paid to top executives by public U.S. issuers. By mandating regular disclosure of information previously obtained only with difficulty, if at all, by stakeholders, the 2006 SEC rules reduce the information asymmetry between executives and other stakeholders. With the increased information, stakeholders are in an improved position to detect and assess certain company decisions in light of their association with executive compensation. This paper addresses two research questions occasioned by the new rules.

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[1] Cox, Christopher, "Speech by SEC Chairman: Chairman's Opening Statement; Proposed Revisions to the Executive Compensation and Related Party Disclosure Rules," U.S. Securities and Exchange, January 17, 2006.

[2] Since the focus of this paper is on executive compensation, we will not refer to director compensation hereafter.

[3] "Executive Compensation and Related Person Disclosure," Securities and Exchange Commission, Securities Act Release No. 8732A, Exchange Act Release No. 54302A, Investment Company Act Release No. 27444A, 71 Fed. Reg. 53,158, 53,159-60 (September 8, 2006). The amendments, which made substantial changes to Item 402 of Regulations S-K and S-B, were codified in 17 C.F.R. pts 228 and 229 (2006). The amendments became effective on November 7, 2006.

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The first research question relates to the impact of the 2006 SEC executive compensation disclosure rules on the association between equity-based executive incentives and particular firm payout choices. Many researchers have argued that executive stock option (hereafter, option) holdings motivate executives to favor firm open-market repurchase (hereafter, repurchase) of stock over dividend payment because repurchase increases the share price and options are seldom "dividend protected" (Bartov et al., 1998; Dittmar, 2000; Fenn and Liang, 2001; Jolls, 1998; Lambert et al., 1989). In other words, executives holding stock options would prefer that the firm uses its cash to buy back shares and not to pay dividends, because the executives' options would increase in value after the buyback. Executives' options would not normally increase in value after a dividend in which the options did not participate. Consistent with this argument, the empirical evidence consistently shows a positive association between executive option holdings and firm repurchases and a negative association between option holdings and firm payments of dividends (Aboody and Kasznik, 2008; Bartov et al., 1998; Dittmar, 2000; Fenn and Liang, 2001; Jolls, 1998; Lambert et al., 1989).

In contrast to option holdings, shareholding motivates executives to favor firm dividend payment over firm repurchase for two reasons. First, according to the argument advanced by Brown et al. (2007), and supported by their finding of a positive association between shares held by executives and dividend changes, the 2003 Jobs and Growth Tax Relief Reconciliation Act has reduced the cost of dividends to executives substantially. Second, executives would prefer dividends for liquidity reasons. As a result, executives holding shares would prefer that the firm uses its cash to pay a dividend to current shareholders, as opposed to pursuing share repurchase which would not provide the liquidity benefit to the executives.

Executive preferences relating to firm payouts are likely to translate into board, and firm, action. The board of directors is responsible for the business and affairs of the corporation. Elected by shareholders, the board exercises effective control over the corporation (Berle and Means, 1932); the board selects the executive officers, decides executive compensation, and decides whether to issue stock, options or dividends. The relationship between the board of directors and the executive officers is close, and top executive officers are frequently also members of the board. In some cases the chief executive officer serves as chairman of the board as well. Because of the resulting "board capture" (Bebchuk and Fried, 2004; Crystal, 1991; Eisenberg, 1976), executive preferences relating to firm payouts are likely to translate into board action.

We expect that the expanded disclosure about executive compensation under the 2006 SEC rules, by mitigating the information asymmetry between executives and stakeholders and reducing the cost of assessing the information,[4] decreases the self-interested behavior of executives. The information asymmetry decreases because, with the 2006 amendments, it is easier for stakeholders to obtain information from firm filings regarding executive compensation. For example, the amended rules require a narrative Compensation Discussion and Analysis section setting out the objectives and implementation of executive compensation programs, particularly with respect to option grants to executives. The amendments significantly increase disclosure of the amount of executive compensation, as well as the process of determining the executive compensation and the reasons behind the timing and type of compensation that is granted. All information is presented in plain English.

The substantial increase in the breadth and detail of executive compensation disclosure by U.S. public issuers under the 2006 amendments reduces the costs for stakeholders to obtain and evaluate the information (Iacobucci, 1998). The more comprehensive information, combined with the SEC's 2003 amendments that required reporting companies to disclose open-market repurchases in their quarterly financial statements, enables stakeholders to detect correspondences between executive compensation and board payout decisions, and thus increases stakeholder opportunities for action in response. The increased information and reduced cost of obtaining and evaluating that information may mitigate the collective action problem that prevents shareholders from attempting to influence the board (Iacobucci, 1998).

The prospect of shareholder reaction to the increased information about executive compensation potentially curbs management self-interested behavior. Specifically, we expect that after the SEC rules were implemented, the positive association between executive option holding and firm repurchases, the negative association between executive option holding and firm dividend payouts, and the positive association between executive shareholding and firm dividend payouts, have weakened.

Corporate scandals giving rise to SOX have spurred shareholders to pay much more attention to the accuracy of financial reporting (O'Connor, 2005). Our second research question thus relates to the impact of the 2006 SEC rules on the association between executive compensation and earnings management. Healy (1985) and Gaver et al. (1995) find that managers manipulate earnings to maximize bonus compensation. More recently, Bergstresser and Philippon (2006) find that companies for which the CEO's overall compensation is more sensitive to the firm share prices have higher levels of discretionary accruals, and CEOs exercise unusually large number of options and sell large quantities of their firms' shares during years of high accruals. We expect the greater transparency about executive compensation arrangements under the 2006 SEC rules, which increases the opportunity for stakeholder response to those arrangements, to have reduced the likelihood that executives conduct self-interested actions after 2006, and thus weakened the association between executive compensation and earnings management.

To test our expectations regarding the first research question, we regress the scaled values of firm repurchases and dividends on sensitivity of executive option holdings and shareholdings, and their interactions with a dummy variable coded as 1 (0) for post- (pre-) SEC rules. In our regressions, we control for various factors that potentially affect company payout

[4] The 2006 SEC amendments were intended to improve the total mix of information available to the marketplace, and thereby to help shareholders and board of director compensation committees to assess the information.

policy, including year and industry association. In addition, we control for the substitution effect of firm repurchases and dividend payouts and the incentives to maintain the payout policy (Brav et al., 2005; Grullon and Michaely, 2002).

To test our expectations related to the second research question, we regress the scaled values of our earnings management proxies on executive bonus, and sensitivity of executive option holdings and shareholdings, and their interactions with a dummy variable coded as 1 (0) for post- (pre-) SEC rules. In these regressions, we control for various factors that potentially affect firms' incentives to manage earnings (Cohen et al., 2008; Dechow et al., 2010; Roychowdhury, 2006).

Using a sample with complete Compustat and ExecuComp data and another also including analyst forecasts and corporate governance data, we find a positive association between executive option holdings and firm repurchases and between executive shareholdings and dividend payouts. In addition, both discretionary accruals and real earnings management measures are positively related to executive compensation. More importantly, we find that after the effective date[5] of the SEC rules, the positive associations between executive option holdings and firm repurchases, and between executive shareholdings and dividend payouts, have weakened. In addition, the positive associations between bonus and discretionary accruals, between bonus and real earnings management, and between equity compensation and real earnings management, have decreased. These findings are consistent with the argument that the increased disclosures about executive compensation provided to stakeholders, and the prospect of increased stakeholder scrutiny of firm payout and financial reporting decisions in light of the compensation information disclosed, led to a reduction in executive self-interested behavior in order to prevent negative stakeholder and market responses.

We contribute to the executive compensation literature in three ways. First, we provide further support to prior literature about the association between executive equity incentives and firm payout policy. Brav et al. (2005) find that firms have a strong (moderate) desire to maintain their dividend levels (repurchases). As such, it is important to control for the historical payout policy when examining payout policy. Our analysis shows that the documented positive association between executive option holdings (shareholdings) and firm repurchases (dividend) holds after controlling for the incentives to maintain historical payout policy.

Second, we show that after the effective date of the 2006 SEC disclosure rules, executives' opportunistic actions have declined. Specifically, we show that the positive associations between executive option holdings and firm repurchases, between executive shareholdings and firm dividend payout, and between executive compensation and earnings management, have all declined. The results are consistent with the notion that the 2006 SEC disclosure rules have facilitated investor scrutiny of firm payout and financial reporting decisions in light of executive compensation, resulting in preemptive curtailment of self-interested actions by executives. This builds on earlier arguments that increased disclosure of executive compensation leads to the adoption of executive compensation packages that are sensitive to firm performance (Iacobucci, 1998), adding an analysis of the impact of disclosure of particular types of performance-related pay on firm payout and financial reporting decisions.

Third, we add to the literature on the trends in accrual and real earnings management. Cohen et al. (2008) find that firms switched from accruals management to real earnings management after the passage of SOX in 2002. Specifically, they find a decrease in the association between executive compensation and abnormal accruals concurrent with an increase in the association between executive compensation and real earnings management. We find that the positive associations between executive compensation and accruals management, and between executive compensation and real earnings management, have both weakened after the 2006 SEC disclosure requirements.

The remainder of this paper is organized as follows. Section 2 reviews the related studies and develops our hypotheses related to the effect of the 2006 SEC rules on the relationship between executive equity incentives and firm payout policy, and between executive compensation and earnings management. The data and the methodology are described in Section 3. Section 4 presents the results of univariate and multivariate tests of the hypotheses, while Section 5 summarizes the study and concludes.

2. Review of related studies and hypotheses development

2.1. Equity-based executive incentives and firm payout policy

One puzzle of payout policy is why firms prefer to use one form of cash distribution versus another (Baker et al., 2002). Brav et al. (2005) conduct a survey of 256 public companies and 128 private firms, and find that executives favor repurchases over dividends because repurchases are more flexible and can be used to increase earnings per share and to time the market when firm stock price is low. Empirical evidence supports Brav et al.'s findings about the financial flexibility, dilutive effect, and undervaluation hypotheses (Bartov et al., 1998; Bens et al., 2003; Dittmar, 2000; Jagannathan et al., 2000; Kahle, 2002). For example, Bens et al. (2003) find that stock repurchases are positively related to the dilutive effect of employee options on earnings per share (EPS), although they are negatively related to stock price changes.[6]

What the survey studies do not document is the effect of executives' equity incentives to favor one particular form of payout over another (Kahle, 2002; Lambert et al., 1989). Lambert et al. (1989) argue that because options are seldom

[5] The amendments outlined in the SEC's "Executive Compensation and Related Person Disclosure" release became effective on November 7, 2006.

[6] Hribar et al. (2006) find that firms use stock repurchases to meet or beat analysts' earnings per share forecasts.

"dividend protected" and payment of dividends decreases stock price, managers are motivated to decrease dividend payments to avoid a decline in the value of their option holdings. They find that dividends decrease following the initial adoption of executive option plans, and interpret their results as suggesting that the personal incentives of executives can affect the corporate dividend payout policy. Repurchases, unlike dividends, do not dilute the per-share value of the stock (Jolls, 1998). In fact, they generally are associated with a positive stock market reaction (Fenn and Liang, 2001; Sanders and Carpenter, 2003). As such, option holding motivates executives to favor firm repurchase of stocks instead of paying dividends because the value of options increases with repurchases. Consistent with the notion that option holding motivates executives to favor repurchase, Fenn and Liang (2001), among others, document a positive association between executive option holding and firm stock repurchase, and a negative association between option holding and dividend payout. Bratton (2006) finds that standard options skew executives' choices away from dividends and toward repurchases in all states of the world.

Benefits to executives from repurchase of stocks may come at the expense of shareholders. Barclay and Smith (1988, p. 65) argue that if managers' compensation packages include options or restricted stocks, firm repurchases provide managers with opportunities to use inside information to benefit themselves at shareholders' expense. Brennan and Thakor (1990) contend that absent detailed information about executive's motives, shareholders prefer dividends to repurchases. In addition, while options prompt executives to implement near-term initiatives such as stock repurchases to maximize their personal self-interest, they "would motivate executives to redirect corporate funds from investments in long-term projects associated with a firm's primary rent-producing activities" (Sanders and Carpenter, 2003, p. 165).

Brown et al. (2007) hypothesize that, contrary to option holding, shareholding motivates managers to choose dividends over firm repurchases because the 2003 Jobs and Growth Tax Relief Reconciliation Act has reduced the cost of dividends to executives. Moreover, executives may place additional value on dividends for liquidity reasons. Consistent with their hypothesis, they find a positive association between shares held by executives and dividend changes, and a negative association between options and dividend changes. Brown et al. (2007) also hypothesize that the substitution of dividends for tax-advantaged share repurchases or the retention of earnings potentially raises the total tax burden for shareholders, leading to an agency problem between executives and shareholders. They find that stock price reaction is consistent with the existence of an agency conflict. In addition, Lippert et al. (2000) argue that linking executive compensation to stock price performance decreases the usual positive price response to dividend increases for two reasons: (1) increasing pay-performance sensitivity exacerbates managers' optimistic bias regarding future financial performance, reducing the credibility of dividend signals, and (2) increasing the sensitivity reduces the need for dividends as a means of reducing agency costs. Consistent with their expectation, they find that price response does decrease as pay-performance sensitivity increases.

To sum up, research shows that executive compensation in the form of options corresponds to firm repurchase of more shares and executive compensation in the form of shareholdings corresponds to more dividend payouts. In both cases, the choice of form of the additional distribution of cash, which likely reflects executive preferences, may not be in the best interest of shareholders. We examine whether, following the significant increase in the required disclosure regarding executive compensation in 2006, executive self-interested behavior relating to firm payout choices abates.

2.2. Compensation incentives and earnings management

Similarly, we examine whether, following the significant increase in the required disclosure regarding executive compensation in 2006, firm earnings management practices also changed. Cheng and Warfield (2005) examine the association between CEO's equity incentives and earnings management. They find that unexercisable options and stock ownership are positively correlated with contemporaneous earnings management. In addition, managers with high incentives from unvested options and stock ownership are more likely to report earnings that meet or just beat analysts' forecast and less likely to report large positive earnings surprises. Bartov and Mohanram (2004) argue that managers can increase their cash payouts from an exercise by inflating earnings in the period of exercising vested options.[7] Their findings suggest that executives manipulate accruals upward in the period when they exercise abnormally large options. Lin et al. (2009) find that managerial exercisable, but not unexercisable, options are positively associated with the discretionary accruals in the current year. And, Uzun and Zheng (2012) find a positive association between unvested options and earnings management. Using a sample of Korean companies, Lee et al. (2011) find a positive association between the value and price sensitivity of exercised executive options and earnings management.

Bergstresser and Philippon (2006, p. 520) find that firms for which the CEO's equity-based compensation is more sensitive to company share prices have higher levels of discretionary accruals, and CEOs exercise unusually large number of options and sell large quantities of their firms' shares during years of high accruals. Weber (2006) also documents a positive relationship between CEO stock-based wealth sensitivity and abnormal accruals. Burns and Kedia (2006) find that the sensitivity of CEO's option portfolio to stock price is positively related to misreporting.

Taken together, the literature documents a positive association between executive equity incentives and accruals management, consistent with the notion that the value of executive option holdings and shareholdings depends on the firm's

[7] Consistent with their argument, Bartov and Mohanram (2004) find that in years of large exercises, the abnormal accruals of their test sample is significantly larger than those of their control sample. They recognize that the influence of a large exercise and a small exercise differs because the motivation underlying a small exercise is likely to be non-informational (e.g., liquidity needs).

stock performance and that executives have stronger incentives to manipulate earnings upward when their total compensation is more sensitive to the value of the equity of their company.[8]

Prior literature also finds that executives manipulate earnings to maximize bonus compensation (Cheng and Warfield, 2005; Gaver et al., 1995; Healy, 1985; Murphy, 2012). While Healy (1985) finds that executives "take a bath" when pre-managed earnings fall way below the lower bound of bonus formula, Gaver et al. (1995) find evidence of earnings management more consistent with income smoothing. Cheng and Warfield (2005) find a positive association between bonus dummy and abnormal accruals. Murphy (2012) finds that non-linear incentive plans result not only in executive earnings management, including income smoothing, but also affect risk-taking behavior.

Nwaeze (2011) uses a firm incentive score based on the factor analysis of the earnings management incentive variables (including compensation incentives) to evaluate the effect of managerial incentives on earnings response coefficient. He finds that the market reaction to the cash flows as well as total accruals is lower in the presence of managerial incentives. The results are consistent with the notion that the shareholders are aware of the existence of earnings management incentives and thus evaluate the cash flows as well as accruals at lower quality.

We examine whether, given such awareness on the part of shareholders and the increased disclosure regarding executive compensation in 2006, executive behavior with respect to earnings management changed.

2.3. Hypotheses development

As discussed in Section 2.1, prior literature consistently shows a positive association between executive option holding and firm repurchases and a negative association between executive option holding and firm payment of dividends. On the other hand, executive shareholding corresponds to more firm dividend payouts. We note that the benefits to executives from repurchase of stocks or dividends may harm the shareholders. Specifically, repurchase provides executives with opportunities to use inside information to benefit themselves at the shareholders' expense (Baker et al., 2002; Barclay and Smith, 1988). The decreased positive price response to firm dividend payouts documented by Lippert et al. (2000) also suggests that the additional dividend payments are not always in the best interest of shareholders. Furthermore, the additional distribution redirects corporate funds from investments in long-term projects (Sanders and Carpenter, 2003).

Concerned that the 1992 executive compensation disclosure rules, which relied on a system of formatted tables, were serving to conceal the true picture of executive compensation, and following a series of options scandals, on September 8, 2006, the SEC overhauled the disclosure requirements for executive and director compensation and stock ownership.[9] The rules became effective on November 7, 2006. The amendments are intended to provide investors with a clearer and more complete picture of compensation to principal officers,[10] thereby reducing the information asymmetry between firm managers and other stakeholders.

The 2006 amended rules require firms to file a new Compensation Discussion and Analysis section (CD&A) with their executive compensation disclosures. The CD&A includes discussion and analysis of material factors underlying compensation policies and decisions that are reflected in the data presented in the compensation tables. For example, the CD&A includes discussion about the timing of option grants, particularly with respect to the release of material non-public information, the determination of exercise price for option grants, the relationship between compensation and corporate performance, and the role of executives in the compensation process.

The 2006 rules also revise the Summary Compensation Table to include a "Total Compensation" column with a single bottom line figure for total annual compensation, the dollar value of any compensation earned during the year under non-equity incentive plans, additional disclosure of other compensation such as perquisites and other personal benefits, and a footnote describing all deferred salary and bonus compensation. The rules introduce a supplemental table, the Grants of Plan Based Awards Table, which complements the Summary Compensation Table's new requirement of disclosure of the grant date fair value of stock and option awards. The Grants of Plan Based Awards Table discloses the number of shares comprising or underlying the award and the terms of grants made during the current year. Narrative discussion follows the two tables, providing material information necessary to an understanding of the information disclosed in the tables.

The 2006 rules include two new tables disclosing exercises and holdings of previously awarded equity. The Outstanding Equity Awards at Fiscal Year-End Table discloses information regarding outstanding awards, for example, under option plans,

[8] Boumosleh (2009) finds a positive association between director stock options and total accruals, concluding that director stock options align interests of directors with those of managers, which results in less reliable financial information.

[9] In addition to the rules adopted in September 2006, on December 22, 2006, the SEC further amended the disclosure requirements for executive and director compensation with respect to how a public company discloses stock and option award compensation. Those additional amendments aligned disclosure of stock and option awards more closely with the manner in which such awards are reported in financial statements under the Financial Accounting Standards Board Statement of Financial Accounting Standards No. 123 (revised 2004), *Share-Based Payment*, or FAS 123(R). "Executive Compensation Disclosure," Securities Act Release No. 8765 (December 22, 2006). Those amendments became effective December 29, 2006.

[10] U.S. federal securities laws are premised on the idea that the prospect of making information public, including information regarding executive compensation, exercises a disciplinary effect on firms and firm managers. As Felix Frankfurter, one of the drafters of the Securities Act of 1933, explained, "The existence of bonuses of excessive commissions and salaries, of preferential lists and the like, may all be open secrets among the knowing, but the knowing are few. There is a shrinking quality to such transactions; to force knowledge of them into the open is largely to restrain their happening. Felix Frankfurter, "Securities Act – Social Consequences," Fortune, August 1933, at 55.

restricted stock plans, and incentive plans, and discloses the market-based values of the rights or shares as of the company's most recent fiscal year-end. The Option Exercises and Stock Vested Table shows the amounts received upon exercise of options or similar instruments or the vesting of stock of similar instruments during the most recent fiscal year. The two tables provide information about the current status and value of outstanding equity awards, as well as value realized from outstanding equity awards during the year. The information must be provided in plain English, with respect to the principal executive officer, the principal financial officer, and the three other highest paid executive officers, based on their total compensation.

These amendments, combined with the SEC's 2003 amendments that require reporting companies to disclose open-market repurchases in their quarterly financial statements,[11] provide stakeholders with increased ability to connect executive compensation and company payout decisions.

We expect the more extensive disclosure to ameliorate the information asymmetry between management and stakeholders regarding executive option- and share-holding and firm payout decisions. The decreased cost of obtaining and evaluating the executive compensation, and the more comprehensive information that must be disclosed, will increase the possibility of stakeholder identification of opportunistic cash payout behavior of executives. We expect that the increased opportunity for stakeholder identification of the self-interested payout behavior, which may induce activism on the part of institutional shareholders or trigger sales of shares (the so-called "Wall Street Rule"),[12] will result in a preemptive reduction of that self-interested behavior. Our first hypothesis is,

H1. After the 2006 SEC rules, the following associations have weakened: the positive association between option holding and repurchases, the negative association between option holding and dividend payouts, and the positive association between shareholding and dividend payouts.

The earnings management literature discussed in Section 2.2 documents a positive association between equity incentives and accruals management. The literature also shows that managers manipulate earnings to maximize their bonus compensation. As with our first hypothesis, we expect the more detailed and comprehensive information about executive compensation provided by the SEC rules, which increases the opportunity for stakeholder response to those arrangements, to reduce the likelihood that executives conduct self-interested actions after 2006, and thus to mitigate the association between compensation and earnings management. Our second hypothesis is,

H2. After the 2006 SEC rules, the positive association between executive compensation and earnings management has weakened.

3. Data and methodology

The Appendix describes the variables used in this study. Our sample consists of all U.S. publicly traded firms in Compustat ExecuComp database because our analyses involve managerial compensation data. We limit the sample to firms with sufficient annual data to calculate the variables for testing our hypotheses. Consistent with prior literature, we omit firms in regulated industries (SIC codes 4400–4999) and financial institutions (SIC codes 6000–6999) (Bens et al., 2003; Cohen et al., 2008; Dittmar, 2000; Roychowdhury, 2006). To control for outliers, we delete firm-years with dividends and repurchases at the extreme 99th percentile levels and all other continuous variables at the 1st and 99th percentiles of their respective distributions (Burgstahler and Dichev, 1997; Dechow et al., 1998; Dechow, Richardson and Tuna 2003). To estimate normal levels of production costs, discretionary expenditures, and accruals for testing H2, we require at least eight observations in each two-digit SIC industry for each year (Cohen and Zarowin, 2010; Cohen et al., 2008).

Because we argue that executive actions are driven by the wealth (dollar) effect, we measure equity-based incentives by the sensitivity of the executive wealth to market price (Shevlin, 2008). Following Bergstresser and Philippon (2006), we first measure the dollar change in the value of executives' stock and option holdings that would come from a one percentage point change in the company stock price, then divide the measure by the total compensation to capture the share of the executives' total compensation that would come from a one percentage point change in the company stock price.

We measure the dollar value of open-market repurchases using Compustat data item "Purchase of common and preferred stock".[13] Following prior literature (Berger et al., 1997; Dittmar, 2000), we first reduce the volume by any decrease in preferred stock that occurs in the current year and then further screen stock repurchases by setting repurchases to zero for any firm that does not repurchase stocks with a value of at least 1% of the market value of its equity. We focus on open-market repurchases because these are the dominant method by which U.S. firms repurchase stocks (Grullon and Ikenberry 2000).

[11] "Purchases of Certain Equity Securities by Issuer and Others," Securities and Exchange Commission, Securities Act Release No. 33-8335, Exchange Act Release No. 34-48766, Investment Company Act Rel. No. 26252, 68 Fed. Reg. 64952 (November 17, 2003). The new requirement took effect on December 17, 2003.

[12] Because of the separation of ownership and control in the modern corporation, shareholders lack any direct, binding, means to affect executive compensation decisions or correct executive self-interested behavior. Nevertheless, shareholders and other stakeholders may discipline executive behavior through other actions.

[13] Since these data overstate stock repurchases, we make adjustment following prior literature. Please see Dittmar (2000, p. 336) for further discussion.

We use models (1) and (2) below, which we call baseline models, to test H1: the association between equity incentives and payout policy and the change in that association after 2006. Our tests are performed over the period 2004–2007, that is, two years before and two years after the change in the rules to avoid the confounding effects of the financial crisis and economic downturn that led to the SEC's 2009 additional amendments to the executive compensation disclosure rules and the 2010 Dodd-Frank Act.

$$\begin{aligned}\text{REPUR} = {} & \alpha_0 + \alpha_1\text{OPT} + \alpha_2\text{SHARE} + \alpha_3\text{OPT}*\text{RULE} + \alpha_4\text{SHARE}*\text{RULE} + \alpha_5\text{REPURLAG} + \alpha_6\text{DIV} + \alpha_7\text{CFO} + \alpha_8\text{MKBK} \\ & + \alpha_9\text{RETURN} + \alpha_{10}\text{SIZE} + \alpha_{11}\text{CAPX} + \alpha_{12}\text{LEV} + \alpha_{13}\text{EPSLAG} + \alpha_{14}\text{STD\_Sale} + \alpha_{15}\text{AGE} + \alpha_{16}\text{GDPCHG} + \varepsilon\end{aligned} \tag{1}$$

$$\begin{aligned}\text{DIV} = {} & \alpha_0 + \alpha_1\text{OPT} + \alpha_2\text{SHARE} + \alpha_3\text{OPT}*\text{RULE} + \alpha_4\text{SHARE}*\text{RULE} + \alpha_5\text{DIVLAG} + \alpha_6\text{REPUR} + \alpha_7\text{CFO} + \alpha_8\text{MKBK} \\ & + \alpha_9\text{RETURN} + \alpha_{10}\text{SIZE} + \alpha_{11}\text{CAPX} + \alpha_{12}\text{LEV} + \alpha_{13}\text{EPSLAG} + \alpha_{14}\text{STD\_Sale} + \alpha_{15}\text{AGE} + \alpha_{16}\text{GDPCHG} + \varepsilon\end{aligned} \tag{2}$$

REPUR and DIV are the dollar value of repurchases and dividend payments respectively, each scaled by the market value at the beginning of the year. OPT and SHARE are the sensitivity of executive option holdings and shareholdings to price change. RULE is a dummy variable equal to 1 for observations in years 2006–2007, after the 2006 rules were in effect, and zero otherwise. We include repurchases from last year (REPURLAG) and DIV in regression (1), and dividends from last year (DIVLAG) and REPUR in regression (2), to control for the firm motivation to maintain repurchase or dividend policy and the substitution effect of repurchases and dividends, respectively (Brav et al., 2005; Dittmar, 2000; Grullon and Michaely, 2002).

Following prior literature (Bens et al., 2003; Bergstresser and Philippon, 2006; Dittmar, 2000; Fenn and Liang, 2001; Gong et al., 2008; Kahle, 2002), we control for operating cash flows (CFO), growth (MKBK), contemporaneous stock returns (RETURN), firm size (SIZE), capital expenditures (CAPX), leverage (LEV), sales volatility (STD_Sale), and firm age (AGE). Since firms have an incentive to meet or beat the EPS benchmark by repurchasing shares (Bens et al., 2003), we also include EPS of prior year (EPSLAG). In addition, based on our belief that firm's payout decision is affected by the economic condition, we include the percentage change in GDP (GDPCHG) in the model. Two-digit SIC and year dummies are also included in the regressions.

Hribar et al. (2006) document that firms use stock repurchases to meet or beat analysts' earnings forecast. In addition, payouts are important corporate governance mechanisms to help control for agency cost (Crutchley and Hansen, 1989; Easterbrook, 1984; Jensen, 1986). In order to control for the potential effects of these factors on the relationships between equity incentives and payout policy, we extend regression models (1) and (2), which we refer to as extended models, to include a meet or beat analysts' forecast dummy (MB) and percentage of outside directors (OTDR). Analyst forecast and director data are obtained from IBES and GMI Ratings databases, respectively.

For testing H2, we use three earnings management proxies: abnormal accruals, abnormal production costs, and abnormal discretionary expenditures.[14] Normal production costs and normal discretionary expenditures are estimated using models developed by Dechow et al. (1998). Normal total accruals is estimated using the cross-sectional model of Jones (1991) and adjusting for financial performance because Kothari et al. (2005) find that it is important to control for firm performance when estimating discretionary accruals. These models are commonly used in earnings management papers (e.g., see Roychowdhury, 2006; Cohen et al., 2008; Cohen and Zarowin, 2010; Zang, 2011; Liu and Espahbodi, 2014). Specifically, we develop the following three regressions.

$$\text{PROD}_t/\text{Assets}_{t-1} = \alpha_0(1/\text{Assets}_{t-1}) + \alpha_1(\text{Sales}_t/\text{Assets}_{t-1}) + \alpha_2(\Delta\text{Sales}_t/\text{Assets}_{t-1}) + \alpha_3(\Delta\text{Sales}_{t-1}/\text{Assets}_{t-1}) + \acute{\varepsilon}_t \tag{3}$$

$$\text{DISX}_t/\text{Assets}_{t-1} = \alpha_0(1/\text{Assets}_{t-1}) + \alpha_1(\text{Sales}_{t-1}/\text{Assets}_{t-1}) + \acute{\varepsilon}_t \tag{4}$$

$$\text{TA}_t/\text{Assets}_{t-1} = \alpha_0(1/\text{Assets}_{t-1}) + \alpha_1(\Delta\text{Sales}_t/\text{Assets}_{t-1}) + \alpha_2(\text{PPE}_t/\text{Assets}_{t-1}) + \alpha_3(\text{IBEI}_t/\text{Assets}_{t-1}) + \acute{\varepsilon}_t \tag{5}$$

In the above regressions, PROD is production costs, defined as the sum of cost of goods sold and change in inventory; DISX is discretionary expenditures, defined as the sum of advertising expenses, R&D expenses, and SG&A;[15] IBEI is income before extraordinary items; TA is total accruals, defined as IBEI less cash flow from operations; and PPE is property, plant, and equipment. Each regression is estimated separately for each two-digit SIC industry for each year.

The abnormal production costs (APROD), abnormal discretionary expenditures, and abnormal total accruals (ATA) are computed as the difference between their actual values and the normal levels predicted (i.e., they are the residuals) from regressions (3) through (5). Abnormal discretionary expenditures are multiplied by –1 (and denoted as ADISX) so that a higher value in all cases indicates greater upward earnings management.

We use model (6), which we also call the baseline model, to examine the effect of equity incentives and bonus (BONUS) on earnings management, and whether the 2006 SEC rules mitigated managers' opportunistic behavior. As in models (1) and (2), our tests are performed over the period 2004–2007.

[14] We do not include abnormal cash flows since the net effect of earnings management activities on cash flows is ambiguous (Roychowdhury, 2006; Zang, 2011).

[15] As long as SG&A value is available, missing values of advertising expenses and R&D are set to zero (Roychowdhury, 2006).

$$\text{Earnings Management Proxy} = \alpha_0 + \alpha_1 \text{OPT} + \alpha_2 \text{SHARE} + \alpha_3 \text{BONUS} + \alpha_4 \text{OPT} * \text{RULE} + \alpha_5 \text{SHARE} * \text{RULE} + \alpha_6 \text{BONUS} * \text{RULE} + \alpha_7 \text{PME} + \alpha_8 \text{BTM} + \alpha_9 \text{SIZE} + \alpha_{10} \text{LEV} + \alpha_{11} \text{STD\_Sale} + \alpha_{12} \text{AGE} + \alpha_{13} \text{GDPCHG} + \varepsilon \quad (6)$$

Earnings management proxy is defined as ATA, APROD, or ADISX. PME is pre-managed earnings, and BTM is book to market value of equity. The other independent variables are defined above. We include PME in our model to control for the incentives to smooth earnings. Two-digit SIC and year dummies are also included in the regressions.

Brown and Caylor (2005) document that analyst forecast is an important earnings threshold. And Bergstresser and Philippon (2006) show that corporate governance plays an important role in earnings management. To control for the potential effects of firm incentive to meet or beat analyst forecast and corporate governance on the relationships between management compensation and earnings management, we extend regression model (6), which we also refer to as extended model, to include a meet or beat analysts' forecast dummy (MB) and percentage of outside directors (OTDR).

4. Results

4.1. Hypothesis 1: the association between repurchases and dividends and executive equity holdings

The descriptive statistics for our samples for testing H1 are reported in Table 1. The first set of columns reports the descriptive statistics for the sample of firm-year observations with complete Compustat and ExecuComp data, i.e., the sample used in the baseline regression models (1) and (2) (N = 3939). The second set presents the statistics for the sample of firm-year observations with complete Compustat, ExecuComp, analyst forecasts and corporate governance data, i.e., the sample used in the extended models (1) and (2) (N = 1915).

Because IBES and GMI Ratings collect data on only larger and more established firms, the size of the second sample is about half of the first sample. The firms in the second sample are thus larger (the mean value of SIZE = 7.460 versus 7.218) and more profitable (the mean value of EPSLAG = 1.761 versus 1.403 and that for CFO = 0.131 versus 0.119). And, on average, the equity compensation of the firms in the second sample is more sensitive to stock prices (OPT = 0.135 versus 0.124 and SHARE = 0.117 versus 0.103).

Table 2 presents the Spearman correlation coefficients for the same two samples. The coefficients for the sample with complete Compustat and ExecuComp data (the larger sample) are reported above the diagonal, and those for the sample with sufficient analyst forecasts and corporate governance data are reported below the diagonal. Coefficients in bold signify significance at the 5% level or less. The data show that option holding (OPT) is positively related to repurchases (REPUR) for both samples, and shareholding (SHARE) is only positively related to dividends (DIV) for the larger sample. Sample composition

Table 1
Descriptive statistics for the samples used for testing Hypothesis 1, the association between repurchases and dividends and executive equity incentives.

Variable	All observations with complete Compustat and ExecuComp data (N = 3939)			All observations with sufficient analyst forecasts and corporate governance data (N = 1915)		
	Mean	Median	Std Dev	Mean	Median	Std Dev
REPUR	0.024	0.000	0.037	0.026	0.012	0.037
DIV	0.008	0.000	0.011	0.009	0.007	0.011
OPT	0.124	0.099	0.099	0.135	0.110	0.104
SHARE	0.103	0.049	0.141	0.117	0.059	0.149
CFO	0.119	0.112	0.085	0.131	0.123	0.079
MKBK	1.772	1.473	1.040	1.841	1.536	1.045
RETURN	0.079	0.042	0.361	0.067	0.036	0.317
SIZE	7.218	7.074	1.426	7.460	7.312	1.394
CAPX	0.048	0.034	0.044	0.052	0.036	0.047
LEV	0.186	0.176	0.158	0.183	0.175	0.147
EPSLAG	1.403	1.270	1.633	1.761	1.550	1.530
STD_Sale	0.148	0.101	0.146	0.142	0.098	0.141
AGE	3.073	3.045	0.644	3.142	3.091	0.641
MB				0.733	1.000	0.442
OTDR				0.718	0.727	0.135

Variable definitions: REPUR = Repurchases of common stock scaled by market value of equity at the beginning of the year; DIV = Total dividends declared scaled by market value of equity at the beginning of the year; OPT = Option incentive ratio, = (0.01*stock price*number of options held by executives)/(SENSITIVE + salary + bonus); SHARE = Share incentive ratio, = (0.01*stock price*number of shares held by executives)/(SENSITIVE + salary + bonus); CFO = Cash flow from operations scaled by total assets at the beginning of the year; MKBK = Market value of assets (i.e., market value of equity plus debt) divided by book value of assets at the beginning of the year; RETURN = Percentage change in closing stock price from prior year; SIZE = Natural logarithm of total assets at the beginning of the year; CAPX = Capital expenditures scaled by total assets at the beginning of the year; LEV = Total debt divided by total assets at the beginning of the year; EPSLAG = Lagged value of earnings per share; STD_Sale = Standard deviation of sales scaled by assets over the previous three years; AGE = Natural logarithm of firm age; MB = A dummy variable equal to 1 if reported earnings meet or beat the last consensus analyst forecast, and 0 otherwise; OTDR = Percentage of outside directors.

Table 2
Correlation coefficients for Hypothesis 1 samples.

	REPUR	DIV	OPT	SHARE	CFO	MKBK	RETURN	SIZE	CAPX	LEV	EPSLAG	STD_Sale	AGE	MB
REPUR		**0.119**	**0.293**	**0.078**	**0.235**	**0.187**	**–0.052**	**0.248**	**0.033**	**–0.102**	**0.287**	**–0.140**	**0.052**	
DIV	**0.091**		0.014	**0.108**	0.014	**–0.116**	0.007	**0.359**	**0.100**	**0.154**	**0.342**	**–0.198**	**0.492**	
OPT	**0.299**	–0.002		**0.050**	**0.273**	**0.362**	**0.090**	**0.366**	0.011	–0.018	**0.227**	**–0.157**	0.019	
SHARE	0.043	0.034	0.002		**0.202**	**0.149**	**0.095**	**0.170**	**0.151**	–0.007	**0.250**	**–0.036**	**0.037**	
CFO	**0.193**	**–0.062**	**0.203**	**0.154**		**0.559**	**0.157**	0.005	**0.334**	**–0.234**	**0.324**	0.019	**–0.100**	
MKBK	**0.197**	**–0.150**	**0.328**	**0.122**	**0.581**		**–0.137**	**–0.166**	**0.130**	**–0.342**	**0.134**	–0.024	**–0.223**	
RETURN	**–0.063**	0.025	**0.073**	**0.070**	**0.120**	**–0.157**		0.007	–0.022	**0.066**	**–0.059**	–0.002	0.007	
SIZE	**0.252**	**0.344**	**0.380**	**0.149**	–0.027	**–0.162**	0.036		**0.071**	**0.394**	**0.410**	**–0.225**	**0.407**	
CAPX	0.014	0.031	–0.035	**0.146**	**0.369**	**0.134**	**–0.053**	0.018		0.015	**0.187**	–0.015	0.031	
LEV	**–0.080**	**0.158**	–0.023	–0.019	**–0.277**	**–0.356**	**0.088**	**0.365**	**–0.060**		**0.092**	**–0.059**	**0.218**	
EPSLAG	**0.248**	**0.273**	**0.178**	**0.210**	**0.216**	**0.053**	**–0.060**	**0.449**	**0.125**	**0.142**		**–0.055**	**0.237**	
STD_Sale	**–0.099**	**–0.191**	**–0.158**	–0.018	0.025	**–0.052**	0.001	**–0.216**	–0.001	**–0.094**	–0.038		**–0.141**	
AGE	**0.079**	**0.520**	**0.068**	0.041	**–0.115**	**–0.206**	0.027	**0.445**	–0.029	**0.223**	**0.233**	**–0.167**		
MB	**0.096**	–0.026	**0.165**	**0.045**	**0.108**	**0.096**	**0.100**	**0.103**	–0.022	**–0.065**	0.043	**–0.051**	–0.007	
OTDR	**0.152**	**0.138**	**0.193**	**–0.128**	0.005	–0.016	0.028	**0.162**	**–0.064**	**0.060**	**0.094**	**–0.087**	**0.203**	0.035

Spearman coefficients for the observations with complete Compustat and ExecuComp data are reported above the diagonal (N = 3939), and those for the observations with sufficient analyst forecasts and board of directors data are reported below the diagonal (N = 1915). Coefficients in bold are significant at the 5% level or less.

Variable definitions: REPUR = Repurchases of common stock scaled by market value of equity at the beginning of the year; DIV = Total dividends declared scaled by market value of equity at the beginning of the year; OPT = Option incentive ratio, = (0.01*stock price*number of options held by executives)/(SENSITIVE + salary + bonus); SHARE = Share incentive ratio, = (0.01*stock price*number of shares held by executives)/(SENSITIVE + salary + bonus); CFO = Cash flow from operations scaled by total assets at the beginning of the year; MKBK = Market value of assets (i.e., market value of equity plus debt) divided by book value of assets at the beginning of the year; RETURN = Percentage change in closing stock price from prior year; SIZE = Natural logarithm of total assets at the beginning of the year; CAPX = Capital expenditures scaled by total assets at the beginning of the year; LEV = Total debt divided by total assets at the beginning of the year; EPSLAG = Lagged value of earnings per share; STD_Sale = Standard deviation of sales scaled by assets over the previous three years; AGE = Natural logarithm of firm age; MB = A dummy variable equal to 1 if reported earnings meet or beat the last consensus analyst forecast, and 0 otherwise; OTDR = Percentage of outside directors.

appears to have an effect on the relationship between the dependent and independent variables, thus supporting our decision to report descriptive statistics and regression results for both samples.

As expected, many of the independent variables are also significantly correlated. For example, SIZE is significantly correlated with EPSLAG in both samples, indicating that larger companies have more stable earnings. We thus examine the variance inflation factors in our regressions to assess the potential effects of multicollinearity on the results.

Table 3 reports the results of our multivariate tests of H1. We use Tobit regression because REPUR and DIV have a lower bound of zero. The results for the repurchase regressions are presented in Panel A. The first two columns show the results for our baseline model, while the last two show the results for our extended model. The log likelihood ratio, which is a chi-square test of whether all regression coefficients are simultaneously zero, is significant for both models, indicating that at least one of the coefficients is significantly different from zero. The ancillary statistic _Sigma, the estimated standard error of the regression and equivalent to the root mean squared error in an OLS regression, is significant at the 5% level in both models, indicating that its estimated coefficient is significantly different from zero or that there is a substantial reduction in the residual variance. The results are unlikely to be affected by multicollinearity as the largest variance inflation factor is 7.87 in the baseline model and 7.15 in the extended model.

The coefficient of OPT in the baseline model is 0.085 ($p < 0.001$) and that of OPT*RULE is –0.062 ($p = 0.003$). The marginal effects of OPT and OPT*RULE on REPUR are 3.92% and –2.86%, respectively. Following Fenn and Liang (2001), we multiply the marginal effects by 100 and the standard deviation of OPT (0.099) to determine the economic significance of the OPT and OPT*RULE coefficients. This calculation shows that one standard deviation increase in OPT is associated with an increase in repurchases of 39 basis points (0.39), and that the effect is decreased by 28 basis points (0.28) after the effective date of the SEC rules. The decline is thus economically significant.

In the extended model, the coefficient for OPT is 0.078 ($p = 0.002$), while that for OPT*RULE is –0.063 ($p = 0.020$). The marginal effects of OPT and OPT*RULE on REPUR are 4.02% and –3.21%, respectively. The economic significance analysis suggests that one standard deviation increase in OPT (0.104) is associated with an increase in repurchases of 42 basis points, and that the effect is decreased by 33 basis points after 2006. Again, the decline is economically significant.

The significant positive coefficient for OPT suggests that when executives' option holdings are more sensitive to stock price, firms repurchase more stocks (Dittmar, 2000; Fenn and Liang, 2001; Sanders and Carpenter, 2003), while the significant negative coefficient on OPT*RULE suggests that the effect of executive option holdings on firm repurchases has declined after the implementation of the 2006 SEC expanded executive compensation disclosure rules. This result is consistent with the notion that the 2006 SEC rules, which provide increased potential for stakeholder scrutiny of compensation and payout decisions, have prompted executives to mitigate their self-interested behavior.

The significant positive coefficients on REPURLAG in the baseline and extended regressions suggest the importance of controlling for the correlation of repurchases over time. The insignificant negative coefficient on DIV indicates that the

Table 3
Tobit regression analysis for testing Hypothesis 1.

Panel A: Results with repurchases (REPUR) as the dependent variable

	Baseline regression		Extended regression	
	Estimate	P value	Estimate	P value
Intercept	–0.043	<0.001	–0.057	<0.001
OPT	0.085	<0.001	0.078	0.002
SHARE	–0.019	0.103	–0.020	0.207
OPT*RULE	–0.062	0.003	–0.063	0.020
SHARE*RULE	–0.002	0.902	0.002	0.921
REPURLAG	0.751	<0.001	0.790	<0.001
DIV	–0.044	0.696	–0.095	0.507
CFO	0.103	<0.001	0.082	0.001
MKBK	–0.003	0.067	–0.001	0.493
RETURN	–0.007	0.038	–0.009	0.043
SIZE	0.009	<0.001	0.008	<0.001
CAPX	–0.167	<0.001	–0.133	0.000
LEV	–0.069	<0.001	–0.059	<0.001
EPSLAG	0.004	<0.001	0.002	0.029
STD_Sale	–0.028	0.000	–0.007	0.487
AGE	–0.003	0.100	–0.001	0.716
MB			0.006	0.045
OTDR			0.019	0.056
GDPCHG	–0.003	0.293	–0.003	0.426
N	3939		1915	
Log likelihood	1732		1094	
_Sigma	0.052		0.048	

Panel B: Results with dividends (DIV) as the dependent variable

	Baseline regression		Extended regression	
	Estimate	P value	Estimate	P value
Intercept	–0.014	<0.001	–0.009	<0.001
OPT	–0.002	0.380	0.004	0.275
SHARE	0.006	<0.001	0.005	0.003
OPT*RULE	–0.002	0.603	–0.004	0.198
SHARE*RULE	–0.005	0.010	–0.005	0.030
DIVLAG	1.045	<0.001	0.980	<0.001
REPUR	0.005	0.199	0.007	0.115
CFO	0.011	<0.001	0.007	0.018
MKBK	0.000	0.689	0.000	0.680
RETURN	0.000	0.514	0.001	0.338
SIZE	0.000	0.000	0.000	0.096
CAPX	–0.007	0.097	–0.007	0.129
LEV	–0.003	0.014	–0.002	0.244
EPSLAG	0.001	<0.001	0.000	<0.001
STD_Sale	–0.005	<0.001	–0.005	<0.001
AGE	0.002	<0.001	0.002	<0.001
MB			0.000	0.195
OTDR			–0.003	0.049
GDPCHG	0.001	0.151	0.000	0.452
N	3939		1915	
Log likelihood	6184		3822	
_Sigma	0.014		0.006	

Year and Industry dummies are included in the regressions but their coefficients are not reported.
Variable definitions (variables not shown below are defined in the Appendix): REPUR = Repurchases of common stock scaled by market value of equity at the beginning of the year; DIV = Total dividends declared scaled by market value of equity at the beginning of the year; OPT = Option incentive ratio, = (0.01*stock price*number of options held by executives)/(SENSITIVE + salary + bonus); SHARE = Share incentive ratio, = (0.01*stock price*number of shares held by executives)/(SENSITIVE + salary + bonus); RULE = A dummy variable equal to 1 if the year of observation is 2006 or 2007, and 0 otherwise; DIVLAG = Lagged value of DIV; REPURLAG = Lagged value of REPUR; CFO = Cash flow from operations scaled by total assets at the beginning of the year; MKBK = Market value of assets (i.e., market value of equity plus debt) divided by book value of assets at the beginning of the year; RETURN = Percentage change in closing stock price from prior year; SIZE = Natural logarithm of total assets at the beginning of the year; CAPX = Capital expenditures scaled by total assets at the beginning of the year; LEV = Total debt divided by total assets at the beginning of the year; EPSLAG = Lagged value of earnings per share; STD_Sale = Standard deviation of sales scaled by assets over the previous three years; AGE = Natural logarithm of firm age; MB = A dummy variable equal to 1 if reported earnings meet or beat the last consensus analyst forecast, and 0 otherwise; OTDR = Percentage of outside directors; GDPCHG = Percentage change in real gross domestic product from prior year.

magnitude of repurchases is unrelated to the level of dividends.[16] The sign and significance for all other control variables are consistent with prior literature (Bens et al., 2003; Dittmar, 2000; Fenn and Liang, 2001; Gong et al., 2008; Kahle, 2002). In general, REPUR is positively related to cash (CFO), firm size (SIZE), earnings target (EPSLAG and MB), and percentage of outside directors (OTDR); and it is negatively related to stock performance (RETURN), investment opportunities (CAPX), and leverage ratio (LEV).

Panel B of Table 3 represents the results for the dividend regressions. Similar to Panel A, the first two columns show the results for our baseline model, while the last two show the results for our extended model. The log likelihood ratio is significant for both models, indicating that at least one of the coefficients is significantly different from zero. The ancillary statistic _Sigma is significant at the 1% level in both models, indicating that its estimated coefficient is significantly different from zero or that there is a substantial reduction in the residual variance. The results are unlikely to be affected by multicollinearity as the largest variance inflation factor is 7.88 in the baseline model and 7.19 in the extended model.

The coefficient of SHARE in the baseline model is 0.006 ($p < 0.001$) and that of SHARE*RULE is –0.005 ($p = 0.010$). The marginal effects of SHARE and SHARE*RULE on dividends are 0.33% and –0.26%, respectively. The economic significance analysis shows that one standard deviation increase in SHARE is associated with an increase in dividends of 4.7 basis points (0.047), and that the effect is decreased by 3.7 basis points (0.037) after the effectiveness of the rule.

In the extended model, the coefficient of SHARE is 0.005 ($p = 0.003$) and that of SHARE*RULE is –0.005 ($p = 0.030$). The marginal effects of SHARE and SHARE*RULE on dividends are 0.34% and –0.30%, respectively. The economic significance analysis suggests that one standard deviation increase in SHARE (0.149) is associated with an increase in dividends of 5.1 basis points (0.051), and that the effect is decreased by 4.5 basis points (0.045) after the effective date of the SEC rules.

The significant positive coefficient of SHARE suggests that after the 2003 tax cut, executives place more value on dividends as the sensitivity of their wealth to the firm's stock performance increases. However, the effect of executive shareholding on payment of dividends (SHARE*RULE) has declined significantly both statistically and economically after 2006, supporting H1. The insignificant coefficients on OPT and OPT*RULE suggest that over the 2004–2007 period, firms in our sample do not decrease their dividend payments as their OPT increases, and that behavior is not effected by the 2006 SEC rules.

The significant positive coefficients on DIVLAG in the baseline and extended regressions suggest executives' strong incentive to maintain last year's dividends as documented by prior survey and empirical studies (Aharony and Swary, 1980; Brav et al., 2005; Grullon et al., 2002; Healy and Palepu, 1988). The insignificant coefficient on REPUR indicates that firm share repurchase decisions have no effect on the dividend payout decisions. In general, payment of dividends is positively related to cash flow (CFO), firm size (SIZE), profitability (EPSLAG), and firm age (AGE); and it is negatively related to volatility of sales (STD_Sale) and percentage of outside directors (OTDR).

Overall, the results from Table 3 suggest that, while executive option holdings are positively associated with the incentives to favor repurchases to maximize the value of option holdings and executive stock holdings are positively associated with the incentives to favor payment of dividends for tax and liquidity reasons, the associations have significantly declined after the 2006 SEC rules.

4.2. Hypothesis 2: the association between earnings management and executive compensation incentives

The descriptive statistics for our samples for testing H2 are reported in Table 4. The first set of columns reports the descriptive statistics for the sample of firm-year observations with complete Compustat and ExecuComp data, i.e., the sample used in the baseline regression model (6) ($N = 3356$), while the second set reports the statistics for the sample of firm-year observations with complete Compustat, ExecuComp, analyst forecasts and corporate governance data, i.e., the sample used in the extended model (6) ($N = 1396$). Again, the firms in the second sample are larger (the mean value of SIZE = 7.360 versus 7.165). And, on average, the option holdings for these firms are more sensitive to stock prices (OPT = 0.162 versus 0.146). Also, consistent with prior literature (Cohen et al., 2008), the mean and median values of ATA, APROD, and ADISX are all negative.

Table 5 presents the Spearman correlation coefficients for the samples used for testing H2. The coefficients for the sample with complete Compustat and ExecuComp data (the larger sample) are reported above the diagonal, and those for the sample with sufficient analyst forecasts and corporate governance data are reported below the diagonal. Coefficients in bold signify significance at the 5% level or less. The data show that option holding (OPT) is negatively related to ATA, APROD and ADISX in both samples. Shareholding (SHARE) is negatively related to APROD in the larger sample, and BONUS is not correlated to any of the earnings management measures. All the control variables, except for OTDR, are significantly correlated to at least one of the earnings management measures, supporting our decision to control for these variables.

The multiple regression results for testing H2 are reported in Table 6. Panels A, B, and C report the results with ATA, APROD, and ADISX as the dependent variables, respectively. In all three panels, the first two columns report the results for our baseline model, in which Compustat and ExecuComp data comprise the explanatory variables, and the last two columns report the results for the extended model, where the meet or beat analysts' forecast dummy (MB) and corporate governance measure (OTDR) are added to the set of explanatory variables.

[16] This is contrary to the findings of some previous studies, e.g., Grullon and Michaely (2002).

Table 4
Descriptive statistics for the samples used for testing Hypothesis 2, the association between earnings management and executive compensation incentives.

Variable	All observations with complete Compustat and ExecuComp data (N = 3356)			All observations with sufficient analyst forecasts and corporate governance data (N = 1396)		
	Mean	Median	Std Dev	Mean	Median	Std Dev
ATA	–0.009	–0.007	0.053	–0.006	–0.004	0.043
APROD	–0.030	–0.034	0.176	–0.030	–0.030	0.164
ADISX	–0.029	–0.015	0.182	–0.026	–0.017	0.167
OPT	0.146	0.117	0.118	0.162	0.132	0.120
SHARE	0.100	0.046	0.138	0.108	0.057	0.140
BONUS	0.115	0.069	0.128	0.112	0.052	0.133
BTM	0.417	0.374	0.248	0.389	0.356	0.194
SIZE	7.165	7.025	1.405	7.360	7.192	1.373
LEV	0.179	0.169	0.156	0.171	0.166	0.143
STD_Sale	0.143	0.101	0.136	0.135	0.094	0.128
AGE	3.077	3.045	0.653	3.153	3.091	0.650
MB				0.755	1.000	0.430
OTDR				0.725	0.750	0.132

Variable definitions: ATA = Abnormal total accruals; APROD = Abnormal production costs; ADISX = Abnormal discretionary expenses; OPT = Option incentive ratio, = (0.01*stock price*number of options held by executives)/(SENSITIVE + salary + bonus); SHARE = Share incentive ratio, = (0.01*stock price*number of shares held by executives)/(SENSITIVE + salary + bonus); BONUS = Executive bonus/total compensation; BTM = Book value of equity divided by market value of equity as of the beginning of the year; SIZE = Natural logarithm of total assets at the beginning of the year; LEV = Total debt divided by total assets at the beginning of the year; STD_Sale = Standard deviation of sales scaled by assets over the previous three years; AGE = Natural logarithm of firm age; MB = A dummy variable equal to 1 if reported earnings meet or beat the last consensus analyst forecast, and 0 otherwise; OTDR = Percentage of outside directors.

In the baseline model in Panel A, the coefficient of BONUS is 0.066 ($p < 0.001$) and that of BONUS*RULE is –0.032 ($p = 0.043$). The results suggest that one standard deviation increase in BONUS (0.128) is associated with an increase in accruals manipulation by 0.84%, and that the effect is decreased by 0.41% after the SEC rules became effective. Extending the model to include the two additional explanatory variables increases the adjusted R-square from 0.287 to 0.306. The coefficient of BONUS slightly decreases to 0.054 ($p = 0.000$) and that of BONUS*RULE increases to –0.051 ($p = 0.009$). These results suggest that one standard deviation increase in BONUS (0.133) is associated with an increase in accruals manipulation by 0.718% before 2006, and that effect is decreased by 0.678% after the effective date of the SEC rules, 2006. The associations between option- and share-holdings do not change after 2006. The results are unlikely to be affected by multicollinearity as the largest variance inflation factor is 9.93 in the baseline model and 9.77 in the extended model.

Panel B presents the results with APROD as the dependent variable. Extending the model to include the two additional explanatory variables increases the adjusted R-square from 0.895 to 0.930. In both the baseline and the extended models, SHARE and BONUS are significantly and positively associated with APROD ($p < 0.001$). The associations decline significantly

Table 5
Correlation coefficients for Hypothesis 2 samples.

	ATA	APROD	ADISX	OPT	SHARE	BONUS	BTM	SIZE	LEV	STD_Sale	AGE	MB
ATA		**0.296**	**0.255**	**–0.171**	0.017	0.004	**0.083**	**–0.096**	**0.052**	0.016	**0.057**	
APROD	**0.206**		**0.799**	**–0.324**	**–0.039**	–0.004	**0.350**	**–0.103**	**0.085**	**0.160**	**0.054**	
ADISX	**0.210**	**0.762**		**–0.262**	0.027	0.019	**0.238**	**–0.052**	**0.098**	**0.103**	**0.085**	
OPT	**–0.124**	**–0.332**	**–0.312**		**0.045**	**–0.206**	**–0.365**	**0.363**	–0.025	**–0.140**	0.015	
SHARE	0.031	–0.037	0.022	0.000		**–0.190**	**–0.115**	**0.172**	–0.006	**–0.044**	**0.050**	
BONUS	0.014	–0.017	0.019	**–0.233**	**–0.217**		0.001	0.002	**0.056**	0.015	0.006	
BTM	**0.074**	**0.387**	**0.293**	**–0.370**	**–0.123**	–0.006		**–0.113**	0.016	0.017	0.018	
SIZE	**–0.082**	**–0.130**	–0.050	**0.375**	**0.153**	–0.040	**–0.168**		**0.397**	**–0.224**	**0.418**	
LEV	–0.006	**0.059**	**0.081**	–0.029	0.000	0.021	0.034	**0.387**		**–0.037**	**0.232**	
STD_Sale	–0.007	**0.168**	**0.113**	**–0.169**	**–0.058**	–0.017	**0.110**	**–0.239**	**–0.099**		**–0.175**	
AGE	**0.062**	**0.064**	**0.115**	0.043	0.051	–0.002	0.010	**0.471**	**0.253**	**–0.195**		
MB	–0.011	**–0.092**	**–0.100**	**0.169**	0.033	0.019	**–0.107**	**0.137**	–0.025	**–0.098**	–0.007	
OTDR	–0.032	0.009	0.015	**0.155**	**–0.094**	**–0.127**	–0.044	**0.211**	**0.126**	**–0.085**	**0.195**	0.012

Spearman coefficients for the observations with complete Compustat and ExecuComp data are reported above the diagonal (N = 3356), and those for the observations with sufficient analyst forecasts and board of directors data are reported below the diagonal (N = 1396). Coefficients in bold are significant at the 5% level or less.

Variable definitions: ATA = Abnormal total accruals; APROD = Abnormal production costs; ADISX = Abnormal discretionary expenses; OPT = Option incentive ratio, = (0.01*stock price*number of options held by executives)/(SENSITIVE + salary + bonus); SHARE = Share incentive ratio, = (0.01*stock price*number of shares held by executives)/(SENSITIVE + salary + bonus); BONUS = Executive bonus/total compensation; BTM = Book value of equity divided by market value of equity as of the beginning of the year; SIZE = Natural logarithm of total assets at the beginning of the year; LEV = Total debt divided by total assets at the beginning of the year; STD_Sale = Standard deviation of sales scaled by assets over the previous three years; AGE = Natural logarithm of firm age; MB = A dummy variable equal to 1 if reported earnings meet or beat the last consensus analyst forecast, and 0 otherwise; OTDR = Percentage of outside directors.

Table 6
Multiple regression analysis for testing Hypothesis 2.

Panel A: Results with abnormal accruals (ATA) as the dependent variable

Variable	Baseline regression		Extended regression	
	Estimate	P value	Estimate	P value
Intercept	0.053	<0.001	0.060	<0.001
OPT	0.052	0.000	0.034	0.074
SHARE	0.036	<0.001	0.034	0.003
BONUS	0.066	<0.001	0.054	0.000
OPT*RULE	–0.023	0.128	–0.016	0.408
SHARE*RULE	–0.009	0.450	–0.016	0.283
BONUS*RULE	–0.032	0.043	–0.051	0.009
PME	–0.361	<0.001	–0.422	<0.001
BTM	–0.040	<0.001	–0.063	<0.001
SIZE	–0.005	<0.001	–0.004	0.000
LEV	–0.030	<0.001	–0.048	<0.001
STD_Sale	0.002	0.737	0.007	0.473
AGE	0.008	<0.001	0.007	<0.001
MB			0.006	0.020
OTDR			–0.004	0.595
GDPCHG	–0.004	0.075	0.003	0.426
N	3356		1396	
Adjusted R-square	0.287		0.306	

Panel B: Results with abnormal production costs (APROD) as the dependent variable

Variable	Baseline regression		Extended regression	
	Estimate	P value	Estimate	P value
Intercept	0.063	<0.001	0.078	<0.001
OPT	0.141	<0.001	0.043	0.059
SHARE	0.081	<0.001	0.060	<0.001
BONUS	0.145	<0.001	0.089	<0.001
OPT*RULE	–0.087	<0.001	–0.026	0.266
SHARE*RULE	–0.026	0.081	–0.033	0.083
BONUS*RULE	–0.090	<0.001	–0.081	0.001
PME	–0.831	<0.001	–0.867	<0.001
BTM	–0.059	<0.001	–0.101	<0.001
SIZE	–0.003	0.007	–0.003	0.016
LEV	–0.088	<0.001	–0.099	<0.001
STD_Sale	0.050	<0.001	0.050	<0.001
AGE	0.009	<0.001	0.009	<0.001
MB			0.008	0.006
OTDR			0.002	0.837
GDPCHG	–0.002	0.482	0.010	0.012
N	3356		1396	
Adjusted R-square	0.895		0.930	

Panel C: Results with abnormal discretionary expenditures (ADISX) as dependent variable

Variable	Baseline regression		Extended regression	
	Estimate	P value	Estimate	P value
Intercept	0.078	<0.001	0.093	<0.001
OPT	0.206	<0.001	0.085	0.001
SHARE	0.094	<0.001	0.067	<0.001
BONUS	0.178	<0.001	0.102	<0.001
OPT*RULE	–0.117	<0.001	–0.045	0.072
SHARE*RULE	–0.027	0.086	–0.029	0.133
BONUS*RULE	–0.108	<0.001	–0.076	0.006
PME	–0.905	<0.001	–0.935	<0.001
BTM	–0.085	<0.001	–0.132	<0.001
SIZE	–0.004	0.002	–0.003	0.034
LEV	–0.098	<0.001	–0.106	<0.001
STD_Sale	0.031	0.001	0.036	0.005
AGE	0.010	<0.001	0.008	0.000
MB			0.008	0.014
OTDR			0.000	0.993
GDPCHG	0.001	0.813	0.013	0.003
N	3356		1396	
Adjusted R-square	0.882		0.921	

Year and Industry dummies are included in the regressions but their coefficients are not reported.
Variable definitions (variables not shown below are defined in the Appendix): ATA = Abnormal total accruals; APROD = Abnormal production costs; ADISX = Abnormal discretionary expenses; OPT = Option incentive ratio, = (0.01*stock price*number of options held by executives)/(SENSITIVE + salary + bonus); SHARE = Share incentive ratio, = (0.01*stock price*number of shares held by executives)/(SENSITIVE + salary + bonus); BONUS = Executive bonus/total compensation; RULE = A dummy variable equal to 1 if the year of observation is 2006 or 2007, and 0 otherwise; PME = Pre-managed earnings, = $IBEI_t/Assets_{t-1}$ – earnings management $proxy_t$, which could be ATA, ADISX, APROD, consistent with the dependent variable used in regression (6); BTM = Book value of equity divided by market value of equity as of the beginning of the year; SIZE = Natural logarithm of total assets at the beginning of the year; LEV = Total debt divided by total assets at the beginning of the year; STD_Sale = Standard deviation of sales scaled by assets over the previous three years; AGE = Natural logarithm of firm age; MB = A dummy variable equal to 1 if reported earnings meet or beat the last consensus analyst forecast, and 0 otherwise; OTDR = Percentage of outside directors; GDPCHG = Percentage change in real gross domestic product from prior year.

after the effective date of the SEC rules. For example, in the extended model, one standard deviation increase in SHARE (0.140) is associated with an increase in APROD of 0.84% (0.140*0.060) and the effect is decreased by 0.46% (0.140*0.033) after the rules became effective. Also, one standard deviation increase in BONUS (0.133) is associated with an increase in APROD by 1.18% (0.133*0.089) and the effect is decreased by 1.08% (0.133*0.081) after the rules became effective. The results for OPT is not consistent across the two models. Only in the first model do we observe a significant decline in the association between OPT and APROD after the effective date of the 2006 SEC rules. The largest variance inflation factor is 9.82 in the baseline model and 9.65 in the extended model, suggesting that the results are unlikely to be affected by multicollinearity.

Panel C shows that OPT and BONUS are significantly and positively associated with ADISX ($p < 0.001$). The associations decline significantly after the effective date of the SEC rules. For example, in the extended model, one standard deviation increase in OPT (0.120) is associated with an increase in ADISX of 1.02% (0.120*0.085); that effect decreases by 0.54% (0.120*0.045) after the rules became effective. Also, one standard deviation increase in BONUS (0.133) is associated with an increase in ADISX of 1.36% (0.133*0.102); that effect decreases by 1.01% (0.133*0.076) after the SEC rules became effective. The results for SHARE are inconsistent across the two models. Only in the first model do we observe a marginal decline in the association between SHARE and ADISX after the effective date of the SEC rules. Similar to other regressions, extending the model to include the two additional explanatory variables increases the adjusted R-square, in this case from 0.882 to 0.921. Again, the results are unlikely to be affected by multicollinearity as the largest variance inflation factor is 9.76 in the baseline model and 9.63 in the extended model.

For all the regressions, consistent with the view that firms have strong desire to smooth earnings, we find consistently negative coefficients on pre-managed earnings (PME). Our results show that controlling for firms' incentives to smooth earnings, firms manipulate earnings upward through either discretionary accruals, overproduction, or reduction of discretionary expenditures to a greater extent as executive option holdings and shareholdings are more sensitive to their firm's stock price, and as their bonus payments represent a higher proportion of their total compensation. More importantly, after the effective date of the 2006 SEC rules, the instances in which firms manipulate earnings upward through either accruals management or real earnings management, which would maximize the value of executive option- and share-holdings and bonus payments, have declined. And the decline is economically significant. These results provide support for H2.

5. Summary and conclusions

Compensation in the form of options motivates executives to favor firm share repurchase over dividend payment because executive options are seldom "dividend protected" and repurchase increases the share value (Aboody and Kasznik, 2008; Bartov et al., 1998; Bratton, 2006; Dittmar, 2000; Fenn and Liang, 2001; Jolls, 1998; Lambert et al., 1989). Stock ownership, on the other hand, motivates executives to favor firm payment of dividends over repurchase because of the reduction in the cost of dividends after the enactment of the 2003 Jobs and Growth Tax Relief Reconciliation Act and because of liquidity reasons (Aboody and Kasznik, 2008; Brown et al., 2007). Also, because the value of option holdings and shareholdings depends on the firm's stock performance, executives have stronger incentives to manipulate earnings upward when their compensation is more sensitive to the value of the equity of their firm (Bergstresser and Philippon, 2006; Burns and Kedia, 2006; Weber, 2006). And, executives have an incentive to manipulate earnings to maximize bonus compensation (Cheng and Warfield, 2005; Gaver et al., 1995; Healy, 1985).

In 2006, following a number of executive option scandals, and finding that the current executive compensation disclosure rules failed to provide investors with a true picture of compensation, the SEC adopted extensive amendments to the U.S. public issuer disclosure requirements for top executive compensation and stock ownership. The intent was to provide investors with a clearer and more complete picture of compensation paid to principal executives, and thus reduce the information asymmetry between executives and stakeholders. The more comprehensive information provided to stakeholders increases their potential to identify and act in response to self-interested behavior by executives, and the prospect of action by stakeholders may be expected to curb such executive behavior.

In this paper, we analyze the effects of the 2006 amendments on the association between equity-based incentives for executives and firm payout choices, and between executive compensation and earnings management. In our analysis, we control for the substitution effect of repurchases and dividend payouts, the incentives to maintain the payout policy, and various factors that are associated with company payout policy and earnings management.

The results are consistent with prior studies: executive option holding is positively associated with firm repurchases, and executive stock ownership is positively associated with dividend payouts. More importantly, we find that after the effective date of the SEC rules, the positive associations between executive option holdings and firm repurchases, and between executive shareholdings and dividend payouts, have weakened. In addition, the positive associations between bonus and discretionary accruals, between bonus and real earnings management, and between option- and share-holdings and real earnings management, have all decreased. In general, these findings are consistent with the notion that the 2006 SEC disclosure rules have made it easier and less costly for stakeholders to obtain more comprehensive information regarding executive compensation, and to detect correspondences between that information and firm payout and earnings management policies. The reduced information asymmetry between executives and stakeholders, and the resulting potential for stakeholder response, correspond to a preemptive reduction by executives of self-interested actions.

Our paper makes three contributions. First, it provides further support to prior literature on the association between executive equity incentives and firm payout policy, and the importance of controlling for the historical payout policy. Second,

we show that after the effective date of the 2006 SEC disclosure rules, executives' opportunistic actions have declined. That is, the 2006 SEC disclosure rules were effective in reducing executives' self-interested actions. Third, we add to the discussion on the trends in accrual and real earnings management. While Cohen et al. (2008) find a decrease in the association between equity holdings and accruals management concurrent with an increase in the association between equity holdings and real earnings management after the passage of SOX, we show that the executive compensation-driven accruals management and real earnings management both declined after 2006.

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Appendix. Variable definitions

DIV	Total dividends declared scaled by market value of equity at the beginning of the year
REPUR	Repurchases of common stock scaled by market value of equity at the beginning of the year
SENSITIVE	Sensitivity of shares and options to stock price, = 0.01*stock price*(number of shares held by executives + number of options held by executives)
OPT	Option incentive ratio, = (0.01*stock price*number of options held by executives)/(SENSITIVE + salary + bonus)
SHARE	Share incentive ratio, = (0.01*stock price*number of shares held by executives)/(SENSITIVE + salary + bonus)
RULE	A dummy variable equal to 1 if the year of observation is 2006 or 2007, and 0 otherwise
DIVLAG	Lagged value of DIV
REPURLAG	Lagged value of REPUR
CFO	Cash flow from operations scaled by total assets at the beginning of the year
MKBK	Market value of assets (i.e., market value of equity plus debt) divided by book value of assets at the beginning of the year
RETURN	Percentage change in closing stock price from prior year
SIZE	Natural logarithm of total assets at the beginning of the year
CAPX	Capital expenditures scaled by total assets at the beginning of the year
LEV	Total debt divided by total assets at the beginning of the year
EPSLAG	Lagged value of earnings per share
STD_Sale	Standard deviation of sales scaled by assets over the previous three years
AGE	Natural logarithm of firm age
GDPCHG	Percentage change in real gross domestic product from prior year
MB	A dummy variable equal to 1 if reported earnings meet or beat the last consensus analyst forecast, and 0 otherwise
OTDR	Percentage of outside directors
IBEI	Income before extraordinary items
TA	Total accruals, = IBEI – Cash flow from operations
PROD	Production costs, = cost of goods sold + change in inventory
DISX	Discretionary expenses, = R&D + Advertising + SG&A (Selling, general and administrative expenses) – missing values of advertising and R&D expenses are set to zero as long as SG&A value is available
PPE	Property, plant and equipment
ATA	Abnormal total accruals, = Residual from the following regression for each two-digit SIC industry per year: $TA_t/Assets_{t-1} = \alpha_0(1/Assets_{t-1}) + \alpha_1(\Delta Sales_t/Assets_{t-1}) + \alpha_2(PPE_t/Assets_{t-1}) + \alpha_3(IBEI_t/Assets_{t-1}) + \acute{\varepsilon}_t$
APROD	Abnormal production costs, = Residual from the following regression for each two-digit SIC industry per year: $PROD_t/Assets_{t-1} = \alpha_0(1/Assets_{t-1}) + \alpha_1(Sales_t/Assets_{t-1}) + \alpha_2(\Delta Sales_t/Assets_{t-1}) + \alpha_3(\Delta Sales_{t-1}/Assets_{t-1}) + \acute{\varepsilon}_t$
ADISX	Abnormal discretionary expenses, = Residual from the following regression for each two-digit SIC industry per year multiplied by –1: $DISX_t/Assets_{t-1} = \alpha_0(1/Assets_{t-1}) + \alpha_1(Sales_{t-1}/Assets_{t-1}) + \acute{\varepsilon}_t$
BONUS	Executive bonus/total compensation
PME	Pre-managed earnings, = $IBEI_t/Assets_{t-1}$-–earnings management $proxy_t$, which could be ATA, ADISX, APROD, consistent with the dependent variable used in regression (6)
BTM	Book value of equity divided by market value of equity as of the beginning of the year

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