

The Effects of Option Incentives on Backdating and Earnings Management

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ABSTRACT

This paper examines how various elements of CEOs' option portfolios create conflicting incentives for both earnings management and option backdating, and investigates the link between these two opportunistic actions in order to explain the effects. We find that higher incentives from newly granted options are associated with income-decreasing earnings management and higher incidence of backdating, whereas higher incentives from unvested outstanding options are related to income-increasing earnings management and lower incidence of backdating. However, incentives from vested outstanding options have an insignificant effect on both earnings management and backdating. As we further show that CEOs engaging in option backdating are more likely to use income-decreasing earnings management to get more favorable share price for their new option grants as well, the need for managers to diversify the increased-risk associated with stock-based compensation can clearly explain the effects of CEOs' outstanding options on both earnings management and the occurrence of backdating.

JEL Classifications: G30, G34, M41, M52

Keywords: backdating; earnings management; stock options; pay-for-performance sensitivity

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I. INTRODUCTION

CEO stock options are typically granted at-the-money, where the exercise price of the option is set at the market price on the grant date. Lower share price on the grant date and price appreciation afterwards can help managers profit from their option compensation. Previous research suggests that managers can pursue a variety of opportunistic managerial behaviors to increase the value of their option grants, including backdating option grants to periods of lower share prices (Yermack, 1997; Aboody and Kasznik, 2000; Chauvin and Shenoy, 2001; Lie, 2005; Heron and Lie, 2007; and Narayanan and Seyhun, 2006), or decreasing earnings to suppress share price when options are granted (Baker, Collins, and Reitenga, 2003; Cheng and Warfield, 2005; Bergstresser and Philippon, 2006; Cornett, Marcus, and Tehranian, 2008; McAnally, Srivastava, and Weaver, 2008). In other words, newly granted options induce CEOs to engage in either option backdating or downwards earnings management. But CEOs' option portfolios do not include only newly granted options. In addition to new options granted in the current year, CEOs' option portfolios also have vested and unvested outstanding options that CEOs retain from their grants in previous years. These two elements can also motivate CEOs to pursue self-interest. Therefore, the purpose of this paper is to examine how various elements of CEOs' option portfolios create conflicting incentives for both earnings management and option backdating, and investigate the link between the two opportunistic behaviors in order to explain the effects.

We examine a sample of 9,568 CEO-year observations in Standard & Poor's Execucomp database from 1992 through 2005, among which 685 CEO years are labeled as the potential backdaters according to the methodology in Collins, Gong and Li (2009), and 8,883 CEO years are labeled as the benchmark firms. We first test the effects of various elements of CEOs' option portfolios on accrual-based earnings management and the occurrence of backdating separately. Given the conflicting effects of various option elements on both earnings management and option backdating, we then examine the link between these two opportunistic actions in order to explain the effects.

Our main findings are as the following. We find that higher incentives from newly granted options are associated with income-decreasing earnings management and higher incidence of backdating, whereas higher incentives from unvested options are related to income-increasing earnings management and lower incidence of backdating. However, incentives from vested options have an insignificant effect on both earnings management and backdating. We further show that negative total accruals and discretionary accruals are associated with higher likelihood of backdating, which suggests that CEOs engaging in option backdating are more likely to use income-decreasing earnings management to get more favorable price for their new option grants as well.

Due to the correlation between downward earnings management and option backdating, the need for managers to diversify the increased-risk associated with stock-based compensation (Ofek and Yermack, 2000; Cheng and Warfield, 2005) can clearly explain the effects of CEOs' outstanding options on both earnings management and the occurrence of backdating. Those managers with high incentives from unvested options in a given year are more likely to take income-increasing accruals to beat-up short-term

stock price when they sell stock to diversify risk (Cheng and Warfield, 2005), and then have disincentives for backdating. However, we further show that the negative relation between unvested options and the occurrence of backdating is largely driven by managers with less persistent incentives from unvested options. Those managers with highly persistent incentives from unvested options are more willing to bear the risk involved in their compensation. As a result, they have lower incentives for upward earnings management for selling purpose and then have a less motivation to reduce the incidence of backdating. In addition, by the time that options become exercisable, vested options likely have a constant hedge ratio and generate no needs for further risk diversification (Cheng and Warfield, 2005), and produce unclear preferences for the choice of accrual-based earnings management¹. Due to the insignificant effect on earnings management, vested options do not generate a significant effect on backdating either.

Our paper provides new evidence on the conflicting effects of various option elements on both option backdating and earnings management. Especially, we study the occurrence of backdating in previously unexplored situations where managers face conflicting incentives from newly granted options and outstanding options. We are not aware of any previous studies that investigate the occurrence of backdating relate to such conflicting incentives. For example, Collins, Gong and Li (2009) only consider the effect of newly granted options on backdating. Minnick and Zhao (2009) use a variable of pay-for-performance sensitivity of total option holdings, which include, but do not distinguish, newly granted options and outstanding options. Therefore, our study is the first to examine how conflicting incentives associated with various option elements affect the occurrence of option backdating.

Furthermore, our paper extends the literature on backdating and earnings management. The prior studies *separately* examine backdating and option grant related earnings management. We combine and extend the two strands of literature by providing new evidence that self-serving CEOs are likely to take both opportunistic actions at the same time when they are granted options.

In addition, our findings have implications for corporate executive compensation policies. The evidence that managers take into account the conflicting incentives from their whole option portfolios in determining their opportunistic actions should be of interest to board of directors who contemplate compensation contracts for managers. The findings that indicate *multiple* opportunistic actions related to option grants are also relevant to the current public policy debate regarding options and executive pay in general.

The paper proceeds as follows. In Section II we briefly review the literature and develop our hypotheses. Section III describes our sample and data. Section IV presents empirical tests and results, and Section V concludes the paper.

II. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

A. Literature Review

Option grants to CEOs are designed to align the interests of managers with those of shareholders (Jensen and Meckling, 1976; Jensen and Murphy, 1990). However, the literature also documents that option awards can induce opportunistic behaviors by

management. For example, one line of research suggests that managers manipulate the timing of option award dates as a means of increasing the fair value of their awards (Yermack, 1997; Aboody and Kasznik, 2000; Chauvin and Shenoy, 2001; Lie, 2005; Heron and Lie, 2007; and Narayanan and Seyhun, 2006). Specifically, options are found to be awarded prior to increases in stock price, and after decreases in stock price. The other line of research suggests that option grants emerge as a particularly strong predictor of income-decreasing earnings management (Baker, Collins, and Reitenga, 2003; Cheng and Warfield, 2005; Bergstresser and Philippon, 2006; Cornett, Marcus, and Tehranian, 2008; McAnally, Srivastava, and Weaver, 2008), which can directly benefit managers via lower strike price of their option awards.

B. Hypotheses Development

The literature has shown that new option grants create incentives for CEOs to manipulate exercise prices, either through backdating or through downward earnings management. However, the option portfolios that CEOs hold not only include new options that are granted in the current year, but also retain unexercised vested and unvested options that are granted in previous years. These two elements can also motivate CEOs to pursue self-interest and affect the selection of opportunistic managerial actions such as earnings management and option backdating.

The incentives from outstanding options for earnings management can arise from either risk diversifications or option exercises. When a manager is granted options, the options usually are not exercisable until three or four years later. As unvested options cannot be exercised immediately, the effect of unvested options on earnings management through option exercises is unclear. However, managers with high incentives from unvested options have more needs to diversify increased risk associated with stock-based compensation and tend to sell shares. Because of the selling, managers have a motivation to increase the short-term stock price through income-increasing earnings management. Consistent with this argument, Cheng and Warfield (2005) find managers with high incentives from unvested options are more likely to report earnings that meet or just beat analysts' forecast.

Different from unvested options, vested options are exercisable. If managers choose to exercise their vested options, they have a motivation to take income-increasing accruals to beat up short-term stock price, as price appreciation can benefit their option exercises. However, managers can choose to hold their vested options instead and have incentives to manage earnings downward in the current period to reserve good earnings for the future when they decide to exercise. Therefore, the choice of earnings management associated with vested options through option exercises differs across firms and over time, depending on the relative value of the options to be exercised in the current period and the discounted value of options to be exercised in the future (Srivastava, 2005). As a result, the effect of vested options on earnings management through option exercises can be inconsistent. Similarly, the risk diversification argument also predicts an insignificant association between incentives from vested options and earnings management. It is because that by the time when options become exercisable, options likely have a constant hedge ratio and generate no needs for further risk diversification (Cheng and Warfield, 2005).

In sum, earnings management can not only benefit managers' newly granted options, but also affect managers' profit from outstanding options. Therefore, we develop the following hypothesis:

Hypothesis 1: Accrual-based earnings management is negatively associated with incentives from newly granted options, and positively associated with incentives from unvested outstanding options. However, there is no significant association between accrual-based earnings management and incentives from vested options.

Next, we want to examine the effects of vested and unvested outstanding options on the occurrence of option backdating. The practice of using hindsight to select a date in the past as the option grant date is supposed to affect the new option grants only. However, if option backdating correlates with earnings management, incentives from outstanding options can also affect the incidence of option backdating. On the one hand, if managers can easily backdate their options and already secure gains from their option compensation, it is possible that they are less interested in managing earnings. On the other hand, it is also reasonable for self-serving CEOs to take both opportunistic actions at the same time to reap even greater profits from their newly granted options. Especially, those CEOs who engage in backdating are considered to have more influences over board of directors (Collins, Gong, and Li, 2009). Consequently, they can also be more likely to circumvent board monitoring to manipulate earnings for their own benefits. If managers engage in option backdating and downward earnings management at the same time, incentives driven by outstanding options for backdating will be different from those by newly granted options, since they have conflicting effects on earnings management. Specifically, as we test in Hypothesis 1, unvested outstanding options can create a preference for earnings management in a direction opposite to newly granted options, whereas vested outstanding options do not have a significant correlation with earnings management. Therefore, we test the following hypothesis:

Hypothesis 2: The incidence of option backdating is positively associated with incentives from newly granted options, and negatively associated with incentives from unvested outstanding options. However, there is no significant association between the incidence of option backdating and incentives from vested options.

III. SAMPLE AND DATA

To study the effects of CEO option incentives on earnings management and CEO option backdating, we start with a sample of CEOs from the Execucomp database by restricting our attention to nonfinancial and non-utilities firms with available data for CEO compensation, tenure, age, and option portfolio data in the years between 1992 and 2005.

We then collect CEO stock option grant data from Thomson Financial Insider Trading database for our initial sample, after eliminating multiple grants that occur on the same date. The Insider Trading database provides data on insider trading activities reported on SEC forms 3, 4, 5, and 144. Following Collins, Gong, and Li (2006), we label a firm in a given year as a potential backdater if the stock price on at least one

grant date in that year falls within the lowest decile over 120 trading days before and 120 trading days after the grant date. A firm in a given year is labeled as a benchmark firm if the stock prices on all grant dates in that year do not fall in the bottom decile of the firm's 240-day stock price distribution.

In addition, we employ accounting data from Compustat, stock return data from the Center for Research in Security Prices (CRSP), board data from the Corporate Library and proxy statements, and institutional ownership data from CDA Spectrum. To be included in the final sample, a firm must have data available from all the above sources for a given year. The requirement results in a sample of 9,568 CEO-year observations, among which 685 CEO years are for the potential backdaters and 8,883 CEO years are for the benchmark firms.

A. Measures of Earnings Management

Following the literature (Dechow, Sloan, and Sweeney, 1995; Bartov, Gul, and Tsui, 2001; Bergstresser and Philippon, 2006; Cornett, Marcus, Tehranian, 2008), we construct total accruals and discretionary accruals as our measures of earnings management.

In order to construct the variable of total accruals, we first calculate earnings before extraordinary items and discontinued operations minus operating cash flows from continuing operations (Cornett, Marcus, Tehranian, 2008). We then divide the number by the previous year's assets to obtain the measure of total accruals (*Ratio_ta*).

After the calculation of total accruals, we use the modified Jones (1991) model to construct the variable of discretionary accruals. Discretionary accruals equal the difference between total accruals and "normal" accruals. The modified Jones model estimates "normal" accruals as a fraction of lagged assets from the following model:

$$\frac{TA_{jt}}{Assets_{jt-1}} = \alpha_0 \frac{1}{Assets_{jt-1}} + \beta_1 \frac{\Delta Sales_{jt}}{Assets_{jt-1}} + \beta_2 \frac{PPE_{jt}}{Assets_{jt-1}} \quad (1)$$

where TA_{jt} denotes total accruals for firm j in year t , $Assets_{jt-1}$ denotes total assets for firm j in year $t-1$, $\Delta Sales_{jt}$ denotes a change in sales for firm j in year t , and PPE_{jt} denotes property, plant, equipment for firm j in year t . We estimate model (1) by using the firms in Compustat with the same two-digit SIC code as our sample firms in each year of the sample period.

Discretionary accruals then are defined as a fraction of assets as

$$Ratio_da_{jt} = Ratio_ta_{jt} - \left(\hat{\alpha}_0 \frac{1}{Assets_{jt-1}} + \hat{\beta}_1 \frac{\Delta Sales_{jt} - \Delta Receivables_{jt}}{Assets_{jt-1}} + \hat{\beta}_2 \frac{PPE_{jt}}{Assets_{jt-1}} \right) \quad (2)$$

where hats denote estimated values from model (1). The inclusion of $\Delta Receivables_{jt}$ in equation (2) is the "modification" of the Jones (1991) model. This variable attempts to capture the extent to which a change in sales is due to aggressive recognition of questionable sales.

In addition to Ratio_{ta} and Ratio_{da}, we also use other variables derived from these two measures of earnings management, in order to capture changes in accruals between years, or to distinguish different directions of accruals. Please see the Appendix for the definition of these variables.

B. Measures of CEO Option Incentives

To examine the effects of the level of option incentives on earnings management and the likelihood of backdating, we use three measures of the pay-for-performance sensitivity: Pps_{new}, Pps_{vest}, and Pps_{unvest}. Pps_{new} is the pay performance sensitivity of newly granted options, which is the value change in CEO's newly granted options in the current year for 1000-dollar change in the market value of equity. Pps_{vest} is the pay performance sensitivity of exercisable outstanding options that are granted from previous years and CEOs retain in their portfolios. Similarly, Pps_{unvest} is the pay performance sensitivity of unexercisable outstanding options.

To capture the value of option sensitivity, we begin by calculating the partial derivative of individual stock option with respect to one-dollar change in share price (the Black and Scholes (1973) hedge ratio with dividends, i.e., delta), times the proportion of shares represented by executive option award (see, Yermack, 1995). The risk-free rate is the interest rate on seven-year constant-maturity Treasury bond, obtained from the website of the Federal Reserve Bank of St. Louis, and the volatility (i.e., Volat in the Appendix) is the standard deviation of stock price over the prior sixty months. For previously granted options, we follow Core and Guay's methodology (2002) to estimate the average exercise prices.

C. Measures of Other Governance Variables, Firm Characteristics, and CEO Characteristics

In order to examine the effects of CEO option incentives on the incidence of backdating and earnings management, we also control for various firm characteristics, CEO characteristics, and other governance characteristics such as board characteristics, institutional ownership, and CEO ownership, by following the backdating and earnings management literature. The Appendix defines the above variables in details.

In the following analysis, we winsorize all the variables except Ceoown at the top and bottom 1% of the observations, in order to mitigate the inordinate influence of extreme values.

IV. EMPIRICAL ANALYSIS AND RESULTS

Table 1 presents the descriptive statistics of the key variables for our sample. The five panels provide information on earnings management, CEO option incentives, other governance variables, firm characteristics, and CEO characteristics.

In addition, Table 2 reports correlations between our key variables. Both the correlation matrix and variance influence factors (VIF) do not indicate problematic multicollinearity for our regression models in the following sections.

Table 1
Summary statistics

The table reports the descriptive statistics for the key variables for the sample over 1992 through 2005. The variables are defined in the Appendix. The major variables are winsorized at the top and bottom 1% of the observations. Mve and Nisd are in million dollars.

Variable	Obs.	Mean	Median	Std. Dev.	10%	90%
Panel A: Earnings management						
Ratio_ta	9568	-0.067	-0.058	0.085	-0.154	0.012
Ratio_da	9568	0.149	0.011	1.777	-0.189	0.508
Dev_rta	9381	-0.005	0.000	0.089	-0.095	0.078
Dev_rda	9288	0.043	-0.001	2.148	-0.691	0.527
Neg_ta	9568	0.865	1.000	0.342	0.000	1.000
Neg_da	9568	0.448	0.000	0.497	0.000	1.000
Panel B: CEO compensation						
Pps_new	9568	1.8800	0.8400	3.216	0.000	4.711
Pps_vest	9568	6.2500	3.5500	8.014	0.000	15.811
Pps_unvest	9568	2.2100	0.9500	3.416	0.000	6.019
Panel C: Other governance variables						
Ceoown	9568	2.344%	0.000%	6.172%	0.000%	6.800%
Ln_ninst	9568	4.978	4.949	0.786	4.025	5.994
Instown	9568	63.844%	65.853%	18.081%	38.331%	85.965%
Ln_bdsiz	9568	2.185	2.197	0.279	1.792	2.565
Pctbdind	9568	63.767%	66.667%	17.458%	40.000%	85.714%
Duality	9568	0.657	1.000	0.475	0.000	1.000
Panel D: Firm characteristics						
Mve	9568	6370.577	1328.494	16,156,293,60	204,947,00	13,837,100,00
Lev	9568	0.200	0.148	0.197	0.000	0.487
Nisd	9568	135.874	30.832	319,823,421	4,899,060	326,743,000
Q	9568	2.126	1.649	2.126	1.035	3.661
Ln_ta	9568	7.140	6.978	1.503	5.340	9.260
Volat	9568	0.428	0.382	0.183	0.200	0.700
Panel E: CEO characteristics						
Age	9568	55.613	56.000	7.292	46.000	64.000
Ceotenure	9568	7.411	5.000	7.402	1.000	18.000

Table 2
Correlation matrix

The table reports the correlation matrix for the key variables for the sample over 1992 through 2005. The variables are defined in the Appendix.

	Ratio_ta	Ratio_da	Pps_new	Pps_vest	Pps_unvest	Ceoown	Ln_ninst	Instown	Ln_bdsiz	Pctbdind	Duality	Mve	Lev	Nisd	Q	Ln_ta	Volat	Age	Ceotenure
Ratio_ta	1.00																		
Ratio_da	0.04	1.00																	
Pps_new	-0.08	0.01	1.00																
Pps_vest	-0.01	0.00	-0.01	1.00															
Pps_unvest	-0.01	0.00	-0.01	0.99	1.00														
Ceoown	0.04	-0.01	-0.15	0.00	0.00	1.00													
Ln_ninst	0.03	0.00	0.15	0.01	0.01	-0.21	1.00												
Instown	0.05	0.01	0.10	0.00	0.00	-0.26	0.43	1.00											
Ln_bdsiz	0.07	-0.01	-0.05	0.00	0.00	-0.18	0.40	-0.05	1.00										
Pctbdind	-0.02	0.00	0.08	0.00	0.00	-0.24	0.20	0.24	0.09	1.00									
Duality	0.04	0.00	-0.04	0.00	0.00	0.13	0.15	0.04	0.11	0.11	1.00								
Mve	-0.01	0.00	0.08	0.00	0.00	-0.05	0.56	-0.02	0.29	0.07	0.09	1.00							
Lev	-0.03	0.00	-0.12	-0.01	0.00	-0.05	-0.15	-0.08	0.19	0.03	0.07	-0.10	1.00						
Nisd	-0.09	0.01	0.06	0.00	0.00	-0.08	0.43	-0.02	0.25	0.10	0.07	0.56	0.12	1.00					
Q	-0.11	-0.01	0.18	0.00	0.00	0.05	0.20	0.01	-0.12	-0.03	-0.03	0.20	-0.40	-0.03	1.00				
Ln_ta	0.03	0.00	0.04	0.01	0.01	-0.16	0.79	0.21	0.55	0.17	0.20	0.55	0.28	0.55	-0.19	1.00			
Volat	-0.18	0.06	0.21	0.02	0.02	0.03	-0.29	-0.05	-0.43	-0.03	-0.17	-0.19	-0.01	-0.02	0.10	-0.38	1.00		
Age	0.09	0.00	-0.17	-0.01	-0.01	0.13	0.06	-0.01	0.13	-0.01	0.28	0.05	0.07	0.02	-0.12	0.15	-0.23	1.00	
Ceotenure	0.06	-0.01	-0.11	0.00	0.00	0.39	-0.04	-0.05	-0.08	-0.17	0.25	-0.02	-0.07	-0.08	0.02	-0.06	-0.04	0.40	1.00

A. The Effects of Various Option Elements on Earnings Management

We run regressions of accrual-based earning management against variables for incentives from various option elements and the other variables defined in Section III. We estimate the following equation:

$$\begin{aligned} \text{Accruals}_{it} = & \beta_0 + \beta_1 \text{CEOOptionIncentives}_{it} + \beta_2 \text{OtherGovernance}_{it} \\ & + \beta_3 \text{FirmCharacteristics}_{it} + \beta_4 \text{CEOCharacteristics}_{it} + \varepsilon_{it} \end{aligned} \quad (3)$$

Variables for option incentives (i.e., Pps_new, Pps_vest, and Pps_unvest) will enter one at a time before all of them are put together to test their conflicting effects.

Table 3 presents the results.² When only Pps_new is included, higher incentives from newly granted options are significantly related to decreasing total accruals and greater decreases in total accruals from the prior three-year average. When only Pps_vest is included, incentives from vested outstanding options are not significantly related to any accrual measures. When only Pps_unvest is included, on the one hand, higher incentives from unvested outstanding options are significantly correlated with increasing total accruals, greater increases in total accruals from the prior three-year average, and lower likelihood of negative total accruals. On the other hand, higher incentives from unvested options are also related to lower discretionary accruals and greater decreases in discretionary accruals from the prior three-year average. However, the latter relation is only marginally significant. When all the option incentives are included as in Table 3, Pps_new is significantly related to decreasing total accruals and greater decreases in total accruals from the prior three-year average. Pps_unvest is significantly related to increasing total accruals, greater increase in total accruals from the prior three-year average, and lower likelihood of negative total accruals. At the same time, incentives from vested outstanding options continue to have no significant relationship with any accrual measures. Therefore, the results suggest that on average high incentives from newly granted options decrease earnings and high incentives from unvested options increase earnings via accruals.

Table 3

OLS regression of the effects of various option elements on earnings management

The table shows the coefficients from OLS regressions of incentives from various option elements on earnings management. The dependent variables and the independent variables are defined in the Appendix. The major variables are winsorized at the top and bottom 1% of the observations. The variance inflation factors (VIF) do not indicate problematic multicollinearity. For each coefficient, p-values for t-tests are provided in parentheses. *, **, *** denote significance at the 0.10, 0.05, and 0.01, levels respectively.

Table 3 (continued)

Indep. Variables	Dep. Variables											
	Ratio_ta		Ratio_da		Dev_rta		Dev_rda		Neg_ta		Neg_da	
	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value
CEO option incentives												
Pps_new	-0.002 ***	(0.000)	0.002	(0.692)	-0.001 ***	(0.012)	0.004	(0.584)	0.001	(0.543)	0.002	(0.196)
Pps_vest	0.000	(0.282)	-0.002	(0.451)	0.000	(0.189)	0.000	(0.968)	0.000	(0.737)	-0.001	(0.367)
Pps_unvest	0.001 **	(0.022)	-0.007	(0.132)	0.001 **	(0.046)	-0.009	(0.107)	-0.003 ***	(0.004)	0.001	(0.545)
Other governance variables												
Ceoown	0.041 **	(0.016)	0.190	(0.534)	0.031 *	(0.076)	0.424	(0.340)	-0.033	(0.635)	0.150	(0.120)
Ln_ninst	0.004 *	(0.057)	-0.041	(0.269)	0.006 ***	(0.002)	-0.057	(0.201)	0.053 ***	(0.000)	0.006	(0.579)
Instown	0.030 ***	(0.000)	0.338 ***	(0.007)	0.018 ***	(0.014)	0.254	(0.105)	-0.056 **	(0.016)	-0.040	(0.255)
Ln_bdsiz	0.021 ***	(0.000)	-0.140 *	(0.064)	0.013 ***	(0.006)	-0.043	(0.643)	0.010	(0.514)	-0.031	(0.169)
Pctbind	-0.018 ***	(0.001)	0.288 ***	(0.004)	0.003	(0.649)	0.238 *	(0.059)	0.091 ***	(0.000)	0.022	(0.476)
Duality	0.002	(0.384)	-0.047	(0.239)	-0.001	(0.562)	-0.070	(0.172)	-0.012	(0.140)	-0.013	(0.258)
Firm characteristics												
Mve	0.443 ***	(0.000)	0.075	(0.966)	-0.113	(0.213)	1.170	(0.539)	-0.115	(0.675)	0.238	(0.611)
Lev	-0.001	(0.846)	-0.034	(0.745)	-0.010 *	(0.084)	0.129	(0.301)	0.054 ***	(0.008)	-0.015	(0.625)
Nisd	-39.500 ***	(0.000)	63.400	(0.462)	2.890	(0.635)	14.700	(0.876)	-28.200 **	(0.023)	21.300	(0.307)
Q	-0.005 ***	(0.000)	-0.013	(0.277)	0.001	(0.204)	-0.009	(0.571)	-0.012 ***	(0.000)	-0.010 ***	(0.010)
CEO characteristics												
Age	0.001 ***	(0.000)	-0.004	(0.151)	0.000	(0.657)	-0.002	(0.488)	0.000	(0.818)	-0.002 **	(0.047)
Ceotenure	0.000	(0.489)	0.002	(0.444)	0.000 *	(0.055)	0.003	(0.408)	-0.001	(0.214)	0.000	(0.939)
Intercept	-0.162	(0.000)	0.531	(0.020)	-0.078	(0.000)	0.242	(0.389)	0.583	(0.000)	0.608	(0.000)
# of obs.	9904		9568		9713		9288		9904		9568	
F statistics	13.070		2.060		6.060		1.040		11.960		1.690	
Prob.	0.000		0.009		0.000		0.409		0.000		0.046	

The results support our Hypothesis 1. When CEOs are granted new options, downward earnings management can help managers profit from their option compensation. In addition, when CEOs have higher incentives from unvested outstanding options, upward earnings management can help them to sell shares to diversify risk associated with their option portfolios.

B. The Effects of Various Option Elements on Option Backdating

1. Univariate Analysis between Potential Backdaters and the Benchmark Sample

Table 4 reports the univariate comparison for the key variables between potential backdaters (Backdate=1) and the benchmark sample (Backdate=0). As can be seen from Panel A of Table 4, potential backdaters generally have more negative values and greater decreases in accruals. For instance, potential backdaters have average (median) total accrual of -7.50% (-6.20%) of assets, which is significantly smaller than -6.60% (-5.80%) for the benchmark firms. Potential backdaters also have significantly higher value of the dummy variable for negative total accruals, which indicates more negative values. In addition, compared to the benchmark firms, potential backdaters have greater decreases in accruals from the previous three-year average. Specifically, in terms of discretionary accruals, the mean (median) deviation from the previous three-year average value is -8.9% (-0.8%) of assets, which is significantly smaller than 5.3% (-0.1%) of assets for the benchmark firms.

In addition, according to Panel B, on average, CEOs in potential backdaters have higher incentives from newly granted options (average value of \$3.260 vs. \$1.780 per \$1,000 change in market value of equity, and median value of \$1.740 vs. \$0.780 per \$1,000 change in market value of equity) and higher incentives from vested option holdings. Furthermore, according to Panel C and Panel D, potential backdaters have more institutional shareholders, higher institutional ownership, fewer directors on the boards, lower leverage, higher growth, and larger stock return volatility than the benchmark firms. Finally, Panel E shows that CEOs who are in potential backdaters are younger than those in the benchmark firms, but they are not significantly different from each other in terms of the length of time on tenure.

2. Logit Analysis of the Effects of Various Option Elements on Option Backdating

To further analyze the relation between incentives from various option elements and option backdating, we estimate a logit regression model, where the dependent variable (Backdater) equals one if the firm is a potential backdater, and zero if the firm is a non-backdater (i.e. the benchmark firm), and the independent variables are variables for option incentives and the other variables defined in Section III. We estimate the following equation:

$$P(\text{Backdater}) = \beta_0 + \beta_1 \text{CEOOptionIncentives}_{it} + \beta_2 \text{OtherGovernance}_{it} + \beta_3 \text{FirmCharacteristics}_{it} + \beta_4 \text{CEOCharacteristics}_{it} + \varepsilon_{it} \quad (4)$$

Table 4
Univariate comparison of backdaters vs. non-backdaters

The table compares the key variables between the potential backdaters and the benchmark firms over 1992 through 2005. The variables are defined in the Appendix. The major variables are winsorized at the top and bottom 1% of the observations. Mve and Nisd are in million dollars. We use t-test and Wilcoxon rank-sum test to determine mean and median difference between the two sub-samples respectively. *, **, *** denote significance at the 0.10, 0.05, and 0.01 levels.

Variable	Potential Backdaters			Benchmark			p-values for difference tests	
	Obs.	Mean	Median	Obs.	Mean	Median	Mean	Median
Panel A: Earnings management								
Ratio_ta	685	-0.075	-0.062	8883	-0.066	-0.058	0.008***	0.010***
Ratio_da	685	0.095	0.011	8883	0.153	0.011	0.411	0.635
Dev_rta	677	-0.014	-0.003	8704	-0.004	0	0.006***	0.033**
Dev_rda	665	-0.089	-0.008	8623	0.053	-0.001	0.101*	0.048**
Neg_ta	685	0.904	1	8883	0.862	1	0.000***	0.002***
Neg_da	685	0.439	0	8883	0.449	0	0.641	0.641
Panel B: CEO option incentives								
Pps_new	685	3.26	1.74	8883	1.78	0.78	0.000***	<.0001***
Pps_vest	685	6.72	4.13	8883	6.21	3.53	0.108	0.035**
Pps_unvest	685	2.12	0.99	8883	2.22	0.95	0.47	0.776
Panel C: Other governance variables								
Ceoown	685	1.88%	0.02%	8883	2.38%	0.00%	0.015**	0.814
Ln_ninst	685	5.029	4.977	8883	4.975	4.949	0.064*	0.055*
Instown	685	65.98%	68.53%	8883	63.68%	65.61%	0.001***	0.001***
Ln_bdsiz	685	2.142	2.197	8883	2.188	2.197	0.000***	<.0001***
Pctbdind	685	63.91%	66.67%	8883	63.76%	66.67%	0.82	0.773
Duality	685	0.653	1	8883	0.657	1	0.814	0.814
Panel D: Firm characteristics								
Mve	685	6046.795	1397.663	8883	6395.545	1324.14	0.586	0.203
Lev	685	0.18	0.132	8883	0.202	0.15	0.005***	0.003***
Nisd	685	136.955	33.215	8883	135.79	30.607	0.927	0.356
Q	685	2.279	1.735	8883	2.114	1.643	0.008***	0.005***
Ln_ta	685	7.114	6.975	8883	7.142	6.98	0.639	0.721
Volat	685	0.483	0.445	8883	0.424	0.379	0.000***	<.0001***
Panel E: CEO characteristics								
Age	685	54.809	55	8883	55.675	56	0.003***	0.015**
Ceotenure	685	7.045	5	8883	7.439	5	0.141	0.612

Similar as Section IV.A, variables for option incentives (i.e. Pps_new, Pps_vest, and Pps_unvest) will enter one at a time before all of them are put together to test their conflicting effects.

Table 5 presents the results. It shows that the sensitivity of newly granted option values to changes in stock price is significantly and positively related to the probability of firms' option backdating. The result suggests that as the option-based compensation becomes more important, and greater benefit can be generated from option backdating, CEOs have stronger incentives to engage in option backdating. This is consistent with Minnick and Zhao (2009) and Collins, Gong, and Li (2009). In addition, higher incentives from unvested options are related to lower probability of backdating, whereas incentives from vested options do not have a significant effect. The results are consistent with our Hypothesis 2.

According to Section IV.A, managers with high incentives from unvested options tend to manage earnings upward, which is in the direction opposite to the preference created by newly granted options. Therefore, it is possible that backdating is correlated with income-decreasing earnings management, which creates disincentives for backdating by those managers with high incentives from unvested outstanding options. But managers with high incentives from vested outstanding options do not have a similar disincentive for backdating, since vested options are shown to be insignificantly correlated with earnings management. We are going to test the implied correlation between backdating and downward earnings management in Section IV.C and IV.D.

Furthermore, among the governance variables, the number of institutional investors is positively related to the likelihood of backdating. It is possible that more institutional investors become interested in purchasing the stock in the year of backdating when stock price goes down due to income-decreasing earnings management. In addition, higher CEO stock ownership is related to a lower likelihood of backdating. This is consistent with the notion that higher ownership improves the incentive alignment between CEOs and shareholders, making it less likely that backdating will occur (Collins, Gong, and Li, 2009). However, the proposed correlation between backdating and income-decreasing earnings management can also possibly explain the negative relation between CEO stock ownership and the occurrence of backdating, as the value of CEO stock holdings will reduce when stock price goes down due to downward earnings management. Among the variables of firm characteristics, we find that greater stock return volatility increases the likelihood of backdating. The result is consistent with Collins, Gong, and Li (2009) and Minnick and Zhao (2009).

C. The Effects of Earnings Management on Option Backdating

In order to confirm the correlation between backdating and income-decreasing earnings management, in this section, we run logit regressions of the likelihood of option backdating against both variables for earnings management and variables for option incentives, as well as other control variables. We estimate the following equation:

$$\begin{aligned}
 P(\text{Backdater}) = & \beta_0 + \beta_1 \text{EarningsManagement}_{it} \\
 & + \beta_2 \text{CEOOptionIncentives}_{it} + \beta_3 \text{OtherGovernance}_{it} \\
 & + \beta_4 \text{FirmCharacteristics}_{it} + \beta_5 \text{CEOCharacteristics}_{it} + \varepsilon_{it} \quad (5)
 \end{aligned}$$

Table 5

Logit analysis of the effect of various option elements on the likelihood of backdating

The table shows the coefficients from a logit regression of incentives from various option elements on the likelihood of backdating. The dependent variable equals one if the firm is a potential backdater, and zero if the firm is a non-backdater (i.e. the benchmark firm). The independent variables are defined in the Appendix. The major variables are winsorized at the top and bottom 1% of the observations. The models are estimated by maximum likelihood method. The variance inflation factors (VIF) do not indicate problematic multicollinearity. For each coefficient, p-values for t-tests are provided in parentheses. *, **, *** denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

Indep. Variables	1		2		3		4	
	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value
CEO option incentives								
Pps_new	0.083 ***	(0.000)					0.083 ***	(0.000)
Pps_vest			0.000	(0.981)			-0.002	(0.712)
Pps_unvest					-0.033 ***	(0.011)	-0.028 **	(0.029)
Other governance variables								
Ceown	-0.017 **	(0.051)	-0.019 **	(0.034)	-0.020 **	(0.025)	-0.018 **	(0.043)
Ln_ninst	0.285 ***	(0.002)	0.218 **	(0.019)	0.215 **	(0.020)	0.282 ***	(0.003)
Instown	0.300	(0.223)	0.326	(0.186)	0.362	(0.140)	0.347	(0.163)
Ln_bdsiz	-0.280	(0.126)	-0.363 **	(0.045)	-0.391 **	(0.031)	-0.307 *	(0.094)
Pctbind	-0.183	(0.444)	-0.263	(0.267)	-0.252	(0.287)	-0.172	(0.472)
Duality	0.125	(0.165)	0.149 *	(0.096)	0.155 *	(0.082)	0.134	(0.139)
Firm characteristics								
Ln_ta	0.000	(0.998)	-0.012	(0.816)	-0.024	(0.632)	-0.012	(0.810)
Volat	1.241 ***	(0.000)	1.531 ***	(0.000)	1.575 ***	(0.000)	1.281 ***	(0.000)
CEO characteristics								
Age	-0.004	(0.530)	-0.007	(0.277)	-0.008	(0.198)	-0.005	(0.422)
Ceotenure	0.004	(0.527)	0.001	(0.897)	0.001	(0.859)	0.005	(0.460)
Intercept	-4.070	(0.000)	-3.206	(0.000)	-2.955	(0.000)	-3.839	(0.000)
# of obs.	9944		9943		9942		9942	
Chi-square	169.920		94.480		101.620		175.710	
Prob.	0.000		0.000		0.000		0.000	

Table 6 reports the results. The incidence of option backdating is shown to be positively related to income-decreasing earnings management. As can be seen from regression (3) and (4), backdaters have greater decreases in both discretionary accruals and total accruals from the prior three-year average than the benchmark firms. Higher likelihood of backdating is also shown to be associated with more negative total accruals, according to regression (5). The results suggest that managers engaging in option backdating are also likely to use income-decreasing earnings management to get more favorable price for their new stock option grants as well.

In addition, the effects of various option elements continue to be consistent with our Hypothesis 2. That is, higher probability of backdating is related to greater incentives from newly granted options and smaller incentives from unvested options, whereas incentives from vested options do not have a significant effect on backdating.

D. The Effect of Persistent Unvested Option Incentives vs. Non-Persistent Unvested Option Incentives on Option Backdating

The evidence that managers with high incentives from unvested options are less likely to engage in backdating is consistent with their incentives to manage earnings upward (Stein, 1989; Cheng and Warfield, 2005). In particular, if CEOs have unusually high incentives from their unvested options in a given year, they are likely to sell stocks to diversify risk. As a result, they have incentives to manage earnings upward to beat up short-term stock price for selling purpose. However, if CEOs have highly persistent incentives from their unvested options, it indicates that they are willing to bear the risk involved in their compensation. As a result, they have lower incentives for upward earnings management because they have a less motivation to sell stocks. Consequently, if option backdating is associated with income-decreasing earnings management, the managers with highly persistent incentives from unvested options should be less likely to avoid backdating, compared to those with non-persistent incentives from unvested options. Therefore, in this section, we distinguish between persistent and non-persistent unvested option incentives and investigate their different effects on backdating.

To distinguish between persistent and non-persistent unvested option incentives, we first rank the pay-for-performance sensitivity of unvested options (Pps_unvest) in each year into percentiles. We then calculate the average ranking for each firm over the sample period. To increase the reliability of the classification, we only consider those firms that have at least five years of data for Pps_unvest over the sample period. If a firm's average ranking is above the top 25% or below the bottom 25% of the average ranking distribution, then that firm is regarded as having highly persistent incentives from unvested options (consistently high or consistently low Pps_unvest , respectively). Under this approach, about 60% of the firm-years exhibit highly persistent Pps_unvest . We use a dummy variable, *Recurring*, to denote these firm-years.³ We then add an interaction of this dummy with Pps_unvest to the logit regressions for the likelihood of backdating to capture the incremental effect for the firms with highly persistent incentives from unvested options.

Table 7 reports the results. As in previous sections, pay-for-performance sensitivity of unvested options continues to be related to a lower probability of backdating. However, the coefficient on the interaction term does not have any significant effects on the incidence of backdating. The results suggest that the negative relation between Pps_unvest and the likelihood of backdating is largely driven by the managers with less persistent incentives from their unvested options. These managers have incentives to manage earnings upward to beat up short-term stock price when they sell stocks to diversify risk. As backdating is shown to be associated with income-decreasing earnings management, they have a disincentive for backdating. Differently, those managers with highly persistent incentives from their unvested options have lower incentives for upward earnings management because they are less likely to sell stocks for risk diversification purpose. As a result, they have a less motivation to reduce the incidence of backdating as well.

V. CONCLUSION

In this paper, we study the conflicting incentives from the various elements of CEO option portfolios on both earning management and the occurrence of backdating, and investigate the link between these two opportunistic actions to explain the conflicting effects. We find that higher incentives from newly granted options are associated with income-decreasing earnings management and higher incidence of backdating, whereas higher incentives from unvested options are related to income-increasing earnings management and lower incidence of backdating. However, incentives from vested options have an insignificant effect on both earnings management and backdating. We further show that the correlation between downward earnings management and option backdating, and the need for managers to diversify the increased-risk associated with stock-based compensation can clearly explain the effects of CEOs' outstanding options on both earnings management and the occurrence of backdating.

Table 7

Logit analysis of the effect of persistent unvested option incentives vs. non-persistent unvested option incentives on the likelihood of backdating

The table shows the coefficients from a logit regression of the effect of incentives from persistent vs. non-persistent unvested options on the likelihood of backdating. The dependent variable equals one if the firm is a potential backdater, and zero if the firm is a non-backdater (i.e. the benchmark firm). The independent variables are defined in the Appendix. The major variables are winsorized at the top and bottom 1% of the observations. The models are estimated by maximum likelihood method. The variance inflation factors (VIF) do not indicate problematic multicollinearity. For each coefficient, p-values for t-tests are provided in parentheses. *, **, *** denote significance at the 0.10, 0.05, and 0.01 levels respectively.

Our study is the first to examine how conflicting incentives associated with newly granted options and outstanding options affect the occurrence of option backdating. Our paper also combines and extends the literature on backdating and option grant related earnings management, by providing new evidence that self-serving CEOs are likely to take both opportunistic actions at the same time when they are granted options. Our findings have implications for corporate executive compensation policies, and are relevant to the current public policy debate regarding options and executive pay in general.

ENDNOTES

1. The effect of vested options on earnings management can also occur through option exercises. However, the choice of earnings management associated with vested options through option exercises differ across firms and over time and can be inconsistent. Please refer to Section II.B. Hypothesis Development for details.
2. Table 3 only shows the results when all the option incentive variables are included. The regression results for Pps_new, Pps_vest, and Pps_unvest separately are available upon request.
3. Our empirical results do not essentially change if we only include those firms with consistently high Pps_unvest for Recurring=1.

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Appendix

Definition of the key variables

Variable	Definition
Panel A: Earnings management	
Ratio_ta	Total accruals/the previous year's assets
Ratio_da	Discretionary accruals/the previous year's assets
Dev_rta	Deviation of Ratio_ta from the prior 3-year average
Dev_rda	Deviation of Ratio_da from the prior 3-year average
Neg_ta	Dummy equal to unity if total accruals are negative
Neg_da	Dummy equal to unity if discretionary accruals are negative
Panel B: CEO compensation	
Pps_new	The value change in CEO's newly granted options per 1000-dollar change in the market value of equity
Pps_vest	The value change in CEO's outstanding exercisable options per 1000-dollar change in the market value of equity
Pps_unvest	The value change in CEO's outstanding unexercisable options per 1000-dollar change in the market value of equity
Recurring	Dummy equal to unity if average ranking of Pps_unvest over the sample period is in top or bottom 25% of the average ranking distribution
Panel C: Other governance variables	
Ceoown	CEOs' holdings of common shares/total shares outstanding
Ln_ninst	log(number of institutional investors)
Instown	Total shares held by institutional investors/total shares outstanding
Ln_bdsiz	Log(the number of directors on the board)
Pctbdind	The proportion of outsiders on the board
Duality	Dummy equal to unity if the CEO is also the chairman of the board
Panel D: Firm characteristics	
Mve	Market value of equity
Lev	Book value of debt/(book value of debt + market value of equity)
Nisd	The standard deviation of net income during the three-year period from two years before to the current year
Q	Market value of assets/book value of assets
Ln_ta	Log(total assets in million dollars)
Volat	Standard deviation of daily stock returns over the prior 5 years
Panel E: CEO characteristic	
Age	CEO's age
Ceotenure	The length of time in whole years since the CEO was on the position
Panel F: Option backdating	
Backdate	Dummy equal to unity if the firm is a potential backdater in that year