Is CEO Stock Option Backdating or Otherwise Manipulation Another Form of Option Repricing?

Betty (H.T.) Wu *
School of Business, Yonsei University†

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Abstract

A growing amount of literature suggests that the practice of executive stock option backdating was once common among public firms, potentially for the purpose of strategic trading at the expense of shareholders. In this paper, I use a sample of 6,836 stock option grants to top executives in the S&P 1500 companies during the 1999-2007 period and show that this manipulating behavior is associated with similar determinants of option repricing, which has become rare since a regulatory change in 1998. Contrary to conventional wisdom, I find little evidence that such manipulation is subject to agency problems. Moreover, I do not find a relationship between option manipulation and operating performance immediately afterward, and there seems to be no significant long-term market outperformance, either. The sub-sample analysis suggests that some manipulated options substitute for option repricing while others are likely for retention purposes.

Keywords: executive compensation; stock option grants; backdating; repricing; corporate governance

JEL Classification: G3

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†262 Seongsanno, Seodaemun-gu, Seoul 120-749, South Korea, phone: +82(0)2-2123-6551, e-mail: h.t.wu@yonsei.ac.kr.

1 Introduction

Yermack (1997) first identifies the pattern of abnormal stock price returns around executive stock option grants, i.e., abnormally high returns immediately after these options are granted. Because of accounting conventions and tax considerations, stock options are generally granted at-the-money; that is, the exercise price is set equal to the market price[1]. Therefore, other than pure luck and/or the ability to forecast stock prices, firms' timing of option grants or firm-related announcements, or "springloading", is the most likely explanation. Several subsequent studies (e.g., Aboody and Kasznik, 2000; Chauvin and Shenoy, 2001; Lie, 2005; Heron and Lie, 2007) further show that stock returns are abnormally low before these option grants. Lie (2005) and Heron and Lie (2007) argue that, the stock options in question are more likely actually backdated and that the firms are not likely timing grants and/or manipulating information flow to the market. In other words, in hindsight, the grant dates of current options are changed to more favorable dates with lower strike prices.

These findings, together with comprehensive newspaper coverage (e.g., Wall Street Journal) beginning in late 2005, have revealed this option backdating practice to the public and attracted regulators' close attention, resulting in new disclosure rules in late 2006 (Huang and Lu, 2010). As of March 2007, more than 250 companies were under internal review or formal (or informal) investigation by the U.S. Securities and Exchange Commission (SEC) and/or the U.S. Department of Justice regarding the accounting of option grant dates. Heron and Lie (2009) estimate that 13.6% of all top executive (CEO) option grants from 1996 to 2005 are backdated or otherwise manipulated. This estimate is 18.9% for unscheduled at-the-money grants, but it has decreased significantly since the passage of the Sarbanes-Oxley Act of 2002 (SOX)[2]. At the firm level, they estimate that 29.2% of firms have manip-

[1] See Heron and Lie (2007) for detailed discussions.

[2] On August 29, 2002, this Act was passed to address some issues, such as independent auditors, corporate governance, internal control assessment, and financial disclosure. Among others, firms are required to report their executive stock option grants within two business days to the SEC, which makes this information available to the public within one day. Previously, reports of stock option grants were not due until 45 days after the firm's fiscal year-end and were to be

ulated grants. Nevertheless, not all grants have been backdated or otherwise manipulated. Obviously, this extensive but intermittent manipulation is of great interest to academics and regulators alike.

This paper attempts to understand the rationale behind the practice of option date manipulation. Intuitively, by resetting existing option grants to a date with a favorable price, executives are in fact rewarded for poor performance, which can be viewed as an example of managerial entrenchment or rent-seeking. Several recent papers provide evidence that option backdating is a result of weaker corporate governance (e.g., Bizjak et al., 2009; Collins et al., 2009). Even worse, the anticipation of possible option backdating is detrimental to managerial incentives. That is, executives profit from upside risk (when options become in-the-money) while protecting themselves from downside risk (when out-of-the-money options are backdated). Nevertheless, firms often argue that this practice is essential to restore incentives and to retain talented executives. Note that option backdating is not illegal as long as it is revealed to the shareholders.

My main hypothesis is based on the option repricing literature because this practice and option backdating share very similar features. Option repricing is designed to "re-incentivize" managers by lowering the strike prices of previously granted options that are significantly out of the money. On the theoretical front, Acharya et al. (2000) construct an agency model of compensation contracting and show that repricing is almost always optimal in some contingencies. Empirically, smaller, younger, and rapidly growing firms that undergo a sharp decline in growth and profitability are more likely to conduct option repricing. Repricing firms have better internal governance, providing little evidence for managerial entrenchment or ineffective governance (e.g., Carter and Lynch, 2001; Chance et al., 2000; Chidambaran and Prabhala, 2003; Sauer and Sautner, 2008). Moreover, Sauer and Sautner (2008) find that performance improves significantly after repricing. Therefore, option repricing seems able to render a long-term (flatter) V-shaped curve for performance, similar to option backdating. Other than incentive realignment, another main motivation for option repricing is to retain valuable executives.

announced to the shareholders in the proxy statement for the following year's annual meeting.

For instance, Chen (2004) shows that the policy of restricting repricing makes firms more vulnerable to voluntary executive turnover following stock price declines. However, Carter and Lynch (2004) do not find evidence that repricing affects turnover[3].

Unlike option repricing, little research has been conducted to study the determinants of option date manipulation, which is generally viewed as pure strategic trading at the expense of shareholders. Gao and Mahmudi (2009) utilize an agency model and show that backdating can be a form of efficient contracting. Empirically, they find that backdating is related to lower overall compensation and better managerial incentive structures and corporate governance. Fang and Whidbee (2010) use a sample of 117 backdating firms and find that these firms tend to be younger and fast growing in a more competitive labor market. Moreover, these firms outperform their matched counterparts in pre- and post-backdating years. They argue that these results support the involvement of incentive- and retention-based considerations in this act, i.e., to retain outperforming managers, and refute the notion that option backdating is a mere manifestation of agency problems.

Callaghan et al. (2004) use a sample of 236 repricing events and find sharp increases in stock price in the 20-day period after the repricing date. These dates tend to either precede the release of good news or follow the release of bad news. This pattern suggests opportunistic timing of the repricing events in conjunction with the release of corporate news. A regulatory change in 1998 requires firms to expense the estimated value of repriced grants. Since then, this phenomenon of top executive stock option repricing has become rare (e.g., Brenner et al., 2000; Chance et al., 2000; Callaghan et al., 2004, Chidambaran and Prabhala, 2003). Therefore, the disappearance of option repricing may have given rise to option backdating or other types of grant date manipulation. Given the shared features and the 1998 regulatory change, I conjecture that option backdating becomes another form of option repricing after 1998. More specifically, my aim in this study is to test whether the two major explanations for repricing, to restore incentives and to retain executives, are able to predict this

[3] Nevertheless, they do find evidence that *overall* employee turnover is negatively associated with repricing.

date-manipulating behavior. At the same time, I examine whether option backdating is subject to typical agency problems. To that end, I deploy a sample of 6,836 stock option grants issued to the top executives in the Standard & Poor's (S&P) 1500 companies between 1999 and 2007.

Following Heron and Lie (2009), I estimate the likelihood of option manipulation on the basis of the assumption that, in the absence of backdating or other types of option grant manipulation, the distributions of stock price returns during the month immediately before/after the grants should be similar. Namely, without option manipulation, the distribution of return differences should not be significantly different from zero. Alternatively, positive abnormal return differences imply the existence of some kind of grant manipulation. I calculate abnormal returns as the difference between the stock returns of the granting firm and the returns predicted by the Fama and French three-factor model. I primarily focus on grants whose abnormal return differences rank above 90% in the sample distribution. I believe that this selection criterion provides a more conservative estimate while reducing potential noise in the data[4].

In terms of the determinants, I use a linear probit model to estimate the likelihood of option manipulation. On the whole, I find that this likelihood increases for smaller, younger, and better governed firms whose executive option portfolios are more out-of-the-money. Furthermore, firms that experience a decline in operating performance in the previous year and have higher stock volatility in the month of the grants tend to have manipulated options. As expected, this manipulation likelihood is higher for high-technology firms because of the more competitive labor market. Lastly, options granted after the 2002 SOX are less likely to be manipulated. These results indicate that the factors that explain option manipulation coincide with many of those that explain option repricing. Because

[4]Heron and Lie (2009) estimate the likelihood by using the absolute difference and a dummy indicating whether this difference is positive. Collins el al. (2009) classify a grant as backdated if the stock price at the grant date ranks in the lowest decile of the firm's stock price distribution over a 240-day window around the option grant date. Bizjak et al. (2009) first sort firms based on the stock volatility and then identify grants as being backdated by the magnitude of the post- to pre-grant return difference that corresponds to a pre-specified confidence level (e.g., 95% or 99%).

of the significant correlation between these two behaviors and the regulatory change in 1998 that made repricing rare, option manipulation seemingly substitutes for option repricing. Note that option manipulation is not associated with ineffective governance or managerial entrenchment and thus is not a result of managerial self-dealing. These findings still hold after controlling for industry and year fixed effects.

Although I find evidence that incentive realignment influences decision making regarding option manipulation, whether the intention to engage in option manipulation is materialized *ex-post* matters more. In addition to the legal ramifications, this question has important implications for shareholders[5]. To that end, I investigate the relationship between option manipulation and subsequent operating performance. Unlike Collins et al. (2009), I use the treatment-effects model for estimation because I believe that the selection process is most likely not random. In other words, I incorporate both pre- and post-manipulation operating performance into the analysis simultaneously. Basically, I find that option manipulation is not related to subsequent operating performance. Namely, option manipulation is not capable of realigning incentives and is not detrimental, either. The selection attributes still seem to resemble the option repricing mechanism. Again, there is no evidence for ineffective governance or executive entrenchment. These findings together suggest that firms engage in option manipulation more for retaining valuable employees and less for restoring incentives. Even so, there is some evidence of improvements in market performance in longer horizons for manipulating firms, although they do not significantly outperform their non-manipulating counterparts.

Lastly, I form several sub-samples of option grants for robustness checks. Basically, the main results are consistent when option manipulation is identified by different decile thresholds or the normal return measure. Unscheduled and filed-late options do not act as an option repricing mechanism. If anything, they indicate strategic trading at the expense of shareholders. Manipulated options that are predicted

[5] For instance, Narayanan et al. (2007) and Bernile and Jarrell (2009) document negative abnormal stock returns around public disclosure of backdating-related practices despite no direct linkage to cash flow consequences.

to be repriced seem to be for the purposes of incentive realignment while manipulated options being predicted otherwise are likely for retention purposes, if at all. Regardless of the identification method or horizon, there is no significant difference in market performance between manipulating firms and their non-manipulating counterparts.

Overall, my study provides evidence that CEO option backdating and other forms of manipulation in general resemble the mechanism of option repricing. In addition to retaining talented executives, option manipulation seems to restore mismatched incentives from a long-term perspective, though to a lesser extent. Intriguingly, I find little evidence that option manipulation is related to inferior governance. Consequently, option manipulation is not likely an outcome of ineffective boards or managerial entrenchment, in contrast with the managerial power view.

My paper makes three main contributions. First, unlike Fang and Whidbee (2010), I use a large sample and study the rationale for option backdating or other forms of manipulation. Moreover, I consider firm performance before and after the decision simultaneously to study the incentive effects *ex-post*. Other than similar stock price patterns around the grant date, the findings provide evidence that option manipulation and option repricing share similar determinants. Second, unlike most extant studies on option backdating, I view this decision to manipulate options as a self-selected treatment instead of a random variable. Therefore, the model is capable of capturing both the mechanisms involved in the selection process and the treatment effects of the act of manipulation itself. Last but not the least, this study adds to the literature regarding the evaluation of the regulatory changes of the Sarbanes-Oxley Act of 2002. Several recent studies indicate that the SOX has effectively deterred the practice of option backdating since 2002 (e.g., Heron and Lie, 2007, 2009; Narayanan and Seyhun, 2008). My study shows that, consistent with Huang and Lu (2010), the SOX mitigates option manipulation, but only to some extent. When the media attention begins in late 2005 (together with the ensuing better corporate disclosure rules in late 2006), this opportunistic behavior is further deterred.

The remainder of this paper is organized as follows. Section 2 describes the related literature and

develops the hypothesis. Section 3 describes the sample construction, data collection, and methodology applied for estimation. Section 4 describes the estimation and testing results. Section 5 summarizes the findings and presents concluding remarks.

2 Hypothesis Development

2.1 Option Repricing

Since the 1980s, firms facing promising prospects but dealing with financial constraints have granted stock options to employees, especially in the high-technology industry. Apart from compensation, these option grants aim to provide incentives that align the interests between ownership and control, which is viewed as an effective way to alleviate principal-agent problems (Jensen and Meckling, 1976). The terms of stock options are set at the time of the grant, but they are sometimes subject to changes before these options expire. The most common such change is option repricing, i.e., the strike prices are lowered after a decline in stock price. Usually, the new strike prices are 30%-40% lower than the old ones, often with an extension of the option maturity. Formally, option repricing is executed either by replacing the existing options with new grants at more favorable terms or by rewriting the terms of the existing option grants (Chidambaran and Prabhala, 2003).

The substantial academic literature on option repricing offers two major explanations for option repricing: the benefits of managerial incentives and retention. Because of accounting conventions and tax considerations, stock options are generally granted at-the-money. Consequently, the sensitivities of option values to price movements, and hence the managerial incentives, vary over time. Deep-in-the-money options enhance managerial incentives because option values move nearly one-for-one with stock prices. In contrast, deep-out-of-the-money options make option values insensitive to stock price fluctuations, resulting in weak incentives. Because these options are no longer able to render any material incentives, revising the strike price downward is necessary to restore managerial incentives.

Chidambaran and Prabhala (2003) find that higher executive option holdings (not share ownership) are associated with higher option repricing while Chen (2004) finds that higher CEO share ownership (not option holdings) decreases the likelihood of adopting repricing restrictions.

Ex-post, Sauer and Sautner (2008) find that performance improves significantly after repricing. However, the very anticipation of option repricing can be detrimental to managerial incentives. By resetting the strike price, executives are in fact rewarded for poor performance, which contradicts the original purpose of option grants. This repricing possibility reduces managers' *ex-ante* incentives to perform because they are protected from downside risk. Acharya et al. (2000) employ an agency-theoretic model of compensation contracting and examine the incentive effects of option repricing. They show that although the anticipation of resetting can negatively affect initial incentives, resetting can still be important and enhance value for compensation contracts, even *ex-ante*. Repricing is almost always optimal in some contingencies. The equilibrium hinges on the tradeoff between these two opposing incentive effects.

In addition, option repricing could serve the purpose of retaining talented executives. Firms, particularly in the high-technology industry, often explicitly raise this point as a main reason for repricing option grants. Typically, executives hold many unvested option grants, which are forfeited upon voluntary departure. Hence, these options maintain their retentive power as long as they are not too much out-of-the-money (Scholes, 1991; Mehran and Yermack, 1997). Without repricing, the costs of unexpected executive departures can be substantial. Empirical studies show that option repricing is associated with lower subsequent voluntary executive turnover subsequently (Carter and Lynch, 2001; Chidambaran and Prabhala, 2003; Chen, 2004). Costs also come from managerial self-dealing, which manifests in weak internal governance. If option repricing results from weak governance, it is value reducing at the expense of shareholders. Empirical evidence for the link between these two constructs is mixed. Chidambaran and Prabhala (2003) find that smaller boards, which are generally viewed as providing better governance, are more likely to reprice. Greater insider presence on the board (or its

compensation committee) increases the likelihood of repricing (Brenner et al., 2000; Chance et al., 2000). However, Carter and Lynch (2001) find no relationship between the board structure and option repricing.

2.2 Option Backdating

Option backdating or other methods of manipulation share similar features with option repricing. An option is viewed as backdated when its grant date is set "retroactively", to a date with a more favorable stock price, before a rise in stock price, usually at the bottom of a steep drop. Companies often use option backdating for retention purposes[6]. Several studies document this stock price pattern around executive option grants (Aboody and Kasznik, 2000; Chauvin and Shenoy, 2001; Lie, 2005; Heron and Lie, 2007). This pattern is initially believed to be due to manipulation of the timing of corporate information and/or of option grants. Lie (2005) uses a much larger sample and demonstrates that a similar pattern still holds and has intensified over time. He argues that, "Unless executives have an informational advantage that allows them to develop superior forecasts regarding the future market movements that drive these predicted returns, the results suggest that the official grant date must have been set retroactively" (p. 811). Heron and Lie (2007) further show that this pattern is much weaker since the SOX of 2002 takes effect. In particular, for grants that are reported to the SEC within one day, this pattern completely vanishes. However, it continues to exist for grants reported with longer filing delays, and its magnitude tends to increase with reporting delays. Interestingly, Callaghan et al. (2004) also find a "V-shaped" pattern around option repricing events such as option backdating.

The literature on option backdating mostly documents the price patterns around the time of grants and examines whether this behavior results from weak internal governance. For instance, Bizjak et

[6] For instance, Gregory Reyes, the former CEO of Brocade Communications Systems, was convicted in 2010 for his role in option backdating-related practices and received an 18-month prison term. To his defense, he argued that this practice was intended to retain and recruit talented employees, not to defraud shareholders. Moreover, the purpose of the one-person stock option committee was to facilitate hiring and retention.

al. (2009) find that board interlock significantly facilitates the spread between firms in the practice of backdating. Other factors, such as younger CEOs, higher stock volatility, and larger managerial equity holdings, are also associated with a higher likelihood of backdating. Collins et al. (2009) study the relationship between a set of governance variables and the decision to backdate. They find that weak governance, higher managerial option holding, and board interlock contribute to backdating behavior. Having directors who receive option grants on the same day as the CEO also prompts this opportunistic behavior.

Nevertheless, unlike option repricing, little research has been conducted to understand the rationale behind this manipulating behavior, if not pure managerial rent-seeking. Gao and Mahmudi (2009) utilize an agency model and show that backdating can be a form of efficient contracting. Empirically, they find that backdating is associated with lower overall compensation, superior internal governance, and better managerial incentive structures. Armstrong and Larcker (2009) also provide several behavioral and economic theories for this practice. Fang and Whidbee (2010) use a sample of 117 backdating firms (with 344 pair-matched firm-year observations) and find that younger and quickly growing firms in a more competitive labor market tend to backdate options. Additionally, they link backdating to performance and find that these firms outperform their matched counterparts both before and after backdating. They argue that these results provide evidence that option backdating is used mainly for retaining valuable employees, making it less subject to agency problems.

Therefore, other things being equal, the similarity between option repricing and option backdating mainly emerges from the fact that, for both practices, the strike price of a grant is reset to be significantly lower. However, the two approaches use different "tools": option repricing resets the strikes directly whereas option backdating resets the grant date, which indirectly changes the strikes. Because option backdating allows for more leeway to set a favorite strike price, I expect to observe different stock price patterns around the grants for these two practices, i.e., a "V" shape for option backdating and a "U" shape for option repricing. Except for this, the shared characteristics between these two

acts suggest that the typical explanations for option repricing seem to provide a plausible rationale for option backdating, if not for managerial self-dealing.

Parties outside of academia are also interested in option repricing. The intense pressure from active institutional investors has forced the regulatory agency, the Financial Accounting Standards Board (FASB), to take action. In 1998, a regulatory change required firms to expense the estimated value of repriced grants. Since then, the phenomenon of top executive stock option repricing has become rare (e.g., Brenner et al., 2000; Chance et al., 2000; Callaghan et al., 2004; Chidambaran and Prabhala, 2003). The disappearance of option repricing may have given rise to option backdating or to other types of grant date manipulation. Given the shared features described in the previous section and the 1998 regulatory change, I hypothesize that option backdating becomes another form of option repricing after 1998.

Formally, the alternative hypothesis in this paper is as follows:

H1: Option backdating or otherwise manipulation is another form of option repricing.

3 Data and Methodology

3.1 Sample

I obtain my sample of CEO stock option grants from the Thomson Financial Insider Filing database, which provides all insider transactions reported on SEC forms 3, 4, 5, and 144 in the U.S. I include transactions with the following derivative titles: OPTNS, EMPO, ISO, NONQ, CALL, WT, DIRO, RGHTS, and SAR. All of the sample transactions have a cleanse indicator of R ("data verified through the cleansing process"), H ("cleansed with a very high level of confidence"), or C ("a record added to nonderivative table or derivative table in order to correspond with a record on the opposing table"). I restrict my sample option grants to transactions that are granted or awarded to CEOs between

January 1999 and November 2007[7]. I do not extend the sample period further to avoid the influences from the recent financial crisis starting in 2008. I require stock returns to be available from 20 trading days before to 20 trading days after the grant date. I further eliminate duplicate grants occurring on a given grant date so that there is only one grant for a given date and company combination, i.e., firm-grant-date observation.

This leaves 26,092 firm-grant-date observations for 5,398 companies. Next, I match these transactions with available corporate governance data from the RiskMetrics Governance[8], accounting data from the Compustat[9], and stock price data from the Center for Research in Security Prices (CRSP)[10]. In the end, my sample consists of 6,836 CEO option grants across 1,303 S&P1500 companies in the U.S. during the period of 1999 to 2007[11].

3.2 Methodology for Estimating the Likelihood of Backdating or Otherwise Manipulating Grants

Intuitively, when there exists no opportunistic grant timing or opportunistic timing of information flows around grants, stock returns before and after grant dates should display similar patterns. In other words, in the absence of intentional or strategic timing, the distribution of the difference between the returns for a given number of days before and after the grants should be centered around zero. Similar to Heron and Lie (2009), I use this reasoning to estimate the likelihood of grants' having been

[7] In that case, a month of subsequent stock returns would be available in the 2007 CRSP database.

[8] This database publishes detailed listings of up to 30 corporate governance provisions for firms in corporate takeover defenses for more than 4,000 firms since 1990.

[9] This database provides annual and quarterly income statements, balance sheets, statements of cash flow, and supplemental data items on publicly held companies.

[10] This database maintains a comprehensive collection of security price, return, and volume data for the NYSE, AMEX, and NASDAQ stock markets, among others.

[11] There are 6 pairs of firm-grant-date observations that have slightly different company names but the same ticker names and grant dates. Excluding one in each pair of these observations has no material effects on any of my results in this paper.

backdated or manipulated.

Estimated abnormal stock price movement around grant dates might result from various manipulative practices, such as option backdating, option springloading, and option repricing. Heron and Lie (2007) nevertheless argue that the majority of abnormal returns around declared grant dates suggest option backdating. In addition, abnormal stock price patterns should vary depending on the purposes of these manipulative practices. More specifically, for option springloading, abnormal stock returns before grant dates should not be significantly different from zero. Other than that, as described before, the abnormal stock returns around the grant dates should have a "V" shape for option backdating and a flat "U" shape for option repricing.

Following the event study approach, for the sample CEO option grants, I estimate the cumulative abnormal returns as the difference between the stock returns of the granting firm and the returns predicted by the Fama and French three-factor model. The estimation window lasts for 255 days, ending 46 days before the grant date. The event window comprises 41 days in total, starting from 20 trading days before and ending 20 trading days after the event. I choose the interval of 20 trading days because previous studies suggest that most of the abnormal returns around grants occur during the month immediately before and after the grants. I use the abnormal return difference before and after the grants as my estimate of the likelihood of option manipulation.

I classify option grants as backdated or manipulated when their abnormal return differences, i.e., AR(+1,+20)-AR(-20,-1), rank in the highest decile of the whole sample distribution, given that their AR(+1,+20) values are positive. Heron and Lie (2009) estimate that, on average, 18.9% of all top executive option grants are manipulated, with 23% before and 10% after the 2002 SOX takes effect. Collins et al. (2009) estimate that 10%-12% of their sample grants are backdated, while Bizjak et al. (2009) estimate that 14.22% of their sample firms have backdated options. Therefore, my choice of the top 10% as a threshold provides a conservative estimate of option manipulation.

Using this top 10% threshold, the lower bound of the return differences of the manipulated grants is

17.16%[12]. If I assume a symmetric distribution of this difference measure, 35.53% of the sample firms are estimated to have manipulated their CEO stock option grants between 1999 and 2007[13], compared with 29.2% between 1996 and 2005, as reported by Heron and Lie (2009). Note that, because this estimation methodology could not rule out other types of manipulation (e.g., the timing of corporate information flows to the market or a combination of different manipulating behavior), unless otherwise specified, I will use option manipulation in the rest of the paper.

3.3 Explanatory Variables

3.3.1 Firm-Specific Characteristics

Firm Size and Firm Age: I measure firm size by using the market value of a firm's equity. I estimate firm age by calculating the difference between the first year in which the firm has data in Compustat and the option grant year. Consistent with prior research on option repricing (e.g., Chance et al., 2000; Brenner et al., 2000; Carter and Lynch, 2001; Chidambaran and Prabhala, 2001, 2003), I expect that smaller and younger firms have a higher tendency for option manipulation for retention purposes.

Dispensable Cash: I estimate dispensable cash by using cash minus interest expenses, scaled by total assets. One alternative for option manipulation is to pay cash while leaving the existing options intact. Moreover, the liquidity constraint might lead to option manipulation to implement certain compensation practices (Fang and Whidbee, 2010). As a result, I expect a negative relationship between a firm's dispensable cash holdings and the likelihood of option manipulation.

Growth Opportunity: To estimate growth opportunity, I first calculate the market value of assets, i.e., the book value of assets plus the market value of common stock less the sum of book value of common equity and balance sheet deferred taxes. Then, I divide this market value of assets by the

[12] It is 24.85% (44.08%) when using the top 5% (1%) threshold.

[13] I also use top a top 5% threshold as an alternative proxy for option manipulation. When applying this threshold, the percentage of manipulated firms drops to 19.57%, which provides a more conservative estimate.

book value (the so-called Q ratio). When a firm faces high growth prospects, it is vital to attract and retain the top management talent. Therefore, I expect a higher growth opportunity to increase the propensity for option manipulation.

Profitability: Return on assets is a ratio of EBIT (earnings before interest and tax) to total assets. Prior studies suggest that option repricing is associated with poor prior performance (Carter and Lynch, 2001; Chidambaran and Prabhala, 2003). For the purposes of both managerial incentives and retention, as described in the previous section, I hypothesize that firms with poor prior performance tend to manipulate options.

Stock Volatility: Stock volatility is the standard deviation of daily stock prices in the month of option grants. Stock volatility is a prerequisite for option manipulation. Without volatile stock price movements, the scope for option manipulation is further reduced. Moreover, high stock price volatility indicates greater uncertainty for a typical risk-averse manager. Therefore, consistent with Bizjak et al. (2009), I hypothesize that stock price volatility is associated with option manipulation.

Industry: To capture the industry-specific effects, I follow Chidambaran and Prabhala (2003) and create three industry dummy variables[14]. In addition, I use 2-digit SIC codes to control for the industry fixed effects more generally. Chidambaran and Prabhala (2000, 2003) find that firms in the technology, trade and service industries tend to reprice options. Carter and Lynch (2001) argue that high-technology firms are more likely to be situated in a competitive labor market and thus face higher managerial turnover. They show that option repricing is one effective tool to recruit and retain talent. Chance et al. (2000) and Brenner et al. (2000) do not find such discrepancies across industries. I hypothesize that, for retention purposes, executive stock options are more likely to be manipulated in the high-technology industry.

[14] A technology industry dummy includes the Computer & Electronics Parts (group 8), Software & Technology (group 17), and Biotech (group 18) industries. A services industry dummy indicates the services industry (group 15). A trade industry dummy contains the Wholesale (group 13) and Retail (group 14) industries.

3.3.2 Managerial Incentives

Equity and Option Holdings: I estimate equity ownership as the ratio of shares owned by an executive to total shares outstanding of the firm. The option grant ratio is calculated by option grant value (using the Black-Scholes method) divided by total compensation in the current year. As described before, equity-based compensation is designed to address the conflict of interest between ownership and control by aligning the interests of both parties (Jensen and Meckling, 1976). When executives have large option holdings relative to their direct equity ownership, the need for option repricing is higher because of the misalignment in incentives and/or simply because it is valuable to do so (Chidambaran and Prabhala, 2003). Therefore, I hypothesize that option holdings have a positive relationship with option manipulation. On the other hand, equity ownership can be viewed as a measure for managerial entrenchment (Morck et al., 1988). For retention purposes, I expect that executives with lower equity ownership (who are thus less entrenched) are more likely to have their options manipulated.

Out-of-Moneyness of Existing Executive Option Portfolio: The literature on option repricing (e.g., Carter and Lynch, 2001; Chidambaran and Prabhala, 2003) suggests that option repricing is positively associated with the out-of-moneyness (OOM) of existing executive option portfolios for the purpose of restoring weaker incentives. Ideally, I need complete information with regard to the number and the exercise price of each option grant held by executives. However, due to lack of data, to estimate OOM, instead of adopting the typical methods provided in the repricing literature, I measure how the subsequent price change affects the in-the-money option value at the previous fiscal year-end (FYE). More specifically, it is defined as follows,

$$\text{Out-of-Moneyness (OOM)} = \frac{-\sum Qi \times (P' - P_{FYE})}{OptionValue_{FYE}}$$

where $\sum Qi$ is the aggregate number of unexercised (vested and unvested) options, $OptionValue_{FYE}$ is the estimated value of unexercised (vested and unvested) in-the-money options at the previous FYE, P' is the stock price in the month prior to the option grant date, and P_{FYE} is the stock price at

the previous FYE. Note that this measure potentially over-estimates the true value. I winsorize this variable at the 10% level for regression analysis, which helps address this issue in extreme cases. For incentive-realignment purposes, I conjecture a positive relationship between OOM and option manipulation.

3.3.3 Internal Governance and Board Characteristics

Empirical evidence on the relationship between internal governance and option repricing is mixed. Chidambaran and Prabhala (2003) suggest that better governance is associated with repricing, while Brenner et al. (2000) and Chance et al. (2000) find that greater insider influence on a board is related to repricing. Carter and Lynch (2001) find no relationship. Unlike option repricing, the evidence for option backdating is so far consistent in demonstrating that it results from weak governance (Bizjak et al., 2009; Collins et al., 2009). In this paper, I measure three aspects of internal governance:

Governance: I use the GIM Index and Entrenchment Index as proxies for governance. The GIM Index follows Gompers et al. (2003), and the Entrenchment Index follows Bebchuk et al. (2009). Both measures are constructed from anti-takeover provisions available to a firm, which are generally interpreted as the degree of minority shareholder protection.

Board: I use board size and two dummy variables indicating whether the CEO is on the board or on the compensation committee, respectively, as proxies for board characteristics. Board size is the number of directors on board. Yermack (1996) finds that smaller boards are associated with higher firm value, suggesting that smaller boards are more effective. If a CEO is on the board or compensation committee, he (she) is more able to acquire influence for his (her) private benefits, indicating weak governance.

CEO *Tenure*: I use the difference between the first year of company involvement (based on records from Compustat, Directors, and other online sources) and the option grant year as a proxy for CEO tenure. CEOs with long tenure in a firm are more likely to be entrenched or to influence the board to

pursue rent-seeking activities. So, longer CEO tenure can lead to weaker internal governance, although this relation is not supported by empirical evidence. For instance, Chidambaran and Prabhala (2003) show that CEO tenure is not statistically significantly different between repricers and control firms or between repricers and the universe of non-repricers.

If the managerial rent-seeking hypothesis (agency problems) holds, I expect that a firm that tends to manipulate options has a high governance index (worse governance), a large board (with its CEO sitting on the board and on the compensation committee), and longer CEO tenure.

3.3.4 Grant Characteristics

In addition to the features described above, I expect that scheduled grants significantly reduce the likelihood of option manipulation (Huang and Lu, 2010). A grant is defined as scheduled if it occurs within one day of the one-year anniversary of a prior grant or is followed by a grant dated within one day of the one-year anniversary of the grant in question. Moreover, during the sample period, two major events occur that profoundly affect the behavior of firms and investors: the passage of the SOX in 2002 and the media attention to the issue of option manipulation beginning in late 2005. Several recent studies show that the SOX has effectively deterred firms from engaging in option backdating since 2002 (e.g., Heron and Lie, 2007, 2009; Narayanan and Seyhun, 2008). However, Huang and Lu (2010) find that although SOX mitigates option backdating, it does not affect opportunistic timing behaviors related to option grants. It is not until the media attention to scandals and the subsequent compensation disclosure rules implemented in 2006 that option manipulation is eliminated. I use two dummy variables to capture the effects of the two events, and I expect that both decrease the likelihood of option manipulation.

4 Empirical Results

4.1 Determinants of Option Manipulation

4.1.1 Summary Statistics

Table 1 shows the descriptive statistics of my sample. In Panel A, the market value of slightly more than half of the firms is less than 2 billion U.S. dollars. In terms of industrial classification, as shown in Panel B, sample firms are concentrated in the manufacturing industry (21.18%), followed by the financial industry (13.48%) and the computers and electronic parts industry (11.33%)[15]. The computers and electronic parts industry has the most options that are potentially being manipulated (20.58%)[16], followed by the manufacturing industry (21.56%) and the services industry (10.00%), as illustrated in Panel C. In terms of the timing of the option grants, Panel D shows that, until 2006, the issuance of option grants increases steadily over time. Moreover, consistent with previous studies, the estimated number of manipulated options is higher in general before 2005. Particularly, between 1999 and 2002, approximately 12%-17% of option grants are estimated to have been manipulated, similar to the findings in Heron and Lie (2009).

Panel E displays the grant type distribution according to two categories, i.e., in-the-money, at-the-money, and out-of-the-money versus scheduled and unscheduled option grants, across three groups (whole sample, non-manipulated, and manipulated grants). In general, the grant type distribution of non-manipulated options is similar to that of total options. I also find that unscheduled and out-of-the-money options are more subject to manipulation. Panel F shows similar type distributions across the three groups, separated by the passage of the 2002 SOX Act and the year 2006. Before 2006, unscheduled grants are more common than scheduled ones (at a ratio of 2 to 1, which decreases

[15] The percentage increases to 22.73% when using a broader definition of the high-technology industry, as in Chidambaran and Prabhala (2003).

[16] Similarly, the percentage increases to 33.06% when using a broader definition of the high-technology industry, as in Chidambaran and Prabhala (2003).

significantly in the post-scandal period). In addition, before the SOX, it is more than twice as common to issue not-at-the-money grants. After the SOX, it is almost equally likely to issue both types of grants (not-at-the-money versus at-the-money). The at-the-money grant becomes the dominant type in the post-scandal period. These findings indicate that the trend regarding grant types reverses over time.

4.1.2 Univariate Comparisons

Table 2 shows between-sample (non-manipulated grants vs. manipulated grants) comparisons of selected firm-specific attributes, managerial incentives and internal governance. On the whole, all of the explanatory variables show discrepancies between non-manipulated and manipulated option grants at the 5% level of statistical significance for both mean and Wilcoxon rank-sum tests. A firm with a higher propensity for manipulating its CEO's option grants is typically smaller and younger. In addition, in the year of the grants, the firm tends to have more dispensable cash, lower return on assets, higher growth opportunity, and better internal governance. This firm is more likely to encounter higher stock volatility during the month of the grants. Such firm's CEOs have shorter tenure, own higher equity stakes, and are granted more options in their compensation packages. Once excluding the outliers, manipulated options seem to be granted to CEOs whose option portfolios are associated with a higher degree of out-of-moneyness.

4.1.3 Option Repricing and Option Manipulation

Figure 1 displays the number of senior executives whose stock options are repriced since 1992. The number increases quickly until 1998 and drops drastically afterward. Option repricing has been a rare event since 2000, and it disappears entirely after 2006. In particular, for CEOs, fewer than 10 episodes of option repricing have occurred since 2000. Table 3 reports the relationship between option repricing and option manipulation. Panel A shows the year-on-year comparisons since 1998[17]. The data for

[17] In Table 3, the years refer to fiscal years. Hence, they range from 1998 to 2008.

1999 are of particular interest because it is the first year after the regulatory change. I expect that the substitution effects, if any, should be most significant in this year. Among the 13 options granted by firms that are repricers in the previous year, only one firm (with one non-manipulated option grant) reprices again in 1999. For those that do not reprice (among the 13 repricers in 1998), the likelihood of having manipulated options is 25%. As a benchmark, for those that do not reprice in both years, the likelihood of having manipulated options is around 11.95%.

Panel B shows the correlation matrix between manipulation propensity and different measures of option repricing. The numbers suggest that, in general, a repricer in the previous year seems more likely to manipulate options this year despite not being statistically significant[18]. Those who reprice options in (or prior to) 1998 tend to manipulate options. Taken as a whole, these results provide preliminary evidence that option manipulation substitutes for option repricing, which has been rare since the regulatory change in 1998.

4.1.4 Multivariate Analysis

In this section, the baseline probit model to examine the relationships between explanatory variables and the propensity for option manipulation is as follows,

$$Prob(MANIPULATE_{it}) = \alpha_0 + \beta_1 SIZE_{it-1} + \beta_2 CASH_{it-1} + \beta_3 GROWTH_{it-1} + \beta_4 PROFITABILITY_{it-1} + \beta_5 VOLATILITY_{it} + \beta_6 AGE_{it} + \beta_7 SHAREOWNERSHIP_{it} + \beta_8 OPTIONHOLDING_{it} + \beta_9 OOM_{it} + \beta_{10} Tenure_{it} + \beta_{11} GOVERNANCE_{it} + \beta_{12} SCHEDULED_{it} + \varepsilon_{it}$$

The dependent variable $MANIPULATE$ is a dummy variable that is assigned to the value 1 for firm-grant-date observations whose abnormal stock return differences rank above the top 10% of the entire sample, under the condition that AR(+1,+20) is positive, and 0 otherwise. Table 4 shows

[18] The correlation between concurrent option manipulation and option repricing is positive and statistically significant. This is consistent with Callaghan et al. (2004) showing that executive stock option repricings are systematically timed to coincide with favorable movements in the company's stock price.

the estimated coefficients (marginal effects) from eight probit models that link option manipulation propensity to a number of explanatory variables, including firm, CEO, governance, and grant attributes, as described in Section 3.3. Models 1 and 2 include only one explanatory variable: a dummy variable that takes the value 1 for prior and current repricers, respectively, and 0 otherwise. In the previous section, I find positive correlations between option repricing and option manipulation. After controlling for industry and year fixed effects, the coefficient estimate for repricer in the previous year is 0.027, without statistical significance. Therefore, the regression analysis does not support the notion that firms that reprice in the previous year demonstrate more option manipulation in the current year. However, the positive coefficient estimate for the concurrent repricer is statistically significant at the 1% level. This supports the timing hypothesis of option repricing in Callaghan et al. (2004).

Models 3 to 7 include the same set of explanatory variables but use different measures for internal governance. The results are similar and robust to different governance attributes. Basically, I find that smaller, younger, and better governed firms tend to manipulate their CEO option grants more. Additionally, when a firm encounters a decline in accounting performance in the previous year and has higher stock price volatility in the month of the grants, the likelihood of options' being manipulated is higher. Firms in the technology industry have higher manipulation propensity. Furthermore, options tend to be manipulated when a CEO's option portfolio becomes more out-of-the-money. Options granted since the 2002 SOX are less likely to be manipulated. Almost all of the explanatory variables have the expected signs, except for dispensable cash, share ownership (both not statistically significant), tenure, and the proxies for internal governance.

These results still hold after controlling for industry and year fixed effects, as shown in Model 8. In summary, the variables that explain the probability of option manipulation coincide with many of those for option repricing. Moreover, because of their high correlation and the regulatory change in 1998 that required firms to expense the estimated value of repriced grants, these results suggest that option manipulation substitutes for option repricing. Note that smaller boards, which are viewed as

indicating an effective governance structure, are strongly associated with option manipulation. Thus, option manipulation is not related to weaker governance or managerial entrenchment. This finding is in contrast with the typical managerial power view.

4.1.5 Discussion: (Un)scheduled Grants, the SOX, and the Media

Figure 2 shows the cumulative mean abnormal stock returns (CAR) from 30 days before through 30 days after the option grant date in different sample periods (first for the entire sample, then for (un)scheduled grants). Figure 3 illustrates the CAR patterns for scheduled filed-in-time grants and unscheduled filed-late grants during the post-SOX period[19]. Taking the sample options as a whole, this "V-shaped" CAR pattern, which suggests option manipulation, is more pronounced in the pre-SOX period. The CAR pattern becomes flatter afterward, and it seems to be driven by the post-scandal period. Furthermore, this CAR pattern varies between sample periods for unscheduled and scheduled grants. In the pre-SOX period, neither type of grant shows distinctive patterns, though unscheduled grants show a pattern resembling the springloading mechanism. In the post-SOX period, this pattern intensifies for unscheduled grants. In other words, after the 2002 SOX, granting unscheduled options implies that more manipulation is involved. Despite this, the media attention since 2005 "corrects" these abnormal patterns for both types of option grants. As a result, media attention further reduces the potential opportunity for option grant date manipulation. Lastly, in the post-SOX period, as illustrated in Figure 3, the patterns for scheduled filed-in-time and unscheduled filed-late grants do not show significant differences until around day 13 after the grant date.

4.2 Option Manipulation and Performance

To test whether option manipulation serves the purpose of managerial incentive realignment, ideally I should examine whether performance is better than it would have been in the absence of such

[19] The results still hold when I use value-weighted CRSP market index as the market proxy.

manipulation. Since this cannot be measured, I use the performance of non-manipulating firms as a proxy and in the meantime control for firms' choices to manipulate. In this section I first incorporate post-manipulation accounting performance into my analysis. In addition to the legal ramifications, the ways in which this act might influence performance matter to shareholders. To that end, I use forward return on assets to measure post-manipulation operating performance. I use the treatment-effects model to explore the relationship. Because the decision to manipulate option grant dates is very likely not random, treatment models that consider the selection process are more appropriate than other simple linear models.

Formally, I use the following baseline model specification:

$$PROFITABILITY_{it+1} = \alpha_0 + \beta_1 SIZE_{it} + \beta_2 PROFITABILITY_{it} + \beta_3 MANIPULATE_{it} + \varepsilon_{it}$$

where the binary $MANIPULATE$ variable is a function of a set of selection variables shown in the previous multivariate tests.

Table 5 reports maximum likelihood estimates. Similar to the model specifications in the multivariate tests, Models 1 to 5 are identical except for different proxies for internal governance. On average, after controlling for contemporaneous firm size and profitability (together with industry and year fixed effects), the act of manipulating CEO option grants is not related to subsequent operating performance. The variables in the multivariate tests that explain the propensity for option manipulation still hold as the selection variables in the treatment equation. Growth opportunity and option grant ratio become statistically significant. It thus suggests that, when taking into account the post-performance and viewing option manipulation as a treatment, fast growing firms and CEOs holding more option grants increase the likelihood of manipulation.

Therefore, option date manipulation resembles the mechanism of option repricing. In other words, the rationale behind such manipulation suggests that it is used more for the purpose of retention and less for incentive realignment. Again, I do not find evidence of weaker corporate governance and/or

higher management entrenchment in the selection process. Option manipulation does not merely stem from lax board oversight or executive entrenchment.

I further investigate whether option manipulation has any consequences for a firm's long-term performance. To that end, I employ the calendar-time Fama-French three-factor model to estimate abnormal returns. I follow standard procedures in the literature, with two approaches, i.e., grant-based and firm-based. For the grant-based approach, each month I form portfolios consisting of all option grants that are issued within the last n months (where n is the length of the holding period). For the firm-based approach, the monthly portfolios contain all firms that issue an option grant within the last n months. The portfolios are rebalanced monthly, with those that reach the end of the holding period dropping out and new ones coming in. If a firm is delisted before the end of the holding period, I include its delisting return in computing the portfolio return. Then, I calculate the portfolio i mean monthly abnormal return (α_i) by regressing its excess return on the three Fama-French factors:

$$R_{it} - R_t^f = \alpha_i + \beta_i * (R_t^{mar} - R_t^f) + \gamma_i * SMB_t + \delta_i * HML_t + \varepsilon_{it}$$

where R_i is the equal-weighted portfolio i return, R^f is the risk-free rate (one month Treasury bill rate), R^{mar} is the CRSP value-weighted market portfolio return, SMB is the return of a portfolio of small stocks minus the return of a portfolio of large stocks, and HML is the return of a portfolio of high book-to-market stocks minus the return of a portfolio of low book-to-market stocks. I exclude portfolios consisting of less than 4 companies and the corresponding portfolios of their pairs, if anything.

Table 6 shows the (mean) abnormal returns for both types of portfolios consisting of manipulated and non-manipulated options in terms of grant-based (Panel A) and firm-based (Panel B) approaches. Overall, when using the top 10% (5%) threshold, the mean abnormal return for the manipulated option portfolio is positive and statistically significant in both 1-year and 2-year (2-year only) horizons. Nevertheless, when compared with the non-manipulated option portfolio, the abnormal return difference

is almost never statistically significant[20]. As a result, option manipulation seems unable to provide incentives that lead to outperformance in the long run. To conclude, these results suggest that option manipulation in general does not serve the incentive-realignment purposes, regardless of the horizon.

4.3 Robustness

In this section, I use several alternative proxies for option manipulation for robustness checks.

4.3.1 Normal Returns

For a typical option holder, the real benefits lie in normal (absolute) returns, not abnormal returns. Although my focus in this paper is the likelihood of option manipulation, it is also important to use the difference in normal returns as an alternative proxy for option manipulation since positive normal returns are necessary for such manipulating behavior. I find that the correlation between the difference in abnormal returns and the difference in normal returns is 0.7386 (p-value = 0.0000). Furthermore, when using the same identification method (the top 10% threshold), the correlation between the two dummy variables is 0.5266 (p-value = 0.0000). Therefore, the likelihood and the profitability are positively correlated with statistical significance. I run separate tests with the dummy variable based on the difference in normal returns as the proxy for option manipulation, and the results are similar (not tabulated).

4.3.2 (Unscheduled) Filed-Late Options

Since the 2002 SOX, firms are required to report their executive option grants to the SEC within two business days. Heron and Lie (2007) show that the "V" shape of CAR almost vanishes for the firms that report option grants within one day. For those that report with longer lags, this pattern continues to exist, and its magnitude tends to increase with the reporting delay. They argue that

[20] The only portfolio that shows significant difference is when using the top 10% threshold and the firm-based approach over a 1-year horizon.

filed-late option grants indicate a higher likelihood of option backdating after the 2002 SOX. As a result, I classify options as manipulated if they are filed late (and unscheduled), i.e., more than two business days after the grants, and replicate the analysis in Tables 5[21]. In Table 7 Panel A, Models 1 and 2 report the coefficient estimates of the maximum likelihood treatment-effects model. I find that the main variable of interest, option manipulation, is not associated with pre- or post-manipulation operating performance. This finding is robust to these two proxies. Moreover, for filed-late grants, the only selection variables that explain this manipulating behavior are firm size, CEO option grant ratio, and the scheduled indicator dummy. On the other hand, for unscheduled filed-late grants, only firm size explains such manipulating behavior. Therefore, inconsistent with previous findings, unscheduled and filed-late options do not act as an option repricing mechanism. If anything, they suggest strategic trading at the expense of shareholders.

4.3.3 Manipulated Options Predicted (Not) Being Repriced

One drawback of my findings is that they might simply capture the average sample effects. It can be that both manipulation and repricing-type effects exist in different sub-samples. These two effects are not necessarily exclusive (Callaghan et al., 2004). Hence, to further refine the analysis, I collect CEO options granted in 1998 and employ the same sample selection process described in Section 3.1. I use the repricing variable as the dependent variable and the determinants in the repricing literature as the explanatory variables[22] to conduct the probit model (marginal effects) estimation. Then, I use the coefficient estimates to generate a predicted likelihood of repricing for each sample observation. I classify an option grant whose predicted likelihood ranks among the top 10% of all sample grants to be predicted being repriced. There are 408 manipulated options predicted not being repriced and 118

[21] The correlation between the dummy variable of option manipulation (estimated) and the filed-late dummy variable is 0.0155 (0.0151 for the unscheduled filed-late dummy variable) despite being not statistically significant.

[22] They include: firm size, growth opportunity, return on assets, firm age, CEO stock ownership, CEO option grant ratio, out-of-moneyness of CEO option portfolio, board size, and technology industry.

manipulated options predicted being repriced which I adopt as two alternative proxies for manipulation.

In Table 7 Panel A, Models 3 and 4 report the coefficient estimates similar to the previous section except for different proxies for manipulation in use. The results show that these two types of manipulation have (slightly) different determinants. More specifically, the selection variables of manipulated options predicted being repriced, similar to those of manipulated options as a whole, are more likely for incentive-realignment purposes. The selection variables of manipulated options predicted not being repriced seem to be for retention purposes, if at all. Such discrepancy between these two types of manipulation might result in different influences on future operating performance. Note that board size is significantly negatively associated with manipulated options predicted being repriced while it is not related to manipulated ones predicted otherwise. In any case, there is no evidence that option manipulation (purely) results from weak governance.

Table 7 Panels B and C show the calendar-time abnormal returns using the Fama-French three factor model, similar to Table 6. The results are consistent between grant-based and firm-based approaches. When using the (unscheduled) filed-late options as the proxy for manipulation, the mean abnormal return for the non-manipulated option portfolio is significantly positive regardless of the horizon. On the contrary, when using the manipulated options predicted not being repriced as the proxy, the mean abnormal return for the manipulated option portfolio is significantly positive in the 1-year and 2-year horizons. However, again similar to the findings in Table 6, the abnormal return difference between non- and manipulated option portfolios is never statistically significant, regardless of the horizon or identification method.

5 Concluding Remarks

The finding of a positive abnormal stock return pattern after top executive option grants is first thought to be attributed to opportunistic timing of the grants or firm-specific news. More recent

studies have extended the event window and discovered negative abnormal returns before the grants. Heron and Lie (2007) argue that this V-shaped pattern around the grants is strong evidence for option backdating. This behavior is generally viewed as a result of inferior governance structures or managerial entrenchment. One mechanism sharing similar features, option repricing, is designed to restore weak incentives and retain valuable employees. Since a 1998 regulatory change that requires firms to expense the estimated value of repriced grants, top executive stock option repricing for the purpose of incentive realignment has been rare.

In this paper, I use a sample of 6,836 stock options granted to top executives in the S&P 1500 companies between 1999 and 2007 and test the alternative hypothesis that this manipulating behavior substitutes for option repricing after the regulatory change to circumvent the expenses. More specifically, I examine whether the two major explanations for option repricing, i.e., incentive realignment and employee retention, predict the likelihood of option manipulation. I further contribute to the literature by regarding this manipulating behavior as a self-selecting treatment.

In summary, my results show that CEO option backdating and other forms of manipulation as a whole resemble the mechanism of option repricing. The act of option manipulation seems to serve the purpose of not only retaining talented executives but also restoring misaligned incentives from a long-term perspective. Therefore, other than the tools used to reset the strikes, the difference between option manipulation and option repricing stems from the intensity of value enhancement.

The sub-sample analysis shows that unscheduled and filed late options are more likely to be used for strategic trading at the expense of shareholders. Options predicted to be repriced are manipulated seemingly to restore mismatched incentives whereas those predicted not to be repriced are manipulated likely for retention purposes. Regardless of the horizon or the proxy for manipulation, I do not find strong relations between such manipulating behavior and subsequent performance. Intriguingly, inconsistent with most extant studies, I find little evidence that option manipulation is associated with weak internal governance. It thus suggests that option manipulation is not a (mere) result of ineffective

boards or managerial entrenchment, in contrast with the managerial power view.

Finally, my study has implications for policy evaluation. Most prior work argues that the SOX has effectively deterred firms from engaging in option backdating since 2002. I show that although SOX effectively mitigates option manipulation, it is really the media attention to option backdating that has further eliminated the remaining potential opportunity for such practice or other forms of grant date manipulation. As a result, this paper shows the importance of the monitoring role played by the media and of public awareness, which together lead to better corporate disclosure rules.

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Table 1
Sample Statistics

This table provides summary statistics of sample firms/grants. Panel A displays the firm size distribution, in which the size is proxied by the (mean) market value of sample firms between 1999 and 2007. Panels B and C display, firm-wise and grant-wise, respectively, their industrial orientations, in which the industrial classification is based on SIC codes using the classification by Chidambaran and Prabhala (2003). A grant is assumed to be manipulated when its value of AR(+1,+20)-AR(-20,-2) is ranked among the top 10% of all sample grants, under the condition that its AR(+1,+20) is positive. Panel D reports the grant year distribution. Panels E and F show grant types based on manipulation and time periods, respectively. A grant is defined as scheduled if it occurs within one day of the one-year anniversary of a prior grant or is followed by a grant dated within one day of the one-year anniversary of the grant in question. A grant is at-the-money (out-of-the-money/in-the-money) if its exercise price is equal to (larger/lower than) the close price on the grant date.

Panel A: Size (firm-wise)		
Market Value (US$ million)	Number of Firms	Fraction (%)
<500	189	14.50
500 – 1,000	222	17.04
1,000 – 2,000	267	20.49
2,000 – 3,000	116	8.90
3,000 – 4,000	91	6.98
4,000 – 5,000	52	3.99
5,000 – 6,000	51	3.91
6,000 - 7,000	28	2.15
7,000 – 8,000	25	1.92
8,000 – 9,000	28	2.15
9,000 – 10,000	19	1.46
>10,000	215	16.50
Sample Size	1,303	100.00

Panel B: Industry (firm-wise)		
Industry	Number of Firms	Fraction (%)
Agriculture & Food	32	2.47
Mining	9	0.69
Construction	17	1.31
Oil & Petroleum	52	4.01
Small Scale Manufacturing	57	4.39
Chemicals/related manufacturing	148	11.40
Industrial Manufacturing	127	9.78
Computers & Electronic Parts	147	11.33
Printing & Publishing	21	1.62
Transportation	33	2.54
Telecommunication	23	1.77
Utilities	73	5.62
Wholesale	39	3.00
Retail	78	6.01
Services	119	9.17
Financials	175	13.48
Software & Technology	96	7.40
Biotech	52	4.01
Sample Size	1,298	100.00

Panel C: Industry (grant-wise)					
Industry	Number of Total Grants	Number of Non-Manipulated Options	Fraction (%)	Number of Manipulated Options	Fraction (%)
Agriculture & Food	194	185	2.98	9	1.46
Mining	48	44	0.71	4	0.65
Construction	83	72	1.16	11	1.78
Oil & Petroleum	252	234	3.77	18	2.92
Small Scale Manufacturing	327	300	4.83	27	4.38
Chemicals/related manufacturing	893	817	13.16	76	12.32
Industrial Manufacturing	620	563	9.07	57	9.24
Computers & Electronic Parts	810	683	11.00	127	20.58
Printing & Publishing	147	143	2.30	4	0.65
Transportation	221	197	3.17	24	3.89
Telecommunication	102	94	1.51	8	1.30
Utilities	354	335	5.40	19	3.08
Wholesale	210	190	3.06	20	3.24
Retail	401	362	5.83	39	6.32
Services	571	516	8.31	55	8.91
Financials	885	843	13.58	42	6.81
Software & Technology	422	371	5.98	51	8.27
Biotech	284	258	4.16	26	4.21
Sample Size	6,824	6,207	100.00	617	100.00

Panel D: Year (grant-wise)					
Year	Number of Total Grants	Number of Non-Manipulated Options	Fraction (%)	Number of Manipulated Options	Fraction (%)
1999	501	436	7.01	65	10.48
2000	550	458	7.37	92	14.84
2001	689	572	9.20	117	18.87
2002	729	640	10.30	89	14.35
2003	908	836	13.45	72	11.61
2004	918	853	13.72	65	10.48
2005	949	907	14.59	42	6.77
2006	836	792	12.74	44	7.10
2007	756	722	11.62	34	5.48
Sample Size	6,836	6,216	100.00	620	100.00

Panel E: Grant Type													
		Total Option Grants				Non-Manipulated Options				Manipulated Options			
		In-the-money	At-the-money	Out-of-the-money	Sub-total	In-the-money	At-the-money	Out-of-the-money	Sub-total	In-the-money	At-the-money	Out-of-the-money	Sub-total
Unscheduled	Number	1,273	2,078	1,057	4,408	1,148	1,864	944	3,956	125	214	113	452
	Fraction (%)	18.62	30.40	15.46	64.49	18.47	29.99	15.19	63.65	20.16	34.52	18.23	72.90
Scheduled	Number	733	1,035	659	2,427	688	967	604	2,259	45	68	55	168
	Fraction (%)	10.72	15.14	9.64	35.51	11.07	15.56	9.72	36.35	7.26	10.97	8.87	27.10
All grants	Number	2,006	3,113	1,716	6,835	1,836	2,831	1,548	6,215	170	282	168	620
	Fraction (%)	29.35	45.54	25.11	100.00	29.54	45.55	24.91	100.00	27.42	45.48	27.10	100.00

Panel F: Grant Type (sub-periods)													
		Pre-SOX (1999/01/01-2002/08/28)				Post-SOX (2002/08/29-2005/12/31)				Post-Scandal (2006/01/01-2007/11/30)			
		In-the-money	At-the-money	Out-of-the-money	Sub-total	In-the-money	At-the-money	Out-of-the-money	Sub-total	In-the-money	At-the-money	Out-of-the-money	Sub-total
Unscheduled	Number	551	489	494	1,534	538	1,011	400	1,949	184	578	163	925
	Fraction (%)	24.33	21.59	21.81	67.73	18.07	33.95	13.43	65.45	11.56	36.31	10.24	58.10
Scheduled	Number	280	206	245	731	316	429	284	1,029	137	400	130	667
	Fraction (%)	12.36	9.09	10.82	32.27	10.61	14.41	9.54	34.55	8.61	25.13	8.17	41.90
All grants	Number	831	695	739	2,265	854	1,440	684	2,978	321	978	293	1,592
	Fraction (%)	36.69	30.68	32.63	100.00	28.68	48.35	22.97	100.00	20.16	61.43	18.40	100.00

Table 2
Comparisons of Selected Characteristics of (Non-)Manipulated CEO Option Grants

This table presents means and medians of selected characteristics of CEO stock option grants between 1999 and 2007. An option grant is assumed to be manipulated when its value of AR(+1,+20)-AR(-20,-2) is ranked among the top 10% of all sample grants, under the condition that its AR(+1,+20) is positive. Firm size is proxied by market value of equity. Dispensable cash ratio is defined as cash minus interest expenses, scaled by total assets. Growth opportunity is the market-to-book ratio, defined as the market value of assets (the book value of assets plus the market value of common stock less the sum of book value of common equity and balance sheet deferred taxes) divided by the book value of total assets. Return on assets is a ratio of EBIT (earnings before interest and tax) to total assets. Stock volatility is the standard deviation of daily stock prices in the option-granting month. Firm age is the difference between the first year in which the firm has data in Compustat and the option grant year. Share ownership ratio is calculated as shares owned over total shares outstanding. Option grant ratio is option grant value (Black-Scholes) divided by total compensation in the current year. Out-of-Moneyness is measured by the product of the aggregate number of (unexercised vested and unvested) option grants at the previous fiscal year end and the stock price difference between the previous fiscal year end and the month prior to the grant date, scaled by the (unexercised vested and unvested) in-the-money option value at the previous fiscal year end. CEO tenure is the difference between the first year of company involvement and the option grant year. The GIM Index follows Gompers, Ishii, and Metrick (2003), and the Entrenchment Index follows Bebchuk, Cohen, and Ferrell (2004). Board size is the number of directors on the board.

Variable	Non-Manipulated Options		Manipulated Options		p-Value of Test for Diff. in Means (Distribution)	Number of Observations
	Mean	Median	Mean	Median		
Firm Size	12693.89	2993.25	8004.40	1724.16	0.0004 (0)	6,830
Dispensable Cash Ratio	0.07	0.04	0.09	0.05	0 (0)	6,830
Growth Opportunity	1.95	1.53	2.17	1.67	0.0002 (0.0156)	6,830
Return on Assets	0.09	0.08	0.07	0.07	0 (0.0002)	6,830
Stock Volatility	1.29	0.88	1.62	1.08	0 (0)	6,813
Firm Age	28.72	24.00	23.14	16.00	0 (0)	6,836
Share Ownership (%, excl. stock options)	1.07	0.00	1.53	0.00	0.0035 (0.0001)	6,707
Option Grant Ratio (%)	0.36	0.36	0.46	0.50	0 (0)	6,707
Out-of-Moneyness	-81.00	0.00	44.29	0.00	0.1258 (0)	6,446
CEO Tenure	12.86	10.00	11.91	9.00	0.0395 (0.0331)	6,682
GIM Index	9.52	9.00	8.89	9.00	0 (0)	6,836
Entrenchment Index	2.38	2.00	2.15	2.00	0 (0)	6,836
Board Size	9.92	10.00	8.85	9.00	0 (0)	6,282

Table 3
Option Repricing versus Option Manipulation

This table shows the relationship between option repricing and option manipulation. An option grant is assumed to be manipulated when its value of AR(+1,+20)-AR(-20,-2) is ranked among the top 10% of all sample grants, under the condition that its AR(+1,+20) is positive. Panel A displays the number of (non-)manipulated option grants of option repricing firms (in both the current fiscal year and the previous fiscal year) between 1998 and 2008. Panel B presents the pair-wise correlation matrix between option manipulation and option repricing (with several dummy proxies). The symbols *, **, and *** represent statistical significance at the 0.1, 0.05, and 0.01 levels, respectively.

Panel A: Year

		Non-Repricers (t-1)			Repricers (t-1)		
		Non-Manipulated Options	Manipulated Options	Sub-total	Non-Manipulated Options	Manipulated Options	Sub-total
1998	Non-Repricers	10	2	12	0	0	0
	Repricers	0	0	0	0	0	0
1999	Non-Repricers	383	52	435	9	3	12
	Repricers	1	0	1	1	0	1
2000	Non-Repricers	453	96	549	5	0	5
	Repricers	0	0	0	0	0	0
2001	Non-Repricers	550	107	657	0	1	1
	Repricers	2	3	5	0	0	0
2002	Non-Repricers	634	89	723	2	0	2
	Repricers	1	0	1	1	1	2
2003	Non-Repricers	792	72	864	3	1	4
	Repricers	9	3	12	0	0	0
2004	Non-Repricers	824	64	888	6	0	6
	Repricers	4	0	4	6	0	6
2005	Non-Repricers	914	42	956	3	1	4
	Repricers	7	1	8	2	0	2
2006	Non-Repricers	783	44	827	6	1	7
	Repricers	0	0	0	1	0	1
2007	Non-Repricers	729	31	760	1	0	1
	Repricers	0	0	0	0	0	0
2008	Non-Repricers	74	6	80	0	0	0
	Repricers	0	0	0	0	0	0
Total		6,170	612	6,782	46	8	54

Panel B: Correlation

	Manipulation Propensity	Repricer in 1998	Repricer prior to 1998	Repricer (t)	Repricer (t-1)
Manipulation Propensity	1				
Repricer in 1998	0.0444***	1			
Repricer prior to 1998	0.0590***	0.5818***	1		
Repricer (t)	0.0264**	0.1061***	0.0724***	1	
Repricer (t-1)	0.0179	0.2298***	0.1503***	0.2437***	1

Table 4
Determinants of Option Manipulation

This table provides coefficient estimates (marginal effects) for the probit models explaining the decision to manipulate CEO stock option grants. The dependent variable is assigned the value 1 for grants whose AR(+1,+20)-AR(-20,-2) is ranked among the top 10% of all sample grants, under the condition that AR(+1,+20) is positive, and 0 otherwise. For the explanatory variables, firm size is proxied by log(1+market value of equity). Dispensable cash ratio is defined as cash minus interest expenses, scaled by total assets. Growth opportunity is the market-to-book ratio (winsorized at the 1% level), defined as the market value of assets (the book value of assets plus the market value of common stock less the sum of book value of common equity and balance sheet deferred taxes) divided by the book value of total assets. Return on assets is a ratio of EBIT (earnings before interest and tax) to total assets (winsorized at the 1% level). Stock volatility is the standard deviation of daily stock prices in the option-granting month (winsorized at the 1% level). Firm age is the difference between the first year in which the firm has data in Compustat and the option grant year. Share ownership ratio is calculated as shares owned over total shares outstanding (winsorized at the 1% level). Option grant ratio is option grant value (Black-Scholes) divided by total compensation in the current year. Out-of-Moneyness is measured by the product of the aggregate number of (unexercised vested and unvested) option grants at the previous fiscal year end and the stock price difference between the previous fiscal year end and the month prior to the grant date, scaled by the (unexercised vested and unvested) in-the-money option value at the previous fiscal year end (winsorized at the 10% level). CEO tenure is the difference between the first year of company involvement and the option grant year. The GIM Index follows Gompers, Ishii, and Metrick (2003), and the Entrenchment Index follows Bebchuk, Cohen, and Ferrell (2004). Board size is the number of directors on the board. A grant is defined as scheduled if it occurs within one day of the one-year anniversary of a prior grant or is followed by a grant dated within one day of the one-year anniversary of the grant in question. Industry fixed effects adopt 2-digit SIC codes. Standard deviations are clustered at the 2-digit SIC level. Z-values are reported in parentheses, and the symbols *, **, and *** represent statistical significance at the 0.1, 0.05, and 0.01 levels, respectively.

Explanatory Variables		Predicted Sign	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Firm Attributes	Repricer (t-1)	+	0.027							
			(0.62)							
	Repricer (t)	+		0.073***						
				(2.65)						
	Firm Size (t-1)	—			-0.045***	-0.046***	-0.033***	-0.045***	-0.045***	-0.030***
		(retention)			(-5.54)	(-5.87)	(-3.69)	(-5.5)	(-5.51)	(-3.29)
	Dispensable Cash Ratio (t-1)	—			0.025	0.023	0.009	0.028	0.028	0.024
					(0.93)	(0.86)	(0.31)	(1.06)	(1.03)	(0.86)
	Growth Opportunity (t-1)	+			0.004	0.004	0.002	0.004	0.004	0.002
		(retention)			(1.35)	(1.4)	(0.83)	(1.34)	(1.4)	(1.2)
	Return on Assets (t-1)	—			-0.088**	-0.086**	-0.116***	-0.086**	-0.092**	-0.100***
		(incentives)			(-2.31)	(-2.29)	(-2.98)	(-2.16)	(-2.27)	(-3.12)
	Stock Volatility (t)	+			0.017***	0.017***	0.017***	0.017***	0.017***	0.014***
					(6.06)	(6.11)	(5.92)	(5.93)	(5.95)	(5.02)
	Firm Age (t)	—			-0.001*	-0.001**	-0.001***	-0.001**	-0.001**	-0.001***
		(retention)			(-1.94)	(-2.31)	(-2.91)	(-2.36)	(-2.37)	(-3.12)

	Technology (t)	+ (retention)			0.030** (1.99)	0.029** (1.98)	0.027** (1.96)	0.032** (2.03)	0.031** (2.02)	
	Services (t)				0.007 (0.61)	0.007 (0.61)	0.006 (0.54)	0.008 (0.68)	0.008 (0.69)	
	Trade (t)				0.010 (1.26)	0.009 (1.19)	0.012 (1.41)	0.010 (1.17)	0.010 (1.25)	
CEO Attributes	Share Ownership (t)	– (retention)			0.001 (0.59)	0.001 (0.55)	0.000 (0.45)	0.001 (0.72)	0.001 (0.71)	0.001 (0.66)
	Option Grant Ratio (t)	+ (incentives)			0.016 (1.36)	0.015 (1.28)	0.015 (1.19)	0.016 (1.42)	0.016 (1.33)	0.006 (0.54)
	Out-of-Moneyness (t)	+ (incentives)			0.019*** (6.06)	0.019*** (6.08)	0.020*** (6.36)	0.019*** (6.04)	0.019*** (6.13)	0.021*** (6.77)
	CEO Tenure (t)	+ (agency)			-0.000 (-1.62)	-0.001* (-1.78)	-0.000 (-0.95)	-0.000 (-1.42)	-0.000* (-1.65)	-0.000 (-0.76)
Governance Attributes	GIM Index (t)	+ (agency)			-0.003*** (-2.81)					
	Entrenchment Index (t)	+ (agency)				-0.007** (-2.39)				
	Board Size (t)	+ (agency)					-0.004*** (-3.61)			-0.002* (-1.81)
	CEO on the compensation committee (t)	+ (agency)						-0.056** (-2)		
	CEO on the board (t)	+ (agency)							0.005 (0.48)	
Grant Attributes	Scheduled (t)	–			-0.005 (-0.6)	-0.005 (-0.62)	-0.003 (-0.45)	-0.006 (-0.72)	-0.006 (-0.72)	-0.002 (-0.27)
	Post-SOX (t)	–			-0.062*** (-8.21)	-0.061*** (-7.91)	-0.065*** (-8.64)	-0.062*** (-8.1)	-0.062*** (-8.01)	
	Post-Scandal (t)	–			-0.059*** (-5.74)	-0.059*** (-5.71)	-0.059*** (-6.41)	-0.059*** (-5.72)	-0.059*** (-5.7)	
Industry FE			Yes	Yes	No	No	No	No	No	Yes
Year FE			Yes	Yes	No	No	No	No	No	Yes
Pseudo R^2			0.0794	0.0799	0.0939	0.0947	0.1014	0.0938	0.0929	0.1205
# of obs.			6,764	6,764	6,325	6,325	5,892	6,325	6,325	5,791

Table 5
The Manipulation of CEO Stock Option Grants and Performance

This table shows the maximum likelihood (ML) coefficient estimates of the treatment-effects models on how the manipulation of CEO stock option grants might influence subsequent performance. The dependent variable is forward return on assets, a ratio of EBIT (earnings before interest and tax) to total assets in year (t+1). For the explanatory variables, the option manipulation variable is a dummy variable, assigned to the value 1 for grants whose AR(+1,+20)-AR(-20,-2) is ranked among the top 10% of all sample grants, under the condition that AR(+1,+20) is positive, and 0 otherwise. Firm size is proxied by log(1+market value of equity). Dispensable cash ratio is defined as cash minus interest expenses, scaled by total assets. Growth opportunity is the market-to-book ratio, defined as the market value of assets (the book value of assets plus the market value of common stock less the sum of book value of common equity and balance sheet deferred taxes) divided by the book value of total assets (winsorized at the 1% level). Stock volatility is the standard deviation of daily stock prices in the option-granting month (winsorized at the 1% level). Firm age is the difference between the first year in which the firm has data in Compustat and the option grant year. Share ownership ratio is calculated as shares owned over total shares outstanding (winsorized at the 1% level). Option grant ratio is option grant value (Black-Scholes) divided by total compensation in the current year. Out-of-Moneyness is measured by the product of the aggregate number of (unexercised vested and unvested) option grants at the previous fiscal year end and the stock price difference between the previous fiscal year end and the month prior to the grant date, scaled by the (unexercised vested and unvested) in-the-money option value at the previous fiscal year end (winsorized at the 10% level). CEO tenure is the difference between the first year of company involvement and the option grant year. The GIM Index follows Gompers, Ishii, and Metrick (2003), and the Entrenchment Index follows Bebchuk, Cohen, and Ferrell (2004). Board size is the number of directors on the board. A grant is defined as scheduled if it occurs within one day of the one-year anniversary of a prior grant or is followed by a grant dated within one day of the one-year anniversary of the grant in question. All performance measures are winsorized at the 1% level. Industry fixed effects adopt 2-digit SIC codes. Z-values are reported in parentheses, and the symbols *, **, and *** represent statistical significance at the 0.1, 0.05, and 0.01 levels, respectively.

Explanatory Variables		Model 1	Model 2	Model 3	Model 4	Model 5
Control Variables:						
	Firm Size (t)	0.008***	0.008***	0.008***	0.008***	0.008***
		(8.43)	(8.46)	(8.1)	(8.43)	(8.42)
	Return on Assets (t)	0.796***	0.796***	0.795***	0.796***	0.796***
		(101.35)	(101.35)	(95.03)	(101.35)	(101.35)
Option Manipulation		-0.004	-0.003	-0.004	-0.004	-0.004
		(-0.81)	(-0.67)	(-0.82)	(-0.78)	(-0.82)
Selection Variables:						
Firm Attributes	Firm Size (t-1)	-0.385***	-0.395***	-0.328***	-0.385***	-0.384***
		(-8.72)	(-8.93)	(-6.28)	(-8.69)	(-8.65)
	Dispensable Cash Ratio (t-1)	-0.095	-0.115	-0.299	-0.060	-0.064
		(-0.4)	(-0.49)	(-1.13)	(-0.26)	(-0.27)
	Growth Opportunity (t-1)	0.047**	0.046**	0.039	0.048**	0.049**
		(2.03)	(1.98)	(1.54)	(2.09)	(2.15)
	Return on Assets (t-1)	-0.717**	-0.695**	-0.84**	-0.722**	-0.753**
		(-2.34)	(-2.27)	(-2.51)	(-2.36)	(-2.45)
	Stock Volatility (t)	0.161***	0.160***	0.171***	0.161***	0.161***
		(8.43)	(8.36)	(8.5)	(8.39)	(8.41)
	Firm Age (t)	-0.003	-0.003*	-0.005***	-0.004**	-0.004**
		(-1.47)	(-1.94)	(-2.67)	(-2.17)	(-2.19)
CEO Attributes	Share Ownership (t)	0.006	0.005	0.004	0.007	0.006
		(0.74)	(0.65)	(0.48)	(0.9)	(0.87)
	Option Grant Ratio (t)	0.463***	0.455***	0.485***	0.466***	0.461***
		(5.47)	(5.37)	(5.46)	(5.49)	(5.44)
	Out-of-Moneyness (t)	0.163***	0.163***	0.169***	0.162***	0.163***
		(6.45)	(6.44)	(6.26)	(6.42)	(6.46)
	CEO Tenure (t)	-0.003	-0.003	-0.001	-0.002	-0.003
		(-1.05)	(-1.22)	(-0.5)	(-0.97)	(-1.1)

Governance Attributes	GIM Index (t)	-0.021**				
		(-2.16)				
	Entrenchment Index (t)		-0.058***			
			(-3.04)			
	Board Size (t)			-0.022*		
				(-1.88)		
	CEO on the compensation committee (t)				-0.609	
					(-1.4)	
	CEO on the board (t)					0.027
						(0.42)
Grant Attributes	Scheduled (t)	-0.062	-0.063	-0.055	-0.069	-0.068
		(-1.2)	(-1.23)	(-1.04)	(-1.35)	(-1.33)
Industry FE		Yes	Yes	Yes	Yes	Yes
Year FE		Yes	Yes	Yes	Yes	Yes
Wald Chi^2		17429.19	17431.34	15352.56	17429.33	17428.55
Prob > Chi^2		0	0	0	0	0
# of Observations		6,221	6,221	5,802	6,221	6,221

Table 6
Option Manipulation and Calendar-Time Fama-French Three-Factor Model Abnormal Returns

This table reports calendar-time abnormal returns using the Fama-French three factor model. An option grant is assumed to be manipulated when its value of AR(+1,+20)-AR(-20,-2) is ranked among the top 10% (or top 5% as an alternative proxy for option manipulation) of all sample grants, under the condition that its AR(+1,+20) is positive. Each month I form portfolios consisting of all grants (Panel A) that have been issued and of all firms (Panel B) that have issued a grant within the last *n* years (where *n* is the length of the holding period). Portfolio returns are equally weighted. Abnormal returns are given by the intercept when excess portfolio returns are regressed on the three Fama-French factors. T-statistics are in parentheses.

Panel A: Grant-Based Portfolio						
	Top 10% Threshold			Top 5% Threshold		
	1-Year	2-Year	3-Year	1-Year	2-Year	3-Year
Non-Manipulated Options (1)	0.002	0.003**	0.010*	0.003	0.003**	0.010*
	(1.35)	(2.28)	(1.66)	(1.52)	(2.37)	(1.66)
Manipulated Options (2)	0.008***	0.007***	0.010	0.007	0.007**	0.011
	(2.64)	(2.71)	(1.46)	(1.66)	(2.37)	(1.54)
(2)-(1)	0.006	0.004	-0.000	0.005	0.005	0.001
	(1.65)	(1.52)	(-0.02)	(0.98)	(1.37)	(0.09)

Panel B: Firm-Based Portfolio						
	Top 10% Threshold			Top 5% Threshold		
	1-Year	2-Year	3-Year	1-Year	2-Year	3-Year
Non-Manipulated Options (1)	0.002	0.003**	0.002**	0.002	0.003**	0.002**
	(1.09)	(2.38)	(2.02)	(1.32)	(2.47)	(2.12)
Manipulated Options (2)	0.008***	0.006**	0.003	0.008*	0.007**	0.004*
	(2.74)	(2.48)	(1.64)	(1.72)	(2.21)	(1.68)
(2)-(1)	0.006*	0.003	0.001	0.005	0.004	0.001
	(1.85)	(1.3)	(0.35)	(1.12)	(1.24)	(0.59)

Table 7
Robustness Checks: Alternative Proxies for Manipulated Options

This table adopts four alternative proxies for option manipulation and provides robustness checks: first on treatment-effects ML estimates (as in Table 5) and second on the Fama-French three-factor model abnormal returns (as in Table 6). In Panel A, the dependent variable is forward return on assets, a ratio of EBIT (earnings before interest and tax) to total assets in year (t+1). For the explanatory variables, firm size is proxied by log(1+market value of equity). Option manipulation is a dummy variable that is assigned to the value 1 if an option grant is filed late (Model 1), unscheduled and filed late (Model 2), manipulated and predicted being repriced (Model 3), or manipulated and predicted not being repriced (Model 4), and 0 otherwise. Dispensable cash ratio is defined as cash minus interest expenses, scaled by total assets. Growth opportunity is the market-to-book ratio, defined as the market value of assets (the book value of assets plus the market value of common stock less the sum of book value of common equity and balance sheet deferred taxes) divided by the book value of total assets (winsorized at the 1% level). Stock volatility is the standard deviation of daily stock prices in the option-granting month (winsorized at the 1% level). Firm age is the difference between the first year in which the firm has data in Compustat and the option grant year. Share ownership ratio is calculated as shares owned over total shares outstanding (winsorized at the 1% level). Option grant ratio is option grant value (Black-Scholes) divided by total compensation in the current year. Out-of-Moneyness is measured by the product of the aggregate number of (unexercised vested and unvested) option grants at the previous fiscal year end and the stock price difference between the previous fiscal year end and the month prior to the grant date, scaled by the (unexercised vested and unvested) in-the-money option value at the previous fiscal year end (winsorized at the 10% level). CEO tenure is the difference between the first year of company involvement and the option grant year. Board size is the number of directors on the board. A grant is defined as scheduled if it occurs within one day of the one-year anniversary of a prior grant or is followed by a grant dated within one day of the one-year anniversary of the grant in question. All performance measures are winsorized at the 1% level. Industry fixed effects adopt 2-digit SIC codes. With these four alternative proxies for option manipulation, Panel B and C report calendar-time abnormal returns using the Fama-French three factor model. Z-values are in parentheses, and the symbols *, **, and *** represent statistical significance at the 0.1, 0.05, and 0.01 levels, respectively.

Panel A: Maximum Likelihood Treatment-Effects Models

Explanatory Variables		Model 1: Filed-Late Options	Model 2: Unscheduled and Filed-Late Options	Model 3: Manipulated Options Predicted Being Repriced	Model 4: Manipulated Options Predicted not Being Repriced
Control Variables:					
	Firm Size (t)	0.011***	0.011***	0.008***	0.008***
		(8.71)	(8.9)	(8.49)	(7.85)
	Return on Assets (t)	0.839***	0.839***	0.797***	0.808***
		(83.7)	(83.75)	(91.59)	(95.66)
Option Manipulation		-0.000	-0.001	0.011**	-0.029***
Selection Variables:		(-0.03)	(-0.11)	(2.05)	(-3.01)
Firm Attributes	Firm Size (t-1)	-0.311***	-0.307***	-0.759***	-0.232***
		(-5.47)	(-4.3)	(-5.58)	(-4.01)
	Dispensable Cash Ratio (t-1)	-0.188	-0.187	-0.039	-0.590**
		(-0.65)	(-0.56)	(-0.09)	(-1.96)
	Growth Opportunity (t-1)	0.013	0.002	0.068	0.014
		(0.37)	(0.04)	(1.55)	(0.49)
	Return on Assets (t-1)	0.331	0.032	-1.416***	-0.082
		(0.8)	(0.07)	(-2.58)	(-0.22)
	Stock Volatility (t)	-0.013	0.027	0.127***	0.173***
		(-0.42)	(0.69)	(2.65)	(8.46)
	Firm Age (t)	-0.001	-0.002	-0.009*	-0.003*
		(-0.39)	(-0.96)	(-1.72)	(-1.86)
CEO Attributes	Share Ownership (t)	0.006	0.004	0.017	-0.001
		(0.59)	(0.36)	(1.1)	(-0.12)

	Option Grant Ratio (t)	0.272***	0.162	2.485***	0.097
		(2.78)	(1.36)	(7.89)	(1.04)
	Out-of-Moneyness (t)	0.040	0.023	0.480***	0.109***
		(1.37)	(0.66)	(6.59)	(3.93)
	CEO Tenure (t)	0.002	0.001	-0.015*	0.000
		(0.58)	(0.29)	(-1.93)	(0.07)
Governance Attributes	Board Size (t)	0.013	0.009	-0.222***	0.006
		(0.97)	(0.53)	(-5.74)	(0.51)
Grant Attributes	Scheduled (t)	-0.144**	-5.185	-0.182	-0.030
		(-2.52)	(-0.02)	(-1.23)	(-0.56)
Industry and Year FE		Yes	Yes	Yes	Yes
Wald Chi^2		12010.50	12008.63	14573.84	15302.92
Prob > Chi^2		0	0	0	0
# of Observations		3,797	3,797	5,404	5,685

Panel B: Grant-Based Portfolio												
	Filed-Late Options			Unscheduled and Filed-Late Options			Manipulated Options Predicted Being Repriced			Manipulated Options Predicted Not Being Repriced		
	1-Year	2-Year	3-Year	1-Year	2-Year	3-Year	1-Year	2-Year	3-Year	1-Year	2-Year	3-Year
Non-Manipulated Options (1)	0.003**	0.003**	0.013**	0.003**	0.003**	0.013**	0.002	0.000	0.009*	0.003	0.002*	0.009
	(2.14)	(2.4)	(2.16)	(2.22)	(2.38)	(2.15)	(1.02)	(0.38)	(1.86)	(1.45)	(1.88)	(1.62)
Manipulated Options (2)	0.003	0.002	0.011*	0.003	0.004	0.012*	0.010	0.006	0.010	0.005**	0.006**	0.009
	(1.57)	(1.42)	(1.74)	(1.04)	(1.38)	(1.75)	(1.34)	(1.08)	(1.11)	(2.01)	(2.58)	(1.46)
(2)-(1)	0.000	-0.001	-0.002	0.000	0.000	-0.001	0.008	0.005	0.000	0.003	0.004	-0.000
	(0.14)	(-0.43)	(-0.25)	(0.04)	(0.11)	(-0.15)	(0.99)	(0.96)	(0.05)	(0.87)	(1.43)	(-0.06)

Panel C: Firm-Based Portfolio												
	Filed-Late Options			Unscheduled and Filed-Late Options			Manipulated Options Predicted Being Repriced			Manipulated Options Predicted Not Being Repriced		
	1-Year	2-Year	3-Year	1-Year	2-Year	3-Year	1-Year	2-Year	3-Year	1-Year	2-Year	3-Year
Non-Manipulated Options (1)	0.002*	0.003**	0.003*	0.002*	0.003**	0.003*	0.002	0.001	0.001	0.002	0.003**	0.002*
	(1.77)	(2.23)	(1.89)	(1.87)	(2.22)	(1.87)	(1.03)	(0.65)	(0.57)	(1.27)	(2.2)	(1.95)
Manipulated Options (2)	0.003	0.003*	0.001	0.003	0.004*	0.002	0.010	0.005	0.002	0.005**	0.005**	0.003
	(1.58)	(1.74)	(0.85)	(1.1)	(1.8)	(0.94)	(1.4)	(1.13)	(0.54)	(2.1)	(2.38)	(1.58)
(2)-(1)	0.001	-0.000	-0.001	0.001	0.001	-0.001	0.008	0.005	0.001	0.003	0.003	0.001
	(0.33)	(-0.24)	(-0.72)	(0.23)	(0.42)	(-0.31)	(1.02)	(0.93)	(0.37)	(1.02)	(1.14)	(0.32)

Figure 1
Number of Senior Executives with Repriced Stock Option Grants

Figure 1 shows the number of top executives whose stock option grants are repriced during the 1992-2010 period.

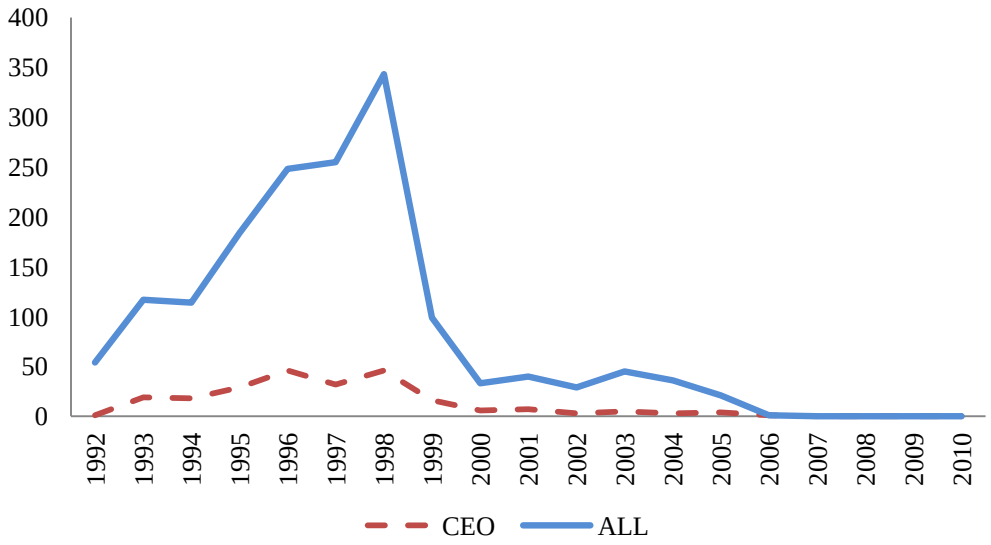
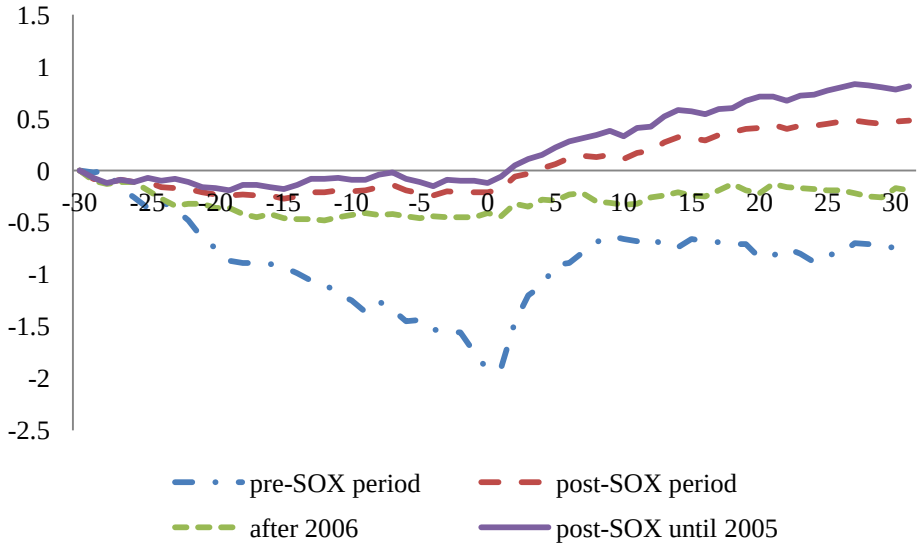


Figure 2
Cumulative Abnormal Returns Around Grant Dates: Sub-sample Periods

Figure 2 shows the cumulative mean abnormal stock returns (as a percentage) from 30 days before through 30 days after the option grant date in four different sample periods, followed by (un)scheduled grants in three sample periods. Abnormal stock returns are estimated using the Fama and French three-factor model, with an equally-weighted CRSP market index, in which the estimation window lasts 255 days, ending 45 days prior to the grant date.



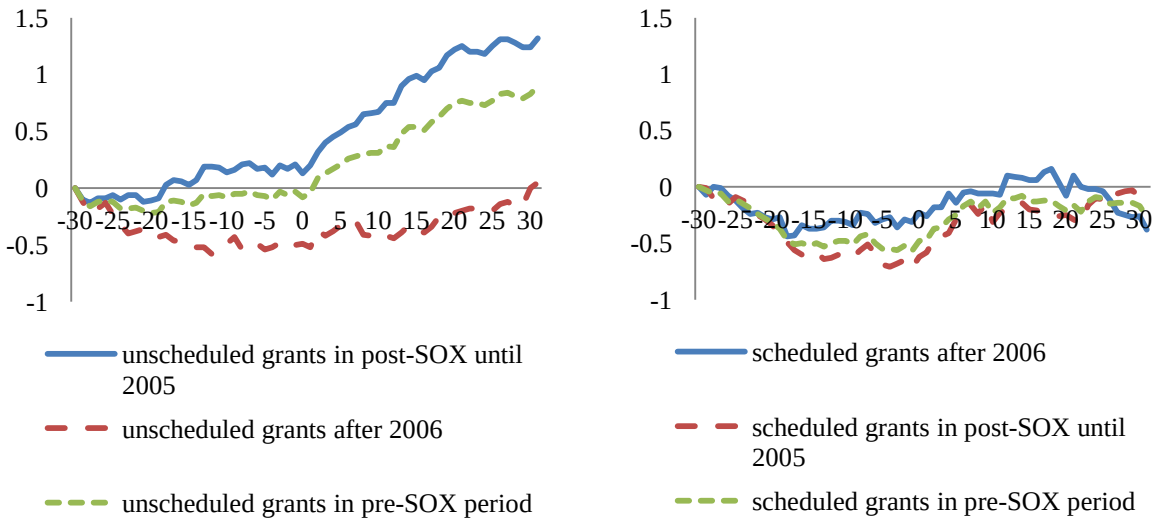


Figure 3
Cumulative Abnormal Returns Around Grant Dates:
Post-SOX Period

Figure 3 shows the cumulative mean abnormal stock returns (as a percentage) from 30 days before through 30 days after the option grant date for scheduled filed-in-time and unscheduled filed-late grants after the passage of SOX on August 29, 2002. Abnormal stock returns are estimated using the Fama and French three-factor model, with an equally-weighted CRSP market index, in which the estimation window lasts 255 days, ending 45 days prior to the grant date.