Executive Stock Options and Financial Analysts' Forecast Behaviors

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ABSTRACT

This paper examines whether managers communicate with analysts to disseminate biased information to increase managers' compensation. We focus on managers' stock option compensation, a setting where managerial incentive to engage in an opportunistic behavior is particularly severe. Meanwhile, we examine whether analysts improve their relative forecast accuracy in the next quarter after issuing biased recommendation to please management. Using option grants sample and option exercises sample over 1996-2005 separately, we find that managers with option grants (option exercises) receive relative unfavorable (favorable) analyst consensus recommendation for each of three months prior to the award month (exercise month). Moreover, individual analysts who issue unfavorable recommendation prior to option awards or favorable recommendation prior to option exercises to increase managers' compensation improve their relative forecast accuracy in the next quarter. These findings support the argument that the communication exists between managers and financial analysts for their own incentives and benefits.

1. Introduction

Companies approve a stock option plan to attract, retain, and motivate the CEOs and other top management on the behalf of shareholders. Thus, stock option awards are designed as a mechanism to align the interests of managers and shareholders. However, there is a controversy over whether executive stock option awards induce opportunistic managerial behavior which is adverse to shareholders interests, and this issue has been extensively investigated in academic work for the last decade. In this study, we attempt to provide further evidence on the role of stock options as a compensation scheme on the firm.

Almost all U.S. firms use at-the-money stock options to compensate CEOs and other top management that is managers' exercise price (strike price) is set to the grant-date market price. In this case, managers may have incentive to engage in opportunistic behavior around the grant date and the exercise date. In particularly, managers wish to lower exercise price around the grant date and to raise the market price around the exercise date so that they can maximize their benefit. Yermack (1997) is the first paper to investigate managers' influence over the terms of their own compensation and find that CEOs opportunistically time option-grant dates around earnings announcements to increase their compensation. Aboody and Kasznik (2000) employ the sample with fixed award schedules to suggest that CEOs time their voluntary disclosures around grant date; Lie (2005) use unscheduled awards sample to suggest that CEOs time their awards retroactively. Carpenter and Remmers (2001), Huddart and Lang (2003), and Bartov and Mohanram (2004) investigate managerial incentive for option exercises with mixed results.

Though previous studies investigate this issue, we propose alternative possibility that managers communicate with analysts to manage investors' expectations and the

stock market. Managers may prefer to use the release of analyst's information to manipulate the market reaction instead of management information disclosure or timing awards retroactively. Since 1940s, shareholders can file lawsuits against managers as managers mislead market by disseminating adverse information (Francis *et al*., 1994) according to rule 10b-5 of the 1934 Securities Exchange Act. Under this situation, managers have to bear legal exposure and litigation costs. Further, they have to bear the cost of reputation loss as investors and shareholders recognize their manipulation behaviors. Given the concerns of media and investors with executive stock option grants, managers would rather employ other indirect methods such as analyst's information than direct methods such as management voluntarily information disclosure and backdating to achieve the same purpose.

On the other hand, we attempt to investigate whether analysts have their benefit after communicating and cooperating with managers to increase managers' compensation. Analysts are one of information intermediaries in the market to collect, process, and disseminate information to market participants. Prior studies suggest that analysts play an information role to improve capital market's information quality which in turn reduces uncertainty and information asymmetry in the market (Branson, Guffey, and Pagach, 1998; Irvine, 2003). Analysts, however, have their incentive to manipulate information to maximize managers' benefit. In particularly, analysts often issue biased earnings forecast (Richardson et al., 2004) and biased recommendation (Chen and Matsumoto, 2006) to please management to access management's private information (Lim, 2001; Bowen et al., 2002; Solomon and Frank, 2003) and then to improve their forecast accuracy (Ke and Yu, 2006; Chen and Matsumoto, 2006). Thus, we expect that analysts who curry favor with management obtain their benefit. Specifically, analysts who issue unfavorable information before

option grants and/or favorable information before option exercises will increase their benefit in the next quarter. Our proxy for analyst's benefit is relative forecast accuracy following Chen and Matsumoto's (2006) study.

Prior studies focus on the sample around earnings announcement to examine the relation between analysts and management (Richardson et al., 2004; Cotter et al., 2006; Ke and Yu, 2006; Chen and Matsumoto, 2006). Distinct from these studies, we examine managerial incentive and communications between analysts and management in the context of managers' stock option compensation around the time of option grants and option exercises, where we argue that managers have the greatest incentive and the agency problem is severe. In this setting we can clearly recognize managerial incentive and provide a direct link between their incentive and the consequent benefits after their opportunistic behavior. Another advantage is that we can provide a more thoughtful idea of the guidance game between analysts and managers, which not only involve analysts' favorable or pessimistic information but also involve analysts' unfavorable or optimistic information to the firm.

This study is conducted with a large sample for U.S. companies during the period of 1996-2005. We use option award sample and option exercise sample separately to test our hypotheses. Stock option data are from the Thomson Financial Insider Filing database; analyst consensus recommendations are from the I/B/E/S summary recommendation file and individual analyst's recommendations are from I/B/E/S detail recommendation file. First Call's Company Issued Guidelines (CIG) database is our source to exclude management's voluntary information disclosure from our sample. Firm's financial characteristics and other control variables are from CRSP and Compustat databases, respectively. In addition, we focus our tests on CEOs' stock option because they have the greatest ability to obtain private inside

information and convey this information to others.

Consistently with our prediction, we find that firms have, on average, significantly unfavorable analyst consensus recommendation before option grants and significantly favorable analyst consensus recommendation before option exercises. Thus, managers who receive their options (exercise their options) are significantly more likely to ask for bad news (good news) from analysts than are managers who do not receive (do not exercise). On the other hand, we find that individual analysts who issue biased recommendation to increase managers' compensation will also improve their relative forecast accuracy in the next quarter. In conclusion, for their own incentive analysts and management communicate with each other to manipulate investors' expectations and the market reactions to obtain their benefits.

The contribution of this paper to the literature on executive compensation by providing evidence that manager communicates with analysts to increase their stock option compensation. To the best of our knowledge, this is the first paper to investigate the opportunistic behaviors which exist between analysts and management in the context of stock option compensation. Meanwhile, this paper is the first one to investigate managerial incentive at the time of option grants and option exercises simultaneously. This paper contributes also to the literature on analysts by providing further evidence on analysts' behaviors. Prior studies only demonstrate that analysts will issue favorable recommendations or optimistic earnings forecasts for managers around earnings announcement. In this paper, we provide further evidence that analysts are also willing to issue the unfavorable information for managers.

The rest of the paper is organized as follows. Section II provides literature review and hypotheses development. Section III contains a description of our sample, variable measurement, and empirical design. Section IV presents and

analyzes our empirical results. Section V conducts a robustness check. Section VI summarizes and concludes this work.

2. Related Research and Hypothesis Development

Executive compensation has long attracted a great deal of attention from financial economists and practitioners. Compensation schemes are initially designed to align the conflict of interests between managers and shareholders, which derived from the separation of control and ownership. Thus, most research has been firmly rooted in agency theory and focus on how executive compensation schemes can help to alleviate the agency problem. These studies found that the introduction of incentive compensation indeed motivate managers to make superior decisions (Jensen and Meckling 1976; Murphy 1985; Gaver and Gaver 1995) and boost firm value (Smith and Watts, 1992). However, Bebchuk and Fried (2003) propose the managerial power hypothesis[1] and argue that the design of compensation is also part of the agency problem itself. Furthermore, managers' activities of rent extraction may lead to the adoption of compensation schemes that provide weak or even perverse incentives. Numerous studies have also recognized the weak link between managers' non-equity compensation and firm's performance and propose the use of stock option awards to top-level executives instead of cash and bonus compensation (see, e.g., Yermack, 1995; Lakonishok and Lee, 2001; Balsam, 2002).

Further, shareholders and regulators believe that stock option could provide a strong link between managers' pay and firm's performance and thus encourage the use of such compensation, because the changes in executive wealth are directly link to the changes in stock price, which stimulate managers to maximize shareholder wealth.

[1] Contrary to the Optimal contracting hypothesis, Bebchuk and Fried's (2003) managerial power hypothesis suggests that executives have substantial influence over the terms of their own pay, and use their power to extract rents.

Since then, the structure of executive compensation schemes has changed dramatically over the last two decades, transiting from non-equity compensation to equity compensation, and stock options have become main component of executive compensation. In 1992, employee stock options worth a total of $11 billion at the time of grant, and the value increase to $119 billion in 2000. Also, in 1980s, only 30% of CEOs had received new stock options grant, but the proportion has reach to 70% in 1994 (Hall and Liebman, 1998; Bebchuk and Fried, 2003).

In addition to link executive compensation to shareholder wealth and to help reduce the agency problem, stock options have several factors which have contributed to its increased use in executive compensation since the early 1990s. Stock options induce risk-averse managers risk taking with increased investment incentives (Agrawal and Mandelker, 1987; Defusco *et al*., 1990; Guay, 1999; Rajgopal and Shevlin, 2002), attract and retain executive (Balsam and Miharjo, 2003), decrease cash outflow for cash constrained firms, reduce reported accounting expense[2] (Dechow *et al*., 1996; Core and Guay, 1999), and obtain tax benefits (Yermack, 1995).

As the popularity of executive stock options has grown, more attention has paid to them by press and academics. In recent years, because of their growing importance for firms and large increase in the use to provide CEO compensation and incentive, executive stock options generate greater controversy (Hall and Murphy, 2003). Are stock options the most efficient or desirable way to reduce the agency problem? Although some prior studies acknowledge the usefulness of stock options on firms, another strand of studies has an opposite perspective. Moreover, a number of researchers and practitioners consider that stock options are inefficient and even

[2] The financial accounting treatment of stock options is different from other types of compensation such as cash and restricted stock before 2006. The value of stock option grants, measured by Black-Scholes model, is not expensed on the income statement, but is disclosed in the footnotes to the financial statements.

more, it does not minimize agency costs (for example, Morck *et al*., 1988; Jensen, 1993; Hall and Murphy, 2000).

The logic behind the inefficiency of stock options is that executives will generally place a much lower value on firm's stock options (Murphy, 1999). Specifically, there is a discrepancy between the cost of stock options to the firm and the value of stock options to executives, and generally the cost is higher than the value. One of the explanations is that stock price is a noisy measure of the executive's performance because it is influenced by factors beyond the executive's control. Thus, managers generally see the out-of-control as a discount for the value of stock options. Another explanation is that risk-averse and undiversified managers generally see the stock options grant as a reward with risk, so managers must be paid a premium to compensate for this risk or they will discount the value of stock option[3] (Lambert *et al*., 1991; Hall and Murphy, 2000). As a result, it is difficult to reach the equivalence between the cost to the firm and the value to the executive as rewarding the stock options. The manager may not take value-maximizing actions for shareholders with too many or too few incentive, so stock options maybe partly a product of the agency problem (Core *et al*., 2003).

In addition, Bebchuk and Fried (2003) discuss three important features of stock options which also trigger the managers' opportunistic behaviors and increase the agency costs. First, managers gain windfalls from stock options for doing nothing. That is, the part value of stock options maybe increase not because the manager's performance, but because industry and market trends such as the wave of a strong bull market. Abowd and Kaplan (1999), Murphy (1999), and Gillan (2001) propose a

[3] Executive stock options are non-tradable, and are typically forfeited if the executive leaves the firm before vesting, thus executive cannot rebalance his/her portfolios.

similar perspective that stock options reward stock price appreciation regardless of the performance. Second, executive stock option's strike price is commonly set to the market price at the time of stock options grant, which is so-called at-the-money stock option[4]. In this case, almost all of managers can be rewarded as the stock prices rise regardless of the rise scope. However, out-of-the-money stock options can offer higher pay-for-performance sensitivity by only rewarding the managers who doing particularly well (Hall, 1999) and then increase firm value (Habib and Ljungqvist, 2000). Finally, managers typically have freedom to determine the time of exercising stock options and selling the shares after the vesting period[5]. Thus, managers could use their superior knowledge and private information about the firm to time the options exercise and shares transaction to gain abnormal profits (Fried, 1998; Seyhun, 1998).

Coinciding with the controversy of inefficiency on stock options as a compensation mechanism to reduce the agency problem, several studies have examined whether stock option compensation schemes induce managerial opportunistic behavior. Indeed, they find that managers use their private information to do opportunistic activities to maximize the value of stock options[6]. In sum, managers can strategically use spring-loading (Yermack, 1997), manipulation of the information flow (Aboody and Kasznik, 2000; Chauvin and Shenoy, 2001; Huddart and Lang, 2003; Bartov and Mohanram, 2004), or backdating (Lie, 2005; Narayanan

[4] An executive stock option is at-the-money if the strike price is the same as the spot price, in-the-money if the strike price is below the spot price and out-of-the-money if the strike price is above the spot price at the date of stock options grant.

5 Vesting period is the period of time within which you cannot exercise the right to buy shares of the company. Executive stock option is ready for exercising only after fulfilling the vesting period, and then the stock option is called vested option.

[6] Generally, there are two ways to maximize the value of executive stock options. One is decreasing the stock's market price at the grant date, which will decrease the strike price for at-the-money stock options concurrently. Another way is increasing the stock's market price at the exercise date, which will increase the manager's returns for trading firm's shares.

and Seyhun, 2005; Heron and Lie, 2007) to affect the strike price of stock option grant and/or the market price at the time of stock option exercise, and then inflate the value of stock options grants[7].

Yermack (1997) is the first paper which uses the timing of CEO stock option awards as a method of investigating corporate managers' influence over the terms of their own compensation. He hypothesizes that CEOs opportunistically time the dates of stock option grants around earnings announcements to increase their compensation. In support of his hypothesis, Yermack (1997) found that CEOs received stock option awards shortly before favorable earnings announcement, and abnormal returns following option grants are favorable than those preceding option grants. By using the sample of scheduled option grants, Aboody and Kasznik (2000) examine whether managers voluntarily disclose company information around grant date to increase their stock option compensation. Their results show that earnings forecasts prior to option awards are less optimistically biased than those without option grants, and also abnormal returns following grant date are significantly positive. Chauvin and Shenoy's (2001) findings also support the hypothesis that managers manipulate the timing of information release to increase their compensation.

Backdating is another method by which managers might influence the stock price at the grant date, and this source of manipulations was first suggested by Lie in 2005. He documents that the abnormal stock returns are negative before unscheduled executive option awards and positive afterward, and proposes that "Unless executives possess an extraordinary ability to forecast the future marketwide

[7] Spring-loading is timing stock option grants to occur before the announcement of favorable news releases that management knows will produce an immediate increase in stock prices. Manipulation of information flow is timing value-relevant information around stock option awards, i.e., by accelerating the release of negative information before scheduled grant dates, and delaying the release of positive information after scheduled grant dates. Backdating is setting the grant date to be a date in the past on which the stock price is particularly low, so it is retroactive timing.

movements that drive these predicted returns, the results suggest that at least some of the awards are timed retroactively." Narayanan and Seyhun's (2005) findings also support the backdating hypothesis. Since then, this new explanation has attracted a great amount of attention from media, regulators, and researchers. Moreover, recent studies have discussed the backdating problem from various perspectives, such as investigating the effect of SOX on backdating (Narayanan and Seyhun, 2006; Heron and Lie, 2007).

Executives' opportunistic behavior by manipulating the timing of information disclosure is also found from executive stock option exercises, and the results, however, are mixed. Carpenter and Remmers (2001) suggest the use of private information to time the exercises of executive stock options before 1991, but did not find the similar evidence after 1991[8]. Contrary to Carpenter and Remmers' (2001) findings, Huddart and Lang (2003) use a proprietary sample of over 50,000 employees at seven firms and conclude that employees of all levels base their exercise decisions on private information. Due to prior studies' mixed results, Bartov and Mohanram (2004) focus on abnormally large exercises where the incentives to time exercises are greatest, and they suggest that top-level executives indeed use their private information to time abnormally large exercises. In addition, Bartov and Mohanram (2004) also reveal that executives' private information is from their opportunistic earnings management which inflate earnings in the pre-exercise period but reverse in the post-exercise period. Aboody, Hughes, Liu, and Su (2008) also suggest that managers' decisions to exercise and hold for at least 30 days are

[8] See http://www.sec.gov. Prior to 1991, section 16b of the Securities Exchange Act of 1934 required insiders to hold shares of stocks acquired through an option exercise for at least six months before selling, or the profits would go to the firm. In May 1991, the SEC effectively removed this restriction by changing the starting date of the six-month holding period from the exercise date to the option grant date. Thus, insiders are able to sell their shares immediately after stock options exercise.

prompted by good news.

Consistent with Bartov and Mohanram's (2004) earnings management hypothesis, several studies investigate and report an association between earnings management and stock option compensation. These studies find that managers use earnings management to decrease earnings before stock option grants (Balsam *et al*., 2003; Baker *et al*., 2003) or increase earnings before stock option exercises (Bergstresser and Philippon, 2006; Burns and Kedia, 2006; Efendi *et al*., 2007) to increase the value of executive stock options. To extend the literature, Cheng and Warfield (2005) consider the subset of firms that manipulate earnings upward to meet or beat earnings targets before stock option exercises, and McAnally *et al*. (2008) consider firms that manipulate earnings downward to miss earnings targets before stock option grants. Both of their evidence complement the general earnings management studies and manifest managers' opportunistic behaviors to increase their compensation.

Managerial incentives to Communicate with Analysts

Backdating, coupled with fraudulent disclosures regarding executive stock option plans, involves disloyalty and intentional violation of duties of executives to the firms and its shareholders, which is adverse to shareholders interests and is therefore an act in bad faith. In addition, misdating option grants have entangled in several problems such as legal, economic, and governance (Walker, 2006; Narayanan *et al*., 2007). Spring-loading based on private information, though less objectionable than backdating from some observers' view (e.g., Atkins, SEC commissioner, 2006), is still the scenario that has drawn much attention and also has substantive legal issues that need to be addressed.

Since 1940s, Rule 10b-5 of the 1934 Securities Exchange Act makes it unlawful

to make an "untrue statement of a material fact or to omit to state a material fact necessary in order to make the statements made…not misleading…." In this case, rule 10b-5 lawsuits are filed by shareholders against firms and managers because managers misled the market by disseminating adverse information or by omitting to state a fact necessary (Francis *et al*., 1994). The issue of litigation in the event of shareholders litigation is severe as it becomes known that managers are manipulating corporate disclosure and is costly to firms and managers, which would divert managers from effort contributions, involve substantial legal expenses, and even damage the reputation of the firms and its managers (Field *et al*., 2005).

In addition to legal exposure and litigation costs, managers bear the cost of loss of reputation as investors and shareholders recognize their manipulation behaviors. That is, shareholders may have the managers' reputation as a protection against options abuse, because most managers have had successful careers in their own right and they have incentive to maintain their own reputation. However, due to the reputational concerns of managers themselves, they may probably involve some activities which damage shareholder interests to preserve their reputation. For example, Lees' (1981) survey evidence reports that many firms do not issue earnings forecasts or decrease the frequency in case they loss their reputation because of forecast errors. Kasznik (1999) has the similar argument that manager use positive discretionary accruals to manage reported earnings upward when actual earnings fall below management's earnings forecast, and revise management's earnings forecast when they underestimate earnings. These managerial incentives are to reduce their forecast errors and then remain their reputation and defer to litigation.

Given the concerns of media and investors with stock option grants, perception is critical and should be sufficient incentive for managers to simply avoid controversy

and legal exposure and reputation loss. In this case, managers have strong incentive to employ other mechanisms to achieve their same intention to increase the value of executive stock options. Security regulators and press have often alleged that firms and financial analysts are involved in an earnings-guidance game through a variety of channels, including analyst meeting, private interviews, management earnings forecasts and other statements made in press, and conference calls (Lees, 1981; Jennings, 1987; Baginski and Hassell, 1990; Frankel *et al*., 1999). And they also suggest that managers can affect analysts' earnings forecasts and analysts have incentives to cooperate. Richardson *et al*.'s (2004) evidence supports earnings-guidance hypothesis and find that analysts walk down their estimates to a level that firms can beat at the official earnings announcement. Thus, managers' capital-market incentives are related to the communications between managers and analysts, and the distributional properties of analyst forecast errors provide a setting to assess whether CEOs manage investors' expectations. Based on the litigation and reputation hypotheses and the earnings-guidance hypothesis, we expect that managers will cooperate with analysts to issue biased analyst forecasts to increase managers' value of stock options instead of using backdating or management's voluntary disclosure.

H1: *Financial analysts issue unfavorable information before the grant date.*

H2: *Financial analysts issue favorable information before the exercise date.*

Analysts' Benefits from Currying Favor with Management

Analysts rely on numerous sources of information in forming their forecasts and recommendations[9], and management is an important source of analysts' private

[9] Sources include earnings and other information from SEC filings such as proxy statements and quarterly and annual reports, industry reports and reports describing macro-economic conditions, and

information (Schipper, 1991). However, managers do not treat all analysts equally when providing information. Managers provide more information to analysts who issue more favorable forecasts (Chen and Matsumoto, 2006). Given management's knowledge of the firm, company-provided information improves the accuracy of analyst forecast (Lang and Lundholm, 1996; Bowen *et al*., 2002) but meanwhile managers punish analysts who issue unfavorable earnings forecast[10] (Solomon and Frank, 2003). In other words, analysts can improve the accuracy of their forecasts by developing better relations with management to access to management's private information. Forecast accuracy is important to analysts. Analysts' livelihoods depend on it, thus they have an incentive to use biased earnings forecasts to please management. It means that analysts rationally trade-off forecast bias to improve management access and forecast accuracy (Lim, 2001).

More accurate forecasters are likely to be rewarded and less accurate forecasters may be forced to change brokerage houses or leave the profession. Earnings forecast accuracy is an important determinant of an analyst's reputation, annual compensation, tenure, and career success (Hong *et al*., 2000; Cooper *et al*., 2001; Hong and Kubik, 2003). For example, analyst forecast accuracy is one of criteria to determine the All-Star analyst ranking in the Institutional Investor magazine and analyst's influence. Influential analysts can help their firms to attract more trading and win more lucrative investment-banking businesses, which will bring benefits to them such as compensation, career advancement and so on. In support of the above contention, Chen and Matsumoto (2006) and Ke and Yu (2006) provide evidences that managers provide different amounts of information to analysts based on the favorableness of

conference calls and other management communications.

[10] Managers of firms exclude the analysts with unfavorable forecast from analyst meeting, refuse to return phone call, or refuse to answer questions from the analyst during the conference calls (Solomon and Frank, 2003)

their research reports, and analysts use biased earnings forecasts to curry favor with firm management in order to improve their forecast accuracy. Based on analyst incentive hypothesis, we expect that analysts differentially benefit from management disclosures with forecast accuracy when they issue biased analyst forecasts to increase managers' value of stock options.

H3: *Financial analysts issuing unfavorable information before the grant date improve subsequent forecast accuracy.*

H4: *Financial analysts issuing favorable information before the exercise date improve subsequent forecast accuracy.*

3. Sample Selection, Research Design, and Variable Measurement

3.1. Data and Sample Selection

We have two groups of samples including the sample of stock option grants to CEOs and stock option exercises from CEOs to examine our hypotheses. We obtain our samples of stock option grants or exercises from the Thomson Financial Insider Filing database, which includes all insider transactions reported on SEC Forms 3, 4, 5, and 144[11] between 1996-2005[12]. In the process of constructing our samples, we use procedures similar to these used by Heron and Lie (2007), by which we include only observations with 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"). With this procedure, we can maintain our data quality.

We focus our tests on CEOs' stock option because they have the greatest ability

[11] We use Thomson Financial Insider Filing database instead of ExecuComp database, because ExecuComp only includes executive compensation information for approximately 1,500 firms (S&P 500, S&P 400 MidCap, and S&P 600 SmallCap). As a result, this database covers only relatively large firms. In addition, we also need the sample of stock option exercises which can be acquired from Thomson Financial Insider Filing database to examine our hypothesis.

[12] The sample period begins in 1996, because SEC first requires insiders to report transactions at that time.

to obtain private inside information and convey this information to others. Many option grants are given with varying vesting dates or maturity dates, and Thomson Financial breaks these grants into separate grants. Since the incentive effects are likely to be the same for managers receiving stock options on the same day, we eliminate any duplicate option grants that occur on the same day so that there is only one option grant on a given date for a company. Also, we employ the same procedure to our sample of executive stock option exercises. A CEO may exercise stock options from different grants on the same date, thus we collapse these exercises into one exercise for the purpose of our analysis. In order to capture only stock option exercises but not other type of option disposition, we match transactions in Table 2 to those in Table 1 by transaction code, transaction date, number of shares, and transaction price[13].

Our hypothesis 1 and 2 (H1 and H2) are tested at the firm-quarter level and hypothesis 3 and 4 (H3 and H4) are tested at the analyst-firm-quarter level. Specifically, for H1 and H2 we collect analyst consensus recommendation from the Institutional Brokers Estimate System (I/B/E/S) summary recommendation file; for H3 and H4 we collect individual analyst's recommendation from I/B/E/S detail recommendation file. Using the analyst forecast data, we can identify analyst's consensus and individual opinion for the firm, respectively. In addition, we require each firm to have at least three analysts following. To measure the analyst forecast accuracy at the firm-quarter level and the analyst-firm-quarter level, data on consensus and individual analysts' forecasts of quarterly earnings per share are

[13] SEC Form 4, the most important insider document, consists of the sections of Table 1 and Table 2. Table 1 contains conventional stock or *non-derivative* transaction information, and also reports option exercise transaction as an acquisition of the underlying stock. Table 2 contains information on *derivative* securities such as options, warrants, and convertible securities, and also includes both Option Grants and Option Exercises. TFN insider Filing database provide this data and more detailed descriptions.

obtained from I/B/E/S consensus and detail earnings forecast dataset, respectively. Actual EPS and stock price are both obtained from I/B/E/S to mitigate measurement error related to stock split and dividends, and to avoid inconsistencies in the definition of the forecasted and reported earnings numbers.

Our intention is to examine whether analyst forecast is the mechanism for managers to obtain their own benefit, which is the raise of the value of stock options. Thus, we have to exclude the influence of management voluntary disclosure of corporate information on our analysis. First Call's Company Issued Guidelines (CIG) database is our source to identify whether management issued a quarterly earnings forecast and corporate voluntary disclosures, or held a conference call activity and has wide coverage starting in 1995. We gather firm financial variables and other control variables from the Center for Research in Security Prices (CRSP) and Compustat databases, respectively. After exclude any firm-quarter observations without sufficient information from both databases, we have 4,882 observations for grant group at firm-quarter level (for H1), 4,105 observations for exercise group at firm-quarter level (for H2), 5,039 observations for change sample and 5,191 observations for deviation sample in the grant group at analyst-firm-quarter level (for H3), and 4,005 observations for change sample and 4,479 observations for deviation sample in exercise group at analyst-firm-quarter level (for H4).

3.2. Research Design

Analysts' stock recommendations play an economically important information role on the financial market. Stock recommendations are the primary product of analyst research and the expressions of analysts' beliefs about firms' share values relative to their market prices. The change in the recommendation incorporates a wide range of information and has a significant association with returns (Ivkovic and Jegadeesh,

2004; Asquith, Mikhail, and Au, 2005). Meanwhile, the recommendation is the bottom line of analyst research report (Schipper, 1991)[14]. In our study, therefore, we employ the stock recommendation as the proxy of analyst's expectation to identify whether analysts "communicate" with managers or not.

3.2.1. Timeline of Events

To investigate whether CEOs communicate with analysts to issue unfavorable information before option awards and favorable information before option exercises (H1 and H2), we identify analysts' consensus recommendations in each of the three months prior to the award month and the exercise month, respectively. I/B/E/S classify analysts' recommendations on a five-point scale: 1 for strong buy, 2 for buy, 3 for hold, 4 for sell, and 5 for strong sell.

Following Aboody and Kasznik's (2000) procedure, we provide a benchmark against which to assess whether analysts issue relative bad news before awards and relative good news before exercises. *Award Group* contains observations with option grants and *Exercise Group* contains observations with option exercises. For every firm in *Award Group* or *Exercise Group*, we classify each month between 1996 and 2005 into *No-Award Group* or *No-Exercise Group*, excluding award (exercise) month and the three months before and after an award (exercise) month. In addition, any observation in the *No-Award Group* or *No-Exercise Group* exceed five years prior to any month of option award or option exercise is not included in the group. Then, same as *Award Group* and e *Exercise Group*, we identify analysts' consensus recommendations in each of the three months prior to the non-award and non-exercise month.

[14] The information in analysts' research reports can be classified into four categories: earnings forecasts, target price forecasts, investment recommendations, and conceptual arguments supporting the forecasts and recommendations.

To investigate whether analysts improve their forecast accuracy after communicate with managers before the option grants or the option exercises (H3 and H4), we identify analysts' individual recommendations three months prior to the award month and the exercise month, respectively. Following Ke and Yu (2006) and Chen and Matsumoto (2006), we require three consecutive quarters of data to compute the changes in analysts forecast accuracy relative to other analysts across time.

We also construct two recommendation samples, one is the change sample and the other one is the deviation sample. For the change sample, we compute the change in an analyst's recommendation from his or her prior recommendation. For the deviation sample, we compute the deviation of an analyst's recommendation from the consensus recommendation. We use these two samples to identify the favorableness of analysts' recommendation and compare their relative change in benefit, forecast accuracy from quarter *q-1* to quarter *q+1*. These two classification schemes have its' own shortcoming and they can complement each other. We will describe further the procedures to classify these two samples and the measurement of relative forecast accuracy in more details below.

[Insert Figure 1 here]

3.2.2. Recommendation Groups

As we mentioned above, we employ two recommendation groups to examine our hypotheses, the change sample and the deviation sample. Recommendation changes could represent two different perspectives: the information role and the market role. The former indicates that analysts fully incorporate the market information into their stock analysis and provide accurate and timely suggestions to investors; the latter indicates that analysts issue biased recommendations to investors based on their

private reasons such as building up their reputation, accessing management information, raising investment banking revenues and so on. Thus, we can use the change sample to investigate whether analysts issue favorably biased recommendation based on their incentive. If so, then we can expect that analysts will acquire their benefit following their biased recommendation.

We further classify analysts in the change sample into three subgroups by comparing their current recommendation to their most recent recommendation for the same firm: upgraded (*UP*), downgraded (*DN*), or reiterated (*RE*). The drawback of the change sample, however, is that some upgraded recommendations may have negative implication (e.g. an upgrade of Sell from Strong Sell), and some downgraded recommendations may have positive implication (e.g. a downgrade of Buy from Strong Buy). Thus, we have the deviation sample as a complementary scheme to examine our hypotheses.

Consensus recommendation aggregates all the analysts' opinions regarding the firm's future prospects and is robust predictor of future returns (Barber *et al*., 2001; Jegadeesh *et al*., 2004). Therefore, analyst's individual recommendation which is different from the consensus recommendation should provide more information than others. Also, we further classify analysts in the deviation sample into three subgroups based on whether their recommendation is above, below, or equal to the median consensus recommendation for the firm: high (*HI*), low (*LO*), or neutral (*NEU*). The drawback of the deviation sample, however, is that *HI* subgroup or *LO* subgroup would be classified as favorable even if it is a reiteration of the analyst's prior recommendation. In addition, we restrict our samples to analysts who do not issue either upgrades or downgrades in quarters *q-1* or *q+1* to ensure their forecast accuracy are not affected by prior or subsequent changes in recommendations.

3.2.3. Measurement of Relative Forecast Accuracy

To examine whether analysts gain their benefit after issuing favorably biased recommendation (H3 and H4), we measure an analyst's relative accuracy compared with all other analysts forecasting for the same firm-quarter. That is, we use the relative forecast accuracy as the proxy of their benefit. Following Chen and Matsumoto's (2006) method, we compare the forecast accuracy before and after a change in an analyst's recommendation.

Specifically, we first calculate analyst *i*'s absolute forecast error in quarter *q* for firm *j* (FE_{ijq-1}, FE_{ijq+1}) as the absolute value of the difference between analysts' forecasts and actual earnings for the quarter. Then, to control for inter-temporal changes and cross-sectional differences in forecasting difficulty we use a benchmark of the average absolute forecast error of all other analysts forecasting for the same firm-quarter to calculate the relative measure of forecast accuracy. The measure proxy for the relative forecast accuracy is a mean-adjusted absolute forecast error[15] (Clement, 1999; Jacob, Lys, and Neale, 1999; Chen and Matsumoto, 2006), and is calculated as follows:

$$MAFE_{ijq-1} = -[FE_{ijq-1} - \overline{FE_{jq-1}}] / \overline{FE_{jq-1}} \quad (1)$$

where, $\overline{FE_{jq-1}}$ is the mean of absolute forecast errors across all analysts for firm *j*, quarter *q-1*. We calculate a similar mean-adjusted absolute error for quarter *q+1*. To ease interpretation, we reverse the sign of *MAFE* so that positive (negative) values indicate that an analyst is more (less) accurate than average.

Our tests involve an analysis of the change in an analyst's relative forecast

[15] The advantages of using this measure, comparing to the price-deflated absolute forecast error are that (1) it is not affected by inter-temporal changes and cross-sectional differences in forecasting difficulty; (2) it allows the comparison of forecast accuracy across companies and quarters.

accuracy, and positive (negative) numbers indicate an increase (decrease) in accuracy from quarter *q−1* to quarter *q+1*. The measure is calculated as follows:

$$\Delta MAFE = MAFE_{ijq+1} - MAFE_{ijq-1} \quad (2)$$

3.2.4. Regression Models

Based on Aboody and Kasznik's (2000) model, we estimate multivariate regressions to examine our tests of H1 and H2 after controlling for other factors that may affect analysts' recommendations. The main explanatory variables of interest are *AWARD_MONTH* and *EXERCISE_MONTH* for model 3 and 4, respectively. *AWARD_MONTH* (*EXERCISE_MONTH*) is an indicator taking the value of one for award (exercise) months and zero otherwise. And the factors we control for are forecast horizon, earnings surprise, firm size, earnings variability and sales growth. The ordinary least squares (OLS) regression models are as follows:

$$AREC_i = \alpha_0 + \alpha_1 AWARD\_MONTH_i + \alpha_2 \Delta EPS_i + \alpha_3 SIZE_i + \alpha_4 SALESGR_i + \alpha_5 EARNVAR_i + \alpha_6 STDEVREC_i + \alpha_7 PROFIT_i + \sigma_i \quad (3)$$

$$AREC_i = \beta_0 + \beta_1 EXERCISE\_MONTH_i + \beta_2 \Delta EPS_i + \beta_3 SIZE_i + \beta_4 SALESGR_i + \beta_5 EARNVAR_i + \beta_6 STDEVREC_i + \beta_7 PROFIT_i + \varepsilon_i \quad (4)$$

where, *AREC* is analysts' consensus recommendation for firms. *HORIZON* is measured as number of months between the forecast month and the award month (or the exercise month). ΔEPS is defined as the change in quarterly earnings per share relative to the same quarter in the precious year, deflated by share price. *SIZE* is measured as logarithm of market value of equity at the beginning of the forecast month. *EARNVAR* is measured as the standard deviation of annual earnings from continuing operations divided by the absolute value of the mean over the previous five years. *SALESGR* is the firm's five-year sales growth. *STDEVREC* is the standard deviation of analyst recommendation for the firm. *PROFIT* is an indicator

variable equal to one if EPS as reported on I/B/E/S for the fiscal quarter is positive, and zero otherwise.

Based on Chen and Matsumoto's (2006) model, we examine whether analysts improve their relative forecast accuracy after issuing favorable biased recommendations (H3 and H4). Model 5 is used for our change sample and Model 6 is for our deviation sample. Our concern is that whether the coefficients on *UP* and *HI* represent the incremental effect for the upgrade and high recommendation groups relative to the downgrade and low recommendation groups.

$$\Delta MAFE_{ij} = \alpha_0 + \alpha_1 UP_{ij} + \alpha_2 RE_{ij} + \alpha_3 \Delta AGE_{ij} + \alpha_4 \Delta FREQ_{ij} + \sigma_{ij} \quad (5)$$

$$\Delta MAFE_{ij} = \beta_0 + \beta_1 HI_{ij} + \beta_2 NEU_{ij} + \beta_3 \Delta AGE_{ij} + \beta_4 \Delta FREQ_{ij} + \varepsilon_{ij} \quad (6)$$

where, $\Delta MAFE_{ij}$ is defined as the change in analyst *i*'s relative forecast accuracy for firm *j* from quarter *q−1* to quarter *q+1*. ΔAGE_{ij} is measured as the difference of the number of days between the forecast and the grant date (or the exercise date) from quarter *q−1* to quarter *q+1*. Δ $FREQ_{ij}$ is defined as the difference of the number of forecasts issued by an analyst for each firm-quarter from quarter *q−1* to quarter *q+1*. Both of these control variables are mean-adjusted.

4. Empirical Results

4.1. Descriptive Statistics

Panel A of Table 1 provides the sample distribution across years for executive option grants (*Award Group*) and executive option exercises (*Exercise Group*) separately during the period from 1996 to 2005. In support of firm's intention of using stock options to alleviate the agency problem, the number of option grants increases steadily each year from 3.05% in 1996 to 15.32% in 2005. Consistently with the trend in *Award Group*, the number of option exercises increase steadily each year

except for year 2001 and 2002. It can be seen that option exercise exhibits an abnormal drop in 2001 and 2002 with only 6.29% and 6.82% respectively due to the dot-com bubble bursts which has the most crash from 2001 to 2002[16]. Panel B provides a sample distribution segmented by industry with the industry classification based on two-digit SIC codes, showing that the Computer Equipment and Services industry has the highest number and proportion both in *Award Group* and *Exercise Group* with 16.09% and 19.74% of its sample, respectively. The use of options is pervasive but does vary across industry groups (Murphy, 1999; Core and Guay, 2001). Also, Ittner, Lambert, and Larcker (2002) find that the use of stock options in high-technology firms such as computer and software are substantially exceeds the use of that in manufacturing firms.

[Insert Table 1 here]

Panel A and B of Table 2 provide the descriptive statistics relating to size and performance measures which are included in our models for *Award Group* and *Exercise Group*, respectively. It shows that the characteristics between these two groups are analogous with similar statistics. The mean (median) for *SALESGR* is 0.286 (0.433) and 0.287 (0.457) for *Award Group* and *Exercise Group*, respectively. And the mean (median) for *EARNVAR* is 1.263 (0.500) and 1.188 (0.500) for *Award Group* and *Exercise Group*, respectively. These statistics are similar to those in Aboody and Kasznik's (2000) study. The mean (median) for *PROFIT* is 0.822 (1.000) and 0.909 (1.000) for *Award Group* and *Exercise Group* respectively, which is similar to that in Richardson *et al*. (2004).

16 Began in 2000, many of dot-coms did not have made a net profit. By 2001 the bubble was deflating at full speed, and many companies even ceased trading on Nasdaq. Within two years, the dot-com bubble crash wiped out $5 trillion in market value of technology companies from March 2000 to October 2002.

Panel C of Table 2 presents analysts' recommendation for each of four groups, including *Award Group*, *No-Award Group*, *Exercise Group*, and *No-Exercise Group*, respectively. Before doing further analysis, we have to acknowledge that analysts' recommendations have five classifications with 1 for strong buy, 2 for buy, 3 for hold, 4 for sell, and 5 for strong sell. It means that the higher score recommendation the lower valuation analyst gives to the firm, vice verse. The number of analyst following is 10.13 and 9.78 for *Award Group* and *No-Award Group* respectively, and 11.86 and 10.36 for *Exercise Group* and *No-Exercise Group* respectively. Thus, there are more analysts follow *Award* and *Exercise Group* than *No-Award* and *No-Exercise* Group. The mean (median) recommendation in *Award Group* is higher than that in *No-Award Group* with 2.18 (2.22) compared to 2.06 (2.08). Meanwhile, Buy percent is 59.37% and Sell percent is 4.50% in *Award Group* compared to 65.31% and 2.59% in *No-Award Group*. It means that analysts suggest investors to buy fewer shares and sell more shares for firms with option grants relative to those without option grants. Thus, analysts issue more unfavorable opinions to firms with option grants relative to those without option grants.

Analysts following *Exercise Group*, however, issue more favorable opinions relative to analysts following *No-Exercise* Group. Specifically, the mean (median) recommendation is 2.07 (2.09) and Buy percent (Sell percent) is 64.57% (2.98%) in *Exercise Group* compared to 2.09 (2.12) and 63.94% (2.90%) in *No-Exercise Group*. Thus, these statistics can provide us preliminary results about our hypotheses.

[Insert Table 2 here]

4.2. Analysis of Communications between Management and Analysts

4.2.1. Univariate Analysis

Table 3 presents the univariate tests of analysts' consensus recommendation to

analyze whether analysts issue biased recommendations in accordance with managers' preference, issuing unfavorable recommendations before option awards (H1) and favorable recommendations before option exercises (H2). Panel A of Table 3 shows the comparison between *Award Group* and *No-Award Group*, three, two, and one month prior to month 0 (award month). The mean recommendation is 2.198, 2.210, and 2.217 for *Award Group* and 2.065, 2.066, and 2.071 for *No-Award Group* in the three months, two months, and one month prior to the award month, respectively. The t-statistics (z-statistics) for the difference in mean (median) are all significant at one percent confidence level. Consistent with our prediction, it shows that analysts following firms in *Award Group* issue unfavorable recommendation relative to those in *No-Award Group* for each of three months prior to award month.

Panel B of Table 3 presents the comparison of analysts' recommendation between *Exercise* and *No-Exercise Group*. The mean recommendation is 2.094, 2.091, and 2.088 (2.105, 2.108, and 2.111) for *Exercise* (*No-Exercise*) *Group*. Analysts consistently issue favorable recommendation for *Exercise Group* relative to *No-Exercise Group* for each of three months prior to exercise month. However, the t-statistic (z-statistic) for the difference in mean (median) is significant at five percent confidence level only for one month prior to exercise month. The possible explanation is that managers can exercise their stock options whenever they want after the vesting period, thus favorable news one month prior to exercise is the suitable time period for managers to obtain their benefits.

[Insert Table 3 here]

In Table 3 we provide preliminary results to demonstrate that managers communicate with analysts to issue biased recommendation to acquire their benefits before option

awards and exercise. Meanwhile, analysts have their own incentive to do that and the most important factor is for their forecast accuracy. The first step to examine whether analysts obtain their benefits after issuing biased recommendation is to analyze analysts' absolute forecast error at the firm-quarter level. Specifically, we use analyst consensus recommendation and consensus quarterly earnings forecast to examine whether analysts improve their forecast accuracy following biased recommendation. We define the forecast accuracy (*AF*) as the absolute forecast error which is calculated as the difference between analyst consensus forecast for quarterly earnings per share and actual earnings deflated by share price at the beginning of the forecast month. The measure of *AF* has a negative relation with forecast accuracy which means that the higher *AF* the lower forecast accuracy.

Panel A of Table 4 are the results for *Award Group* and *Exercise Group* compared to their benchmarks. It shows that *AF* are the same for *q-1* and *q+1* in *Award Group*, but the change in *AF* from *q-1* to *q+1* is 0.0003 in *No-Award Group*. Thus, analysts in *Award Group* has improved their forecast accuracy from *q-1* to *q+1* relative to those in *No-Award Group* and the t-statistics (z-statistics) for difference in mean (median) is significant at one (five) percent confidence level. Also, the change in *AF* is 0.0001 in *Exercise Group* and 0.0003 in *No-Exercise Group*. Thus, analysts in *Exercise Group* have better forecast accuracy relative to those in *No-Exercise Group* and the t-statistics (z-statistics) for difference in mean (median) is significant at one (five) percent confidence level. Based on these outcomes, we can have preliminary results to verify the possibility of analysts obtain their benefits following their biased recommendation.

With these encouraging preliminary results as shown in Panel A, we proceed to test our hypotheses (H3 and H4) which focus on individual analysts and their own

forecast accuracy. Panel B and C present the results for change sample and deviation sample in *Award Group*, respectively. *MAFE* has a positive relation with relative forecast accuracy which means that analysts have higher relative forecast accuracy with higher *MAFE*. In Panel B the mean *MAFE* is -0.058 in *q-1* and 0.023 in *q+1* and the change in *MAFE* from *q-1* to *q+1* is 0.081 for DN group, while they are -0.038, -0.022, and 0.016 for UP group. In quarter *q-1*, the relative forecast accuracy of the DN group is less than the relative forecast accuracy of the UP group but insignificant. In contrast, the difference in relative forecast accuracy between the two groups are significant different in *q+1* and the DN group is more accurate than the UP group. In addition, t-statistic (z-statistic) for the difference in mean (median) $\Delta MAFE$ is significant at one percent confidence level and thus the change in relative forecast accuracy in significantly greater for the DN group relative to the UP group. Panel C presents the similar results for deviation group to further demonstrate the results in Panel B. The mean *MAFE* is -0.023 in *q-1* and 0.009 in *q+1* and the change in *MAFE* from *q-1* to *q+1* is 0.035 for LO group, while they are 0.015, 0.011, and -0.002 for HI group. The t-statistic (z-statistic) for the difference in mean (median) $\Delta MAFE$ is significant at five percent confidence level and thus the change in relative forecast accuracy is significantly greater for the LO group relative to the HI group.

Panel D and E present the results for change sample and deviation sample in *Exercise Group*, respectively. In Panel D the mean *MAFE* is -0.041 in *q-1* and -0.019 in *q+1* and the change in *MAFE* from *q-1* to *q+1* is 0.022 for DN group, while they are -0.037, 0.034, and 0.071 for UP group. The difference between the two groups are significant in *q+1* and the change in relative forecast accuracy is significant greater for the UP group with at least five percent confidence level. In

Panel E the mean *MAFE* is 0.012 in *q-1* and 0.004 in *q+1* and the change in *MAFE* from *q-1* to *q+1* is -0.008 for LO group, while they are -0.046, 0.019, and 0.065 for HI group. The results in Panel E show that the HI group has larger change in relative forecast accuracy relative to the LO group at the one percent significance level and thus the HI group is more accurate than the LO group. Taken together, the results in Table 4 are consistent with our prediction that analysts who issue biased recommendation to curry with management will obtain their benefit.

[Insert Table 4 here]

4.2.2. Multivariate Analysis

Panel A of Table 5 shows the results from estimating equation (3), which is used to test **H1:** *Financial analysts issue unfavorable information before the grant date*. We estimate the model separately for each of the three months prior to month 0 (award month)[17]. The coefficients of *AWARD_MONTH* are 0.028, 0.035, and 0.035 for three months, two months, and one month prior to month 0, respectively, all of which are significant at one percent confidence level. Consistent with our prediction and with the univariate tests, the results suggest that analysts issue unfavorable recommendation prior to option grants for our sample firms, even after controlling for other factors. Panel B presents the results from estimating equation (4), which is used to test **H2:** *Financial analysts issue favorable information before the exercise date.* The coefficients of *EXERCISE_MONTH* are -0.123, -0.129, and -0.133 for three months, two months, and one month prior to month 0 (exercise month), respectively, all of which are significant at one percent confidence level. The results indicate that analysts issue favorable recommendation prior to option exercise, consistent with our prediction and with our univariate tests. Overall, our empirical

[17] We add year dummy variables into the regression model to control year effect.

evidence supports our hypotheses and indicates that managers communicate with analysts to disseminate bad news before option grants and good news before option exercises to obtain their benefit.

[Insert Table 5 here]

Panel A of Table 6 presents the results for change sample and Panel B presents the results for deviation sample. In the first two columns, the results are estimated from equation (5), which is used to test **H3:** *Financial analysts issuing unfavorable information before the grant date improve subsequent forecast accuracy.* We expect that the coefficients of UP and HI are negative. Consistent with our prediction, the coefficient of UP is -0.065 at the one percent confidence level and the coefficient of HI is -0.038 at ten percent confidence level. Thus, analysts in the UP group or HI group have less forecast accuracy relative to analysts in the DN group or LO group. In the right two columns, the results are estimated from equation (6), which is used to test **H4:** *Financial analysts issuing favorable information before the exercise date improve subsequent forecast accuracy.* We expect that the coefficients of UP and HI are positive. Consistent with our prediction, the coefficient of UP is 0.049 at the one percent confidence level and the coefficient of HI is 0.070 at one percent confidence level. Thus, analysts in the UP group or HI group have greater forecast accuracy relative to analysts in the DN group or LO group. Taken together, consistent with our prediction, analysts have greater relative forecast accuracy following a more favorable recommendation issuance relative to a less favorable recommendation issuance.

The coefficients of RE in the change sample are -0.063 and -0.021, and the coefficients of NEU in the deviation sample are -0.020 and -0.001 for *Award Group*

and *Exercise Group*, respectively, and most of them are insignificant at ten confidence level. We do not have any predictions regarding these groups due to their complicated implications. For example, reiteration recommendation could represents a reiteration of a strong buy or a buy which managers likely respond positively, or a reiteration of a strong see or a sell which managers likely respond negatively.

[Insert Table 6 here]

5. Robustness Check

For our sample of stock option grants, there is alternative possibility in explaining our empirical results. That is, managers use the benefit of hindsight to backdate the grant date to obtain lower exercise price for their options. To exclude the effect of backdating hypothesis, we concern the effect of SOX on backdating. Since August 29, 2002, Sarbanes-Oxley Act of 2002 has changed the reporting regulations for stock option grants, so stock option recipients must report them within 2 business days of receiving the grant. Narayanan and Seyhun (2006) and Heron and Lie (2007) demonstrate that SOX effectively curtails the backdating phenomenon.

In Table 7, we divide our *Award Group* into the subsample before SOX and the subsample after SOX. In Panel A, we use analyst recommendation in behalf of analyst's opinion for the firm, and in Panel B we use analyst earnings forecast error to examine whether analyst forecast are less optimistically biased prior to stock option grants. Analyst earnings forecast error is defined as the difference between analyst consensus forecast and the realized earnings per share, adjusted by the share price. From both Panel A and B, we can find that for the subsample after SOX, analysts still cooperate with managers to issue unfavorable information one month prior to grant

date to increase managers' benefits. However, for the subsample before SOX, the results could be partially explained by backdating hypothesis. In Table 8, we can find that analysts still obtain their benefits after SOX but not before SOX. Therefore, the results further support the results in Table 7 and our arguments that analysts cooperate with managers to increase manager's compensation to obtain their own benefits.

[Insert Table 7 and Table 8 here]

6. Conclusion

This study investigates whether managers communicate with analysts to manage investors' expectations to obtain their benefits with option grants or option exercises. Specifically, we examine whether managers ask analysts to issue bad news before option grants and good news before option exercises. On the other hand, this study investigates that whether analysts obtain their benefits of improved forecast accuracy in the next quarter after cooperating with managers. We document the unfavorable recommendation in each of three months prior to the award month in the *Award Group* relative to the *No-Award Group*. We also find the favorable recommendation in each of three months prior to the exercise month in the *Exercise Group* relative to *No-Exercise Group*. Thus, managers cooperate with analysts to opportunistically affect investors' expectations and then increase their benefits.

We also document the evidence on analysts' benefits. For the sample of option grants, analysts who have downgrade recommendation (DN) or recommendation below the median (LO) increase their relative forecast accuracy compared to analysts who have upgrade recommendation (UP) or recommendation above the median (HI) . For the sample of option exercises, analysts with UP or HI recommendation have a

greater relative forecast accuracy compared to analysts with DN or LO recommendation. Overall, our findings support that analysts who issue more unfavorable recommendation before option grants or more favorable recommendation before option exercise improve their forecast accuracy in the next quarter.

Taken together, managers and analysts engage in opportunistic activities to earn their benefits even if they manage investors' expectations and damage investors' interests. Thus, board of directors and investors should be aware of managerial incentives associated with stock options and analysts' incentive. There are costs to the firm for providing too many or too few incentives and managers may not take actions that maximize shareholder wealth. Also, there are cost to investors who place too much reliance on analysts' information and reports.

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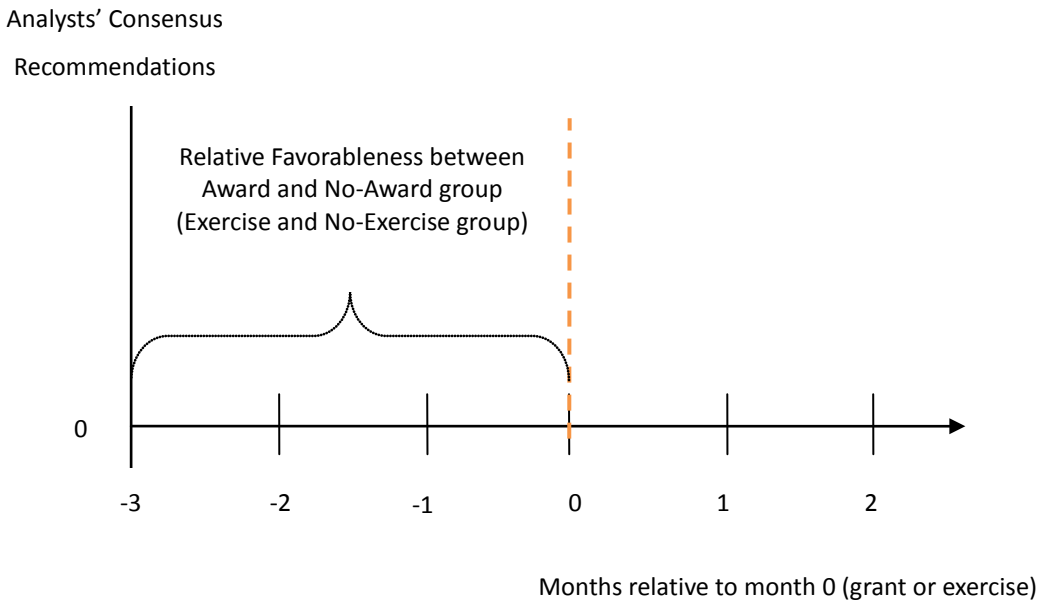
Figure 1 Timeline of Events

(1) Communication between Managers and Analysts



(2) Analysts' Relative Forecast Accuracy

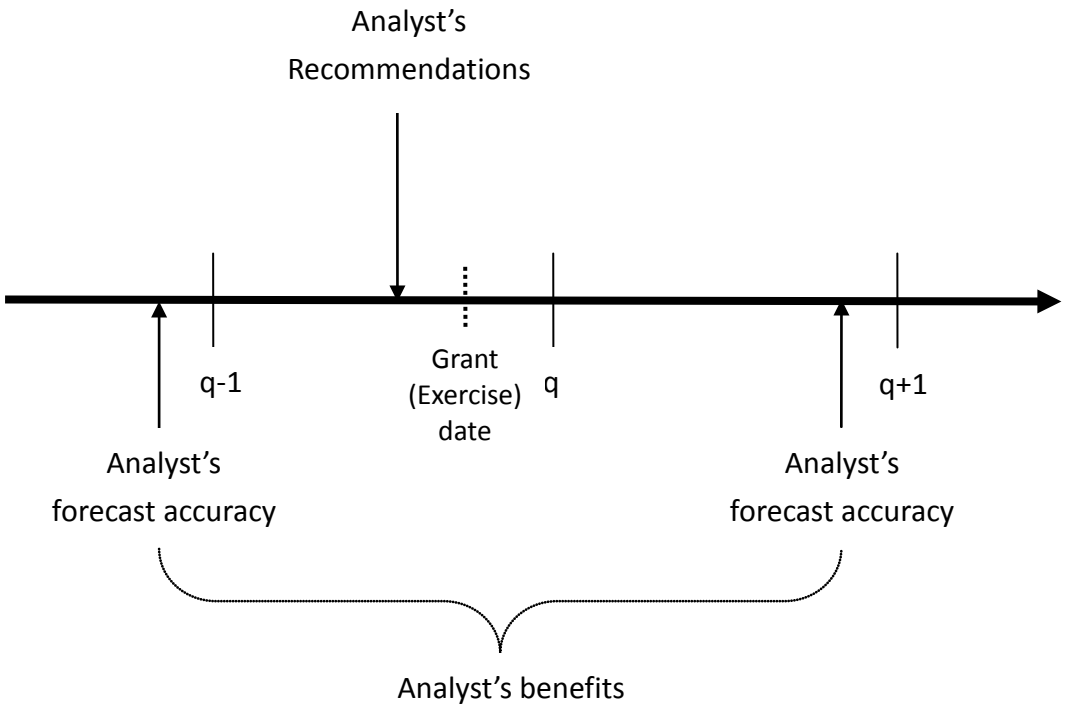


Table 1 Distribution of Sample

Panel A. Sample distribution by years

	Award Group		*Exercise Group*	
Year	Number	% of total	Number	% of total
1996	149	(3.05)	166	(4.04)
1997	351	(7.19)	358	(8.72)
1998	416	(8.52)	348	(8.48)
1999	438	(8.97)	409	(9.96)
2000	460	(9.42)	448	(10.91)
2001	451	(9.24)	258	(6.29)
2002	562	(11.51)	280	(6.82)
2003	629	(12.88)	440	(10.72)
2004	678	(13.89)	655	(15.96)
2005	748	(15.32)	743	(18.10)
Total	4882	(100.00)	4105	(100.00)

Panel B. Sample distribution by industry

	Award Group		*Exercise Group*	
Industry [two-digit SIC code]	Number	% of total	Number	% of total
Oil & Gas [13]	180	(3.96)	168	(4.53)
Food Products [20]	96	(2.11)	80	(2.16)
Paper and Paper Products [24-27]	122	(2.68)	94	(2.53)
Chemical Products [28]	521	(11.45)	350	(9.44)
Manufacturing [30-34]	160	(3.52)	70	(1.89)
Computer Equipment and Services [35,73]	732	(16.09)	732	(19.74)
Electronic Equipment [36]	365	(8.02)	362	(9.76)
Transportation [37,39,40-42,44-45]	188	(4.13)	157	(4.23)
Scientific Instruments [38]	287	(6.31)	222	(5.99)
Communications [48]	122	(2.68)	90	(2.43)
Durable Goods [50]	74	(1.63)	41	(1.11)
Retail [53-54,56-57,59]	170	(3.74)	145	(3.91)
Eating and Drinking Establishments [58]	59	(1.30)	86	(2.32)
Entertainment Services [70,78-79]	71	(1.56)	50	(1.35)
Health Services [80]	126	(2.77)	138	(3.72)
All Others	1277	(28.07)	924	(24.91)

The sample consists of 4,882 or 4105 observations which granting or exercising executive options during 1996-2005, separately.

Table 2 Descriptive Statistics

	Mean	*Std.*	*Q1*	*Median*	*Q3*
Panel A: Award Group					
△EPS	0.004	0.168	-0.030	0.010	0.050
SIZE	7.067	1.572	5.968	6.880	8.012
SALESGR	0.286	0.586	0.141	0.433	0.683
EARNVAR	1.263	2.026	0.383	0.500	1.039
STDEVREC	0.774	0.259	0.580	0.790	0.920
PROFIT	0.822	0.383	0.000	1.000	1.000
Panel B: Exercise Group					
△EPS	0.011	0.147	-0.020	0.010	0.050
SIZE	7.703	1.577	6.578	7.512	8.685
SALESGR	0.287	0.606	0.176	0.457	0.691
EARNVAR	1.188	1.931	0.358	0.500	0.958
STDEVREC	0.766	0.239	0.620	0.790	0.900
PROFIT	0.909	0.289	1.000	1.000	1.000

Panel C. Analysts' Recommendation

	Award Group		*No-Award Group*		*Exercise Group*		*No-Exercise Group*	
	N	*Mean*	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*
No. of following	4882	10.13	49556	9.78	4105	11.86	38936	10.36
Median Rec.	4882	2.22	49556	2.08	4105	2.09	38936	2.12
Mean Rec.	4882	2.18	49556	2.06	4105	2.07	38936	2.09
Std. Dev. Rec.	4882	0.76	49556	0.73	4105	0.77	38936	0.75
Buy Percent	4882	59.37%	49556	65.31%	4105	64.57%	38936	63.94%
Hold Percent	4882	36.13%	49556	32.10%	4105	32.45%	38936	33.16%
Sell Percent	4882	4.50%	49556	2.59%	4105	2.98%	38936	2.90%

△*EPS* is defined as the change in quarterly earnings per share relative to the same quarter in the precious year, deflated by share price. *SIZE* is measured as logarithm of market value of equity at the beginning of the forecast month. *EARNVAR* is measured as the standard deviation of annual earnings from continuing operations divided by the absolute value of the mean over the previous five years. *SALESGR* is the firm's five-year sales growth. *STDEVREC* is the standard deviation of analyst recommendation for the firm. *PROFIT* is an indicator variable equal to one if EPS as reported on I/B/E/S for the fiscal quarter is positive, and zero otherwise. No. of following is the number of analysts who following the firm. Median Rec. is the median value of recommendation and Mean Rec. is the mean value. Buy Percent is the percentage analysts suggest to buy the firm's share. Sell percent and Hold percent are the percentage analysts suggest to sell or hold the firm's share.

Table 3 Univariate Tests on Analysts' Recommendation

Panel A. Award vs. No-Award Group

	Month relative to month 0 (award month)					
	Month -3		Month -2		Month -1	
Group	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*
Award	4855	2.198	4870	2.210	4882	2.217
No-Award	49320	2.065	49440	2.066	49556	2.071
t-stat. [*z*-stat.] for Diff. in Mean [Median]		13.57*** [12.61]***		14.46*** [13.59]***		14.73*** [13.86]***

Panel B. Exercise vs. No-Exercise Group

	Month relative to month 0 (exercise month)					
	Month -3		Month -2		Month -1	
Group	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*
Exercise	4093	2.094	4101	2.091	4105	2.088
No-Exercise	38785	2.105	38860	2.108	38936	2.111
t-stat. [*z*-stat.] for Diff. in Mean [Median]		-0.95 [-0.899]		-1.57 [-1.587]		-2.06** [-2.041]**

Award group contains observations with option grants and exercise group contains observations with option exercises. For every firm in the award group or the exercise group, we classify each month between 1996 and 2005 into the *No-Award* group or the *No-Exercise* group, excluding award (exercise) month and the three months before and after an award (exercise) month. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 4 Univariate Tests on Analysts' Relative Forecast Accuracy

Panel A. Pre-Test for Consensus Recommendation

Award Group			
	Award	*No-Award*	*Diff. between Groups*
AF_{q-1}	0.0025	0.0021	0.0004***
AF_{q+1}	0.0025	0.0024	0.0001
Diff.	0.0000	0.0003	-0.0003
t-stat. [*z*-stat.] for Diff. in Mean [Median]			-3.15*** [-1.95] **
Exercise Group			
	Exercise	*No-Exercise*	*Diff. between Groups*
AF_{q-1}	0.0010	0.0010	-0.0001***
AF_{q+1}	0.0011	0.0013	-0.0002***
Diff.	0.0001	0.0003	-0.0002
t-stat. [*z*-stat.] for Diff. in Mean [Median]			-2.30*** [-1.98] **

Panel B. Award Group-Change Sample

	N		$MAFE_{ijq-1}$	$MAFE_{ijq+1}$	$\Delta MAFE$
DN	2146	Mean	-0.058	0.023	0.103
		Median	0.000	0.000	0.000
UP	1735	Mean	-0.038	-0.022	0.016
		Median	0.000	0.000	0.000
RE	1158	Mean	-0.041	-0.022	0.019
		Median	0.000	0.000	0.000
Test of Difference					
DN vs. *UP*	*t*-stat		-1.58	4.33***	4.07***
	z-stat		-1.04	2.86***	3.03***
DN vs. *RE*	*t*-stat		-1.11	3.60***	3.24***
	z-stat		-0.35	2.37**	2.01**
UP vs. *RE*	*t*-stat		0.22	-0.03	-0.19
	z-stat		0.56	-0.13	-0.64

Analysts have an upgraded recommendation (*UP*), downgraded recommendation (*DN*), or reiterated recommendation (*RE*). Analyst's recommendation is above, below, or equal to the median consensus recommendation for the firm: high (*HI*), low (*LO*), or neutral (*NEU*). ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 4 (Continued) Univariate Tests on Analysts' Relative Forecast Accuracy

Panel C. Award Group-Deviation Sample

	N		$MAFE_{ijq-1}$	$MAFE_{ijq+1}$	$\Delta MAFE$
LO	1665	Mean	-0.023	0.009	0.035
		Median	0.000	0.000	0.000
HI	1507	Mean	0.015	0.011	-0.002
		Median	0.000	0.000	0.000
NEU	2019	Mean	0.002	0.015	0.017
		Median	0.000	0.000	0.000
Test of Difference					
LO vs. *HI*	*t*-stat		-2.63***	-0.16	1.94**
	z-stat		-2.68***	-0.62	1.93**
LO vs. *NEU*	*t*-stat		-0.95	-0.32	1.01
	z-stat		-0.92	-0.04	0.82
HI vs. *NEU*	*t*-stat		1.76*	-0.49	-0.96
	z-stat		1.87*	-0.69	-1.17

Panel D. Exercise Group-Change Sample

	N		$MAFE_{ijq-1}$	$MAFE_{ijq+1}$	$\Delta MAFE$
DN	1640	Mean	-0.041	-0.019	0.022
		Median	0.000	0.000	0.000
UP	1506	Mean	-0.037	0.034	0.071
		Median	0.000	0.000	0.000
RE	859	Mean	-0.035	-0.032	0.003
		Median	0.000	0.000	0.000
Test of Difference					
DN vs. *UP*	*t*-stat		-0.25	-4.00***	-2.62***
	z-stat		-0.38	-2.70***	-1.95**
DN vs. *RE*	*t*-stat		-0.35	0.74	0.80
	z-stat		-0.12	0.73	0.57
UP vs. *RE*	*t*-stat		-0.14	4.08***	2.97***
	z-stat		-0.22	3.06***	2.16**

Analysts have an upgraded recommendation (*UP*), downgraded recommendation (*DN*), or reiterated recommendation (*RE*). Analyst's recommendation is above, below, or equal to the median consensus recommendation for the firm: high (*HI*), low (*LO*), or neutral (*NEU*). ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 4 (Continued) Univariate Tests on Analysts' Relative Forecast Accuracy

Panel E. Exercise Group-Deviation Sample

	N		$MAFE_{ijq-1}$	$MAFE_{ijq+1}$	$\Delta MAFE$
LO	1412	Mean	0.012	0.004	-0.008
		Median	0.000	0.000	0.000
HI	1319	Mean	-0.046	0.019	0.065
		Median	0.000	0.000	0.000
NEU	1748	Mean	0.018	0.009	-0.009
		Median	0.000	0.000	0.000
Test of Difference					
LO vs. *HI*	*t*-stat		3.85***	-0.92	-3.47***
	z-stat		3.15***	-0.29	-2.94***
LO vs. *NEU*	*t*-stat		-0.45	-0.34	0.05
	z-stat		-0.58	0.17	0.04
HI vs. *NEU*	*t*-stat		-4.30***	0.64	3.63***
	z-stat		-3.85***	0.48	3.44***

Analysts have an upgraded recommendation (*UP*), downgraded recommendation (*DN*), or reiterated recommendation (*RE*). Analyst's recommendation is above, below, or equal to the median consensus recommendation for the firm: high (*HI*), low (*LO*), or neutral (*NEU*). ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 5 Regression Analysis for Consensus Recommendation

Panel A. Award Group

	Month -3		Month -2		Month -1	
	Coeff.	*p*-value	Coeff.	*p*-value	Coeff.	*p*-value
Intercept	1.944***	(0.001)	1.985***	(0.001)	2.017***	(0.001)
AWARD_MONTH	0.028***	(0.006)	0.035***	(0.001)	0.035***	(0.001)
⊿EPS	0.029	(0.108)	0.019	(0.301)	-0.004	(0.824)
SIZE	0.038***	(0.001)	0.035***	(0.001)	0.032***	(0.001)
SALESGR	-0.062***	(0.001)	-0.063***	(0.001)	-0.064***	(0.001)
EARNVAR	-0.001	(0.596)	-0.002	(0.286)	-0.002	(0.145)
STDEVREC	0.273***	(0.001)	0.270***	(0.001)	0.263***	(0.001)
PROFIT	-0.054***	(0.001)	-0.062***	(0.001)	-0.065***	(0.001)
Adj. R^2	0.107		0.108		0.109	
F-statistic	406.474		411.596		413.701	
Prob. (*F*-stat.)	0.001		0.001		0.001	

Panel B. Exercise Group

	Month -3		Month -2		Month -1	
	Coeff.	*p*-value	Coeff.	*p*-value	Coeff.	*p*-value
Intercept	2.060***	(0.001)	2.114***	(0.001)	2.144***	(0.001)
EXERCISE_MONTH	-0.123***	(0.001)	-0.129***	(0.001)	-0.133***	(0.001)
⊿EPS	0.032*	(0.094)	0.020	(0.304)	0.011	(0.576)
SIZE	0.029***	(0.001)	0.027***	(0.001)	0.025***	(0.001)
SALESGR	-0.047***	(0.001)	-0.048***	(0.001)	-0.049***	(0.001)
EARNVAR	-0.008***	(0.001)	-0.009***	(0.001)	-0.010***	(0.001)
STDEVREC	0.297***	(0.001)	0.288***	(0.001)	0.279***	(0.001)
PROFIT	-0.249***	(0.001)	-0.083***	(0.001)	-0.093***	(0.001)
Adj. R^2	0.115		0.117		0.118	
F-statistic	348.082		354.150		359.776	
Prob. (*F*-stat.)	0.001		0.001		0.001	

⊿*EPS* is defined as the change in quarterly earnings per share relative to the same quarter in the precious year, deflated by share price. *SIZE* is measured as logarithm of market value of equity at the beginning of the forecast month. *EARNVAR* is measured as the standard deviation of annual earnings from continuing operations divided by the absolute value of the mean over the previous five years. *SALESGR* is the firm's five-year sales growth. *STDEVREC* is the standard deviation of analyst recommendation for the firm. *PROFIT* is an indicator variable equal to one if EPS as reported on I/B/E/S for the fiscal quarter is positive, and zero otherwise. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 6 Regression Analysis for Relative Forecast Accuracy

Panel A. Change Sample

	Award Group		*Exercise Group*	
	Coeff.	*p*-value	Coeff.	*p*-value
Intercept	0.083***	(0.001)	0.026**	(0.050)
UP	-0.065***	(0.001)	0.049***	(0.011)
RE	-0.063***	(0.001)	-0.021	(0.362)
ΔAGE	-0.009	(0.116)	-0.021***	(0.003)
$\Delta FREQ$	-0.149	(0.108)	0.016	(0.890)
Adj. R^2	0.004		0.004	
F-statistic	6.139		5.020	
Prob. (*F*-stat.)	0.001		0.001	

Panel B. Deviation Sample

	Award Group		*Exercise Group*	
	Coeff.	*p*-value	Coeff.	*p*-value
Intercept	0.039***	(0.005)	-0.003	(0.854)
HI	-0.038*	(0.057)	0.070***	(0.001)
NEU	-0.020	(0.275)	-0.001	(0.979)
ΔAGE	-0.023***	(0.001)	-0.031***	(0.001)
$\Delta FREQ$	-0.135	(0.221)	-0.014	(0.909)
Adj. R^2	0.003		0.007	
F-statistic	4.263		8.697	
Prob. (*F*-stat.)	0.002		0.001	

ΔAGE_{ij} is measured as the difference of the number of days between the forecast and the grant date (or the exercise date) from quarter $q-1$ to quarter $q+1$. Δ $FREQ_{ij}$ is defined as the difference of the number of forecasts issued by an analyst for each firm-quarter from quarter $q-1$ to quarter $q+1$. Both of these control variables are mean-adjusted. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 7 Analyst Recommendation for Sarbanes-Oxley Act

Panel A. Recommendation

	Grants before SOX			Grants after SOX		
	Month -3 Coeff.	Month -2 Coeff.	Month -1 Coeff.	Month -3 Coeff.	Month -2 Coeff.	Month -1 Coeff.
Intercept	1.506***	1.543***	1.579***	1.978***	2.014***	2.049***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
AWARD_MONTH	0.012	0.024*	0.031**	0.072***	0.073***	0.063***
	(0.404)	(0.091)	(0.031)	(0.001)	(0.001)	(0.001)
⊿EPS	0.044**	0.028	0.001	-0.006	-0.003	-0.019
	(0.051)	(0.220)	(0.973)	(0.847)	(0.923)	(0.542)
SIZE	0.031***	0.027***	0.024***	0.032***	0.033***	0.034***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
SALESGR	-0.064***	-0.063***	-0.063***	-0.083***	-0.088***	-0.088***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
EARNVAR	0.002	-0.000	-0.001	-0.007***	-0.006***	-0.006**
	(0.416)	(0.894)	(0.451)	(0.005)	(0.012)	(0.015)
STDEVREC	0.431***	0.432***	0.426***	0.150***	0.128***	0.106***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
PROFIT	-0.046***	-0.057***	-0.063***	0.014	0.005	-0.006
	(0.001)	(0.001)	(0.001)	(0.298)	(0.739)	(0.665)
Adj. R^2	0.038	0.036	0.034	0.017	0.016	0.015
F-statistic	211.788	201.290	189.880	41.173	39.707	36.895
Prob. (*F*-stat.)	0.001	0.001	0.001	0.001	0.001	0.001

Table 7 (Continued) Analyst Recommendation for Sarbanes-Oxley Act

Panel B. Earnings Forecast

	Grants before SOX			Grants after SOX		
	Month -3 Coeff.	Month -2 Coeff.	Month -1 Coeff.	Month -3 Coeff.	Month -2 Coeff.	Month -1 Coeff.
Intercept	0.210***	0.222***	0.226***	-0.166***	-0.108***	-0.043*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.072)
AWARD_MONTH	0.013	-0.003	-0.016	0.021	-0.008	-0.296**
	(0.333)	(0.810)	(0.148)	(0.175)	(0.579)	(0.021)
⊿EPS	-3.484***	-2.648***	-1.749***	-2.934***	-2.226***	-1.605***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
SIZE	0.006***	-0.000	-0.006***	0.040***	0.033***	0.022***
	(0.002)	(0.599)	(0.001)	(0.001)	(0.001)	(0.001)
SALESGR	-0.010*	-0.009*	-0.003	-0.046***	-0.033***	-0.025***
	(0.062)	(0.085)	(0.505)	(0.001)	(0.001)	(0.004)
EARNVAR	-0.010***	-0.006***	-0.003**	0.012***	0.009***	0.009***
	(0.001)	(0.001)	(0.022)	(0.001)	(0.001)	(0.001)
STDEVREC	0.298**	0.862***	1.023***	-1.182***	-0.767***	-0.180
	(0.028)	(0.001)	(0.001)	(0.001)	(0.001)	(0.387)
PROFIT	-0.259***	-0.222***	-0.188***	-0.179***	-0.175***	-0.155***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Adj. R^2	0.448	0.356	0.239	0.318	0.247	0.178
F-statistic	4374.801	2976.649	1695.293	1091.014	765.549	507.204
Prob. (*F*-stat.)	0.001	0.001	0.001	0.001	0.001	0.001

△*EPS* is defined as the change in quarterly earnings per share relative to the same quarter in the precious year, deflated by share price. *SIZE* is measured as logarithm of market value of equity at the beginning of the forecast month. *EARNVAR* is measured as the standard deviation of annual earnings from continuing operations divided by the absolute value of the mean over the previous five years. *SALESGR* is the firm's five-year sales growth. *STDEVREC* is the standard deviation of analyst recommendation for the firm. *PROFIT* is an indicator variable equal to one if EPS as reported on I/B/E/S for the fiscal quarter is positive, and zero otherwise. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 8 Relative Forecast Accuracy for Sarbanes-Oxley Act

Panel A. Change Sample

	Grants before SOX		Grants after SOX	
	Coeff.	*p*-value	Coeff.	*p*-value
Intercept	0.027	(0.339)	0.079***	(0.001)
UP	-0.029	(0.456)	-0.063***	(0.001)
RE	0.010	(0.793)	-0.048**	(0.022)
ΔAGE	-0.017	(0.221)	-0.012*	(0.064)
$\Delta FREQ$	-0.002	(0.995)	-0.155	(0.151)
Adj. R^2	0.001		0.003	
F-statistic	0.683		4.354	
Prob. (*F*-stat.)	0.604		0.002	

Panel B. Deviation Sample

	Grants before SOX		Grants after SOX	
	Coeff.	*p*-value	Coeff.	*p*-value
Intercept	0.039***	(0.005)	0.042***	(0.008)
HI	-0.038*	(0.057)	-0.040*	(0.084)
NEU	-0.020	(0.275)	-0.029	(0.175)
ΔAGE	-0.023***	(0.001)	-0.024***	(0.001)
$\Delta FREQ$	-0.135	(0.221)	-0.162	(0.187)
Adj. R^2	0.003		0.003	
F-statistic	4.263		3.848	
Prob. (*F*-stat.)	0.002		0.004	

ΔAGE_{ij} is measured as the difference of the number of days between the forecast and the grant date (or the exercise date) from quarter $q-1$ to quarter $q+1$. Δ $FREQ_{ij}$ is defined as the difference of the number of forecasts issued by an analyst for each firm-quarter from quarter $q-1$ to quarter $q+1$. Both of these control variables are mean-adjusted. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.