Market Reaction to CEO Option Awards, Backdating and Timing of News

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ABSTRACT

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Ruge Shen

This paper observes the pattern of CEO option awards and corresponding SEC Form 4 filings for S&P 1500 firms after the year 2006, when the enhanced disclosure requirements took effect. CEO's option award should be reported in Form 4 no later than two business days from the transaction date. The V-shaped abnormal return remains in my sample. The backdating phenomenon documented before SOX has been largely eliminated, however, it still occurs in late-filing observations. Another explanation for the abnormal return is the opportunistic timing of news, which consists of bullet dogging and spring loading. This phenomenon is more pronounced in the scheduled group than in the unscheduled group as the scheduled option awards can be anticipated. The multivariate regression results also show the late-filing and scheduled option awards are associated with larger abnormal returns, and the CAR is correlated with a few CEO characteristics such as age and tenure Additional tests suggest that the announcement effect of quarterly earnings varies in the before and after periods of option granting, which may be associated with deliberate CEO control over the release of news.

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1. Introduction

Linking executive compensation with the value of the stock has been considered a good way to align executive benefit with the company's long-run performance and the shareholders. Stock options have been heavily used since the 1990s. According to Murphy (2013), the growth in CEO compensation since the 1990s is largely driven by the growth in equity-based pay, and by 2000, stock option constitutes half of a CEO's compensation in a typical S&P 500 firm. However, the backdating incident in the early twenty-first century shocked many people, which means that executives retroactively report fake award date with a low stock price before the actual award date to achieve a low strike price for their stock option in order to gain more profit when they exercise the option in the future. This fraud enables CEOs to make money with options without paying any effort into operation.

Performance-based compensation can take the form of restricted stock, stock option, phantom stock, stock appreciation right (SAR), and long-term incentive plan (LTIP). Stock-based compensation is intended to reward executives for maximizing the market price of the stock. Options provide executives the right to buy stocks at the exercise price years after the grant, and the exercise price usually is set as the market price on the day of the grant (Bryan, Hwang & Lilien (2000)). A restricted stock unit (RSU) is a kind of compensation in the form of granting company shares at a predetermined time through a vesting plan and distribution schedule after achieving required performance milestones. Restricted stock has become more widely used after scandals on stock options in the mid-2000s involving companies like Enron and WorldCom happened.[1] Hayes, Lemmon, and Qiu (2012) find that after FAS 123R required options to be expensed, firms used fewer options starting the year 2006. Many firms switched to using performance-based awards with option-like features (Bettis et al. (2012)). Restricted stock can be viewed as an option with zero strike price. Murphy (2013) provides evidence that there is a noticeable shift from stock options towards restricted stock from 2002 to 2011, and equity-based compensation still accounts for a pronounced part of executive compensation.

The compensation committee of the board of directors holds annual meetings to review and discuss executive compensation. They review executive compensation annually and approve new executive compensation plans and then decide on the size and timing of awards. The requirement for the disclosure of CEO compensation has gradually developed over the past decades in reaction to new changes and scandals. In 2005, backdating of stock options was detected in many firms and caused SEC to raise scrutiny on the reporting of relevant events. A Pulitzer Prize-winning story published in The Wall Street Journal on March 18, 2006, finally brought the backdating scandal to light.[2] SEC issued new guidelines for executive compensation disclosure in August 2006, which require firms to disclose in the proxy statement if they followed a practice of coordinating the timing of option grants with news releases. As of January 2007, over 200 companies have been subject to federal investigations for possible backdating practices.

Prior research largely documents the problem of backdating (Lie (2005), Heron and Lie (2007) and Narayanan and Seyhun (2008)). People believe that backdating has been eliminated, or at least largely controlled by the enhanced reporting regulations. However, on the other hand, opportunistic timing behavior exists as a potential threat. The backdating phenomenon, alongside

[1] The Wall Street Journal article "Bosses' Pay: How Stock Options Became Part of the Problem", Dec. 27, 2006 (https://www.wsj.com/articles/SB116718927302760228).
[2] The Wall Street Journal article "The Perfect Payday.", March 18, 2006 (https://www.wsj.com/articles/SB114265075068802118)

the spring loading and bullet dodging hypothesis, both explained certain historical stock return patterns, the latter hypothesis states that CEO would try to depress stock price before the award by rushing forward bad news before the award and holding back good news until after the award. If the abnormal return on option award still exists in the post-regulation period, the hypothesis is probably true.

This paper examines the reporting pattern of CEO option grants in the decade since the new disclosure requirements on executive compensation were imposed in the year 2006. And I further examine whether the backdating phenomenon has been eliminated by the prompt reporting requirement or if is backdating still occurring. If backdating does not exist, what are the reasons for abnormal returns, and to what extent it proves the argument of bullet dodging and spring loading?

My paper confirms previous findings of backdating and opportunism timing of news around executive option awards. The abnormal stock return in my sample from the year 2007 to 2016 is weaker than the pattern observed before, and this may attribute to the newly enhanced reporting regulations. My findings are consistent with the notion that backdating was responsible for most of the abnormal return patterns before SOX, and it has been largely eliminated due to the tightened reporting regulations and public scrutiny. However, backdating still occurs in late-filing option awards after 2006, and the other hypothesis of opportunistic news timing is tested. I discover negative cumulative abnormal returns from 60 trading days away from the award date and positive abnormal returns right after the award in up to 30 trading days. Though the scheduled option is encouraged as it can limit the backdating behavior, opportunistic timing behavior is enabled at the same time. I replicate the tests of scheduled and unscheduled groups of previous literature and test the results of different classifications, and I extend the definition of schedule to encompass more observations with occasional outliers or grants with semi-annual plans. I find that the abnormal return pattern is more obvious in the scheduled award group, suggesting that the timing behavior of news exists. The abnormal return pattern in my sample is roughly following the opportunistic timing hypothesis that CEOs try to depress the stock price before the award and raise the stock price after the award by controlling news releases. The extent of abnormal return is also associated with some CEO characteristics such as CEO turnover, age, and tenure. Further tests observe that the announcement effect of quarterly earnings differs in the period before and after the option awards, which may be accompanied by deliberate news releases by the CEOs.

The rest of this paper is organized as follows. The “Hypotheses Development” section introduces the literature review and my hypotheses, and the “Data and Methodology” section presents the data and methodology. The “Empirical Results” section reports the empirical results, and the “Additional Tests” and the “Robustness Check” sections briefly discuss a few related tests. Finally, the “Summary and Conclusion” section summarizes and concludes this paper.

2. Hypotheses Development

2.1 Development in the regulatory framework

At first, executives receiving stock option grants only need to report them to the SEC on Form 5, which was not due until 45 days after the company’s fiscal year-end, and to disclose to stockholders in the proxy statements for the next year’s annual stockholder meeting, which is generally three to four months after the year-end. Specifically, since August 29, 2002, the SEC has required that stock option grants must be reported in Form 4: Statement of Changes in Beneficial Ownership, within two business days of the date of issue, subject to Section 16(a) of the Securities Exchange Act of 1934, the Sarbanes-Oxley Act (SOX) amendment. Before August 29, 2002, Form 4 had to be filed by the 10th day of the calendar month following the transaction, which can be around 40 days. Additionally, beginning July 30, 2003, the Act requires insiders to electronically file their Form 4 documents via the EDGAR system.

In addition, firms that have their corporate websites are also required to make the option grant information available on the day following the disclosure to the SEC. New rules applicable to required disclosure of executive compensation arrangements on Form 8-K current report, became effective on November 7, 2006. The reporting time has been shortened to four business days after the award. Although the ultimate value of stock awards and stock options is not known until the stock vests and the options are exercised, stock awards can be valued as the fair market value on the date of grant, and stock options usually can be valued using the Black and Scholes (1973) formula. These fair value valuation figures should be disclosed. Beginning in 2007, the SEC required management to disclose the reasons for selecting particular grant dates for awards and to state whether management granted options "in coordination with the release of material non-public information."[3] Since 2009, the grand-date fair value of options or stock grants and unrealized payouts from non-equity-based bonus plans should be reported in the summary compensation table in the proxy statement.

New rules adopted by the SEC in July 2006 on reporting requirements for public companies with executive compensation require companies to disclose the fair value of the stock on the date of grant, or, if higher than fair value, the closing market price. And, if the date of the grant is different from the date on which the board or committee met to determine the option grant, the meeting date should be disclosed. In addition, the new rules require disclosure of the methodology used to determine the exercise price if it is not equal to the closing price on the date of the grant. Companies must also disclose information about their grant policies, including why certain dates are chosen for granting stock options and how the exercise price is determined. These rules attempt to restrict the ability of executives to coordinate grant dates and the timing of news releases to manipulate the valuation of awards.

*****Insert **Table 1** here*****

Table 1 summarizes the evolution of regulations on disclosure about executive stock options, The information about executive compensation is more and more transparent to the public. People believe these regulations have all but eliminated fraudulent manipulation of executive compensation. Bartova and Faurel (2014) provide evidence that the improved disclosure and the increased media coverage after SOX have improved investors' ability to incorporate the information conveyed by these exercises into stock prices in a timely manner.

2.2 Literature review and hypotheses

Previous papers that focus on market reactions to changes of plan-based awards in executive compensation schemes have mostly found positive returns after the announcement. The earliest papers emerged in the 1980s. Tehranian and Waegelein (1985), studying stock price reaction to the announcement of short-term executive compensation plan adoption, find

[3] SEC press release, "SEC Votes to Adopt Changes to Disclosure Requirements Concerning Executive Compensation and Related Matters", July 26, 2006 (https://www.sec.gov/news/press/2006/2006-123.htm).

significantly positive abnormal returns occur in the month of announcement and in the four months before the bonus plan adoption. Brickley et al. (1985) find positive stock price reactions when new long-term incentive compensation plans were announced. Those long-term managerial compensation packages include stock options, stock appreciation rights, restricted stock, phantom stock, and performance plans. Their findings also show no obvious difference in various types of long-term plans. Defusco et al. (1990) find that the approval of an executive stock option plan was accompanied by a significant positive stock and a negative bond market reaction.

The opposite result also has been found. Gaver et al. (1992) find no significant reaction during the two-day announcement period beginning with the SEC stamp date for a sample of 209 adoptions between 1971 and 1980, either of bonus or stock options, and argue that the timing of information dissemination is problematic and unrelated information released in the proxy statement or impending shareholders' meeting complicates the interpretation of any unusual stock price behavior. Martin and Thomas (2005) find that potential dilution from management-sponsored, executive-only stock option plans result in significantly negative cumulative abnormal returns in the 3-day window surrounding the proxy date by examining a sample of stock option proposals in 1998. As a result, they conclude that the stock market and shareholders' perceptions of stock option plans have been changing and that people's excitement towards those plans has faded.

Earlier papers like Tehranian and Waegelein (1985), Defusco et al. (1990), Gaver et al. (1992), and Martin and Thomas (2005) study the option awards in the 1970s to 1990s using either the SEC stamp date (the date when the SEC received the proxy statements) or the proxy statement date (the date that the company sent out the proxy statements) as the event date. However, the disclosure requirement has improved gradually during the past decades. In the 1990s, the public would only know about the executive awards until the annual proxy statements, which are filed approximately three months after the fiscal year-end. Now prompt reporting requires filings of executive stock options on the 8-K current report within four business days and on Form 4 within two business days. For stock options, the announcement effect should be around the Form 4 filing date. Heron and Lie (2007) find positive returns after filings between August 29, 2002, and November 30, 2004, and infer that it might be the result of investors anticipating an increase in stock returns following the executive option grants, and they might buy stocks on the day that recent executive option grants are revealed, thereby giving rise to a slight uptick in stock prices.

Hypothesis 1: After year 2006, positive stock returns are still expected to be observed following the Form 4 filings of the CEO option awards, as the public anticipates the stock price to rise because of the incentives given to CEOs.

In addition to the potential announcement effect, researchers also observed abnormal returns around the actual grant date of option awards. Yermack (1997) analyzes the timing of CEO stock option awards using a sample of 620 stock option awards to CEOs of Fortune 500 companies between 1992 and 1994 and finds that stocks experience an average cumulative abnormal return of slightly more than 2% in the 50 trading days following CEO option awards,[4] even though news of the awards is not disclosed until several months after a fiscal year-end. The

[4] Before SOX, papers like Yermack (1997) use the option expiration date displayed in the proxy statements to work backwards the actual award date.

results cannot be explained by the efficient market hypothesis and suggest the existence of underlying executive manipulation.

There are two main categories of hypothesis in the previous literature to explain the abnormal stock return pattern around stock option awards. Firstly, a large body of previous literature especially focuses on the backdating phenomenon of stock option grants before SOX. Using a sample of 783 stock-option grants to CEO between 1981 and 1992, Chauvin and Shenoy (2001) find a statistically significant abnormal decrease in stock prices during the 10-day period preceding the grant date, but little evidence of positive abnormal return after the grants. Based on a sample of 5,977 CEO stock option grants from 1992 through 2002, Lie (2005) reports negative abnormal returns before the grants and positive returns afterward, he thinks it suggests that the reported grant dates have been set retroactively. One possible explanation for the abnormal stock returns following CEO stock option awards could be the leakage of the news of awards to some investors around the award dates. Another explanation is that managers might have had influence over the terms of their own compensation and used that power to obtain more performance-based pay in advance of anticipated stock price increases.

In 2005-2006, journalists found some lucky CEOs “happened to” receive the option grants exactly at a local minimum in the stock market, and nearly a hundred firms were reported under scrutiny by the SEC and the justice department for backdating of stock options. These scandals have drawn people’s attention to the timing of option grants. Empirical studies on the abnormal stock return phenomenon at that period largely criticize the backdating of option awards. Lie (2005) is the first paper to argue that backdating attributes to the return-reversal pattern around the grant date. The subsequent paper Heron and Lie (2007) compare the abnormal stock price pattern for a sample of grants from the beginning of the year 2000 to August 28, 2002, to that for a sample from August 29, 2002, to November 30, 2004, and find about 80% of the abnormal returns disappear from the earlier to the later period. They argue that most of the abnormal return pattern before August 29, 2002, is attributable to backdating. Since the scandal, the use of stock options has decreased, and the reporting requirement has been improved.

Though backdating is believed to be the explanation for the abnormal stock return documented before SOX, the pattern remains somewhat. Narayanan and Seyhun (2008) find significant abnormal stock return reversal around the grand date and the magnitude of the abnormal return is positively related to the length of the time interval between the grant date and the SEC filing date. The gain from backdating is smaller for scheduled grants, and for the group with a shorter reporting lag. Heron and Lie (2007) also find that late reporter is associated with a stronger abnormal return pattern. When grants are reported on the day of the deadline, the pattern is perceptible but limited to the days immediately surrounding the grant date. Both believe if the prompt reporting requirement is stringently enforced, backdating can be substantially eliminated. However, Heron and Lie admit that even under these circumstances, there is still room for forward dating (waiting after the board decision date to observe the stock price pattern and choose a future award date).

Although the reporting gap is shortened to two business days, late filing may still exist as not all companies comply with the requirement all the time. Therefore, this phenomenon is unlikely to disappear completely. I expect to observe the same pattern for the late reporters even after the year 2006.

Hypothesis 2: After year 2006, the abnormal return pattern due to backdating of options is mitigated as a result of prompt reporting disclosure but still exists in the late filing group.

Following the new requirement after the year 2006, the enforcement of reporting requirements mitigates backdating phenomenon, and firms start to schedule their grant dates in advance. Previous literature like Aboody and Kasznik (2000) and Chauvin and Shenoy (2001) exploit the fact that many awards are roughly on the same day each year. As the grant date is predetermined by the anniversary, the award date can be anticipated and prepared. Consistent with the executive manipulation hypothesis, they find scheduled awards are preceded by negative abnormal returns and the release of negative news, while more positive news is released after the award.

Even though the backdating phenomenon is eliminated after SOX, if the other hypothesis holds, the CEO can still manipulate option awards by controlling the news release to affect the stock price. Another hypothesis is opportunistic timing news that CEOs can try to accelerate bad news before the award (bullet dodging) and delay good news after the award is taken (spring loading) to drive stock movement so that they can silently affect the market price in favor of themselves. Daines et al. (2018) argue that "the move to scheduled options solved some problems but created others", that CEOs can try to depress the stock price before a scheduled grant, and that the drawback of the scheduled award is even worse than backdating since the latter only increases CEO's own compensation while the former leads to CEO's incentive to distort stock prices, may dissipate firm value.

If an award is scheduled, which means the date is predetermined, the CEO cannot change the timing of the award by either backdating or forward-dating, but it is still possible to manage the news around the event. To sum up, there are two possible methods CEOs can influence the stock price on the award date through timing, either by timing an unscheduled award date to follow the news or by timing corporate news disclosures to follow a scheduled award. Both methods have been suggested in the literature and evidenced (Aboody and Kasznik (2000), Chauvin and Shenoy (2001), Baker, Collins, and Reitenga (2003)). It is worth questioning whether CEO time award dates or time news or do both. Therefore, tests can be done on different subgroups of scheduled and unscheduled awards to investigate the different patterns of stock return and predict which timing practices they perform. Different classifications of scheduled and unscheduled awards yield contradictory conclusions. Aboody and Kasznik (2000) suggest opportunistic timing of voluntary disclosures around award dates for scheduled awards, and opportunistic timing of awards around news announcements for unscheduled awards, using a one-week interval before and after the prior year's grant date to define scheduled awards. However, those papers written in the 2000s observe unscheduled awards while backdating exists. Lie (2005) shows that the abnormal return pattern around scheduled grants is weaker, as most unscheduled grants were backdated. Heron and Lie (2007) argue that once scheduled option grants are redefined as within one day instead of one week of the anniversary, the abnormal returns largely disappear. Using the same classification as Aboody and Kasznik (2000), Daines et al. (2018) document negative abnormal returns before scheduled grants and positive abnormal returns afterward, by studying CEO stock option grants from 2007 to 2011. Huang (2020) defines a grant as scheduled if it occurs within one day of the anniversary of the prior grant or annual board meeting date, and as unscheduled otherwise, which yields a post-disclose (the year 2006) sample of 1,292 scheduled grants and 6,552 unscheduled grants and finds no significant timing of corporate news for scheduled grants.

Hypothesis 3: The abnormal return pattern around option awards should be different between scheduled and unscheduled awards, and the V-shaped pattern is stronger for the scheduled group.

Apart from that, the CEO's ability to influence his compensation plan is also related to his control over the company, and the effectiveness of the company's corporate governance and internal control system. According to Denis et al (1997), most CEOs would retire around the age of 65, and old CEOs who are expected to resign soon are believed to be more conservative and reluctant to change. Grund (2012) classifies CEO's tenure into three groups: 0-5, 6-19, and over 20, and observes that CEOs with medium tenure (6-19 years) are those who receive the most compensation. Therefore, I suppose that old CEOs are less likely to time news and that CEOs with medium tenures are more likely to manipulate information to their advantage. Apart from that, the size and composition of the board of directors may be an indication of the degree of effective corporate governance. For instance, the proportion of independent directors on the board also represents the extent of their internal oversight. If a CEO is also the chairman of the board, he may have more power over the board, and influence the compensation committee to adjust the compensation scheme to his advantage. This is referred to as CEO duality.

Hypothesis 4: The extent of abnormal return is associated with CEO characteristics such as age and tenure and is positively related to CEO's control over the board, such as the CEO duality.

If the opportunistic timing hypothesis holds that executives are motivated to manipulate the stock price downward prior to the grant date and upward after in order to gain extra profits from the unwinding of their equity holdings, the CEO would deliberately control the timing of disclosure of certain corporate information. Therefore, it is suggested that the announcement effect of news would differ before and after the award. Several corporate information releases can be considered, for example, quarterly earnings announcements in which the CEO is considered to attain more private information shortly after the end of the quarter and prior to the announcement. Aboody and Kasznik (2000) find that quarterly earnings announcements have the opposite impact on stock return when it occurs before and after the scheduled option award. Besides, Daines et al. (2018) find market reactions to the SEC Form 8-K current reports tend to be negative in the months immediately before a scheduled CEO option grant and positive in the months after the grant.

Hypothesis 5: CEOs will try to depress stock prices before the award and increase the stock price after the award by controlling certain news releases.

3. Data and Methodology

3.1 Sample construction

To begin with, I get corporate compensation data from WRDS "CompStat- ExecuComp" database. ExecuComp is the database of executive compensation data collected directly from each company's annual proxy (DEF 14A SEC form), which covers companies from the S&P 500, S&P 400 mid-cap, and S&P 600 small-cap indices and includes compensation variables for each company's top five executive officers. Under ExecuComp, I get annual executive compensation data from AnnComp, including the CEO designated for each year, and plan-based awards (PBA) data for all the employees from "Plan Based Awards" database. Since the "Plan Based Awards" database exists after the year 2006 regulation took place, so the observations are year 2006 is not complete. The time range I choose for my study is 10 years from year 2007 to 2016, which can be viewed as a decade after the backdating scandal revealed in 2006.

Apart from that, I get fiscal year-end and CIK data from "Funda". Each firm file through the SEC to report corporate affairs. In the SEC's Edgar database, company filings are documented by CIK (the Central Index Key). The searching by company's name or ticker is not fully supported on Edgar. Through inspection, I find that in the Funda database company's CIK is linked by its current ticker rather than its historical ticker, which causes mistakes when matching, because companies may change the ticker and one ticker could be used repeatedly by others. Therefore, to identify each company's SEC filings, I combine several methods of using python to search companies on Edgar by name, ticker, or the beginning part of the company name to account for those companies whose names contain abbreviations or symbols that are not fully identical with those names in WRDS database and referring to a CUSIP-CIK linking form obtained online, and finally manually check and confirm each match of company and CIK.

The original data contains 2,596 companies and 21,185 firm-year combination observations, while several observations were lost because of unmatching company identifiers, delisting, and security terminating firms. And a few matched-CIK companies cannot find useful filings on Edgar within the sample period. After rechecking for CEO fits in the fiscal year-end range, the sample contains 2,576 matched company-CIK combinations.[5]

To identify each company's CEO for every fiscal year, I first use the "CEO flag" in AnnComp. However, this data is not fully accurate, I then correct a small part of the data by referring to the date become CEO and the date left CEO recorded with the company's fiscal year-end date in the database, and manually check the SEC filings for the rest.[6]

I merge the sample with plan-based awards observations with the same company, year, and CO_PER_ROL (employee identifier), and then select observations with dates information available. Secondly, I drop several observations that wrongly recorded the option exercise date as the award date and are actually out of the sample period. Finally, there are 10,116 observations of unique award dates after excluding duplicate awards on the same day. Table 2 Panel A shows the sample selection starting from the full sample observations retrieved from the Plan Based Awards database.

*****Insert **Table 2** here*****

At this point, the sample contains 1,846 companies with 1,873 company-CIK matches. Gathering the data of dates from SEC Edgar is time-consuming. I use python to help with my manual work to retrieve the SEC filings from Edgar by matching company CIK, award dates, and person. For each report on the SEC, the "filing date" is the date that it is reported to the SEC and published on the SEC website, and the "period of report" is the earliest date mentioned in the report. The data I collect from Form 4 filings include the filing date, award date, and exercise price if it does not have the price recorded in the PBA database. (See Appendix A for example)

The PBA data of awards contains many mistakes like misplaced observations in the fiscal year, so I redo the procedure to check if the CEO and award observations fit in the fiscal year. I modify some observations with grant dates different from those in the database. Apart from that,

[5] A few companies' CIK are corrected by me through manual inspection that is different from the CIK in WRDS. 34 companies change CIK during the sample period and two pairs of companies with different names share the same CIK, just in different years. Company's fiscal year-end date is also corrected according to the SEC website and its DEF 14A proxy filings.

[6] If there is more than one CEO in one fiscal year, I first set consistent with the CEO flag, or set the person in charge for more than half a year, or the person with the highest compensation package.

I exclude observations of option cancel and reload, reissue due to company M&A or reorganization, and those to adjust option exercise price. For consistency, I also check every company for the whole sample years for Form 4 option filings even if it is not originally in the sample, and add those observations, to confirm that I get a full understanding of their award schedule. And in the final sample, 673 observations are RSU/SAR/LTIP, which are wrongly recorded in the database with OPT_GRT. Finally, I get 9,804 different option grant date-exercise price observations from the year 2007 to 2016. In the final sample, there are 9, 695 unique option grant date observations, and 9,789 unique exercise price observations with Form 4 filings. The final sample contains 1,631 companies with 2,385 CEOs. This process of sample selection is shown in Table 2 Panel B.

*****Insert **Table 3** here*****

Table 3 summarizes the final sample distribution. Panel A represents that the year distribution is rather stable during the sample period, with a slight trend to decrease year by year. This is consistent with previous literature that people are gradually decreasing the use of stock options. Panel B and C show the month and quarter distribution. Over half of the awards happened in the first quarter, and most of them are in February and March. It makes sense that the majority of firms have the same year-end as the calendar year and firms will make compensation plans at the beginning of a year. Panel D tells that firm size is not biased in the sample.

In my sample of 9,804 different grant date-exercise price observations, 8,938 observations have stock price available on that day, and among those, the average exercise price is 0.33% higher than the closing price of that business day, and 94% of the observations' exercise prices fluctuate within 1% of the closing price on the day. This illustrates that most of the option awards are set equal to the closing price of that business day, in accordance with the pricing requirement. Besides, in the sample examination, I read some filing notes that disclose their pricing principle, e.g., 110% of the closing price on the day of the grant, as per the disclosure requirement. Therefore, in the later part of my study, I assume all the option grants are at the money. (If not, the exercise price is still linked to the market price on that day.)

As per the regulations, companies should disclose the option grants within two business days after it. I drop observations with unusually long gaps (trimming at the 99th percentile which is 29 business days) between filing date and the award date, and then dividend observations into groups of *disciplined* and *late-filing*. The *disciplined* group contains observations with reporting gap equal to or less than two business days, and the *late-filing* group consists of those files later than two business days. The most common reasons for late-filing are: reporting the option award until its first vest; upon approval by shareholders; reporting after terms of the grant awards are communicated to the recipients, etc.[7] As a result, it could be misleading that a few firms use the shareholder approval date as the transaction date, rather than immediately after the board meeting at which the grant decision is made, while the actual "transaction date", i.e., the date on which the exercise price is set, is several months earlier.

*****Insert **Table 4** here*****

[7] These are the reasons that companies self-noted in Form 4. Other reasons include inadvertent error, and expired SEC password.

Table 4 shows the summary of average reporting gaps of the sample with 9,684 Form 4 filing observations.[8] It is shown that the median of the reporting gap for both trading days and calendar days is 2, and the average business days is 3.259 while the average calendar days is 4.497, indicating that around half of observations file in according with the regulations. However, late filings do exist. Although years after the regulation took effect, not all the companies comply with the regulations strictly every time, some of them violate reporting requirements and still report late. In my sample after dropping extreme observations, the general pattern seems in good comply with the requirement. Figure 1 shows the yearly average of 9,588 observations after trimming by trading days gap at the 1st and 99th percentiles, though the gap gradually shortens over the years, there is no clear pattern. This may indicate that the SEC's penalties for late reporting are not strong enough and do not enforce company compliance very well.

*****Insert **Figure 1** here*****

According to Brickley et al. (1985), there is no obvious difference in the impact of different types of long-term plans. Also, by analyzing the sample, it is found that some companies use a mix of different methods of incentive plan packages in executive compensation, and they tend to issue them at the same time as a comprehensive long-term plan. In the time of cleaning data, I drop those wrongly classified observations of SAR or RSU awards without option awards, but it is not possible to separate those option awards coincide with other compensation packages or differentiate those different kinds of awards.

3.2 **Methodology**

A. Event study

The event study methodology is used to study the market reaction to an announced corporate event, in order to better understand corporate policies and decisions. MacKinlay (1997) states that, using financial market data, an event study measures the impact of a specific event on the value of a firm. The usefulness of such a study comes from the fact that, given rationality and information efficiency in the marketplace, the effects of an event will be reflected immediately in security prices. Thus, a measure of the event's economic impact can be constructed using security prices observed over a relatively short period. There is an assumption that the market processes event information efficiently and unbiasedly. Therefore, we should be able to examine the impact of the event on stock prices.

If there is no abnormal performance surrounding the event date, that means the event has no significant impact on the company's stock price. To test this hypothesis, abnormal return is calculated by the difference between the observed return at the stock market and the expected return estimated by models for that period:

$$AR_{i,t} = R_{i,t} - E(R_{i,t})$$

where $R_{i,t}$ designates the observed return for security i at day t, $AR_{i,t}$ as the excess return for security i at day t, and $E(R_{i,t})$ as the return estimated by chosen model. Different models can be used to do the estimation, such as the market model, mean adjusted model, market adjusted model and multi-factor model. Here I use Fama-French three-factor model with momentum

[8] I keep some observations that are not reported in Form 4, only in Form 3 or 5, for the classification of the award schedule. And those observations are excluded here.

factor for asset pricing of stocks and equally weighted CRSP market index. The data for the factors are retrieval from CRSP (Center for Research of Security Prices) database. The model is also known as the Carhart (1997) model, which is defined as:

$$E(R_{i,t}) - r_f = \alpha_i + \beta_i \cdot (R_{M,t} - r_f) + s_i \cdot SMB_t + h_i \cdot HML_t + u_i \cdot UMD_t + \varepsilon_{i,t}$$

where r_f is the risk-free rate and $R_{M,t}$ is the market return at time t, SMB represents the size premium, which is the difference between returns on a portfolio of small and large stocks, HML represents the book-to-market value premium, which is the difference between returns on a portfolio with high and low book to market firms, and UMD represents the momentum premium, which is the difference between returns on winners and losers. Therefore, the $E(R_{i,t})$ in the first formula is calculated. (Results using other models are robust and not tabulated in this paper for parsimony.)

For event study, define day 0 as the day of the event, I use a maximum of 255 daily return observations for the period before its respective event, which ends 64 days before the event, following the default setting on Eventus, this window is designated as the estimation period, and the event period is designated to be the 120 days window around day 0. Any non-trading calendar day will be converted to the following trading day. For a security to be included in the sample, it ought to have at least 30 daily return records in the estimation period.

The null hypothesis to be tested is that the mean excess return is equal to zero. Therefore, daily abnormal returns are aggregated to get cumulative abnormal returns (CAR) within the time period. For firm i over the event window (t_1, t_2), CAR is computed as:

$$CAR_{i,(t_1,t_2)} = \sum_{t=t_1}^{t_2} AR_{i,t}$$

Then cumulative average abnormal return (CAAR) and precision weighted CAAR (PWCAAR) are computed as follows:

$$CAAR_{(t_1,t_2)} = \frac{1}{N}\sum_{i=1}^{N} CAR_{i,(t_1,t_2)}$$

$$PWCAAR = \sum_{i=1}^{N}\sum_{t=t_1+1}^{t_2} \omega_i AR_{i,t}$$

where

$$\omega_i = \frac{\left(\sum_{t=t_1+1}^{t_2} S_{AR_{i,t}}^2\right)^{-0.5}}{\sum_{1=1}^{N}\left(\sum_{t=t_1+1}^{t_2} S_{AR_{i,t}}^2\right)^{-0.5}}$$

and $S_{AR_{i,t}}^2$ denotes the forecast-error-corrected variance.

Standardized cross-sectional Z test (Boehmer, Musumeci and Poulsen (1991) method) and generalized sign Z test are performed to test whether the respective CAAR and PWCAAR are significantly different from zero, in both figure and sign perspectives. Sign test tests whether the frequency of positive abnormal returns exceeds half of the sample.

To begin with, I test the full option awards sample of 9,588 observations to observe the return pattern. For the test on Form 4 filing dates to see if the announcement effort exists, the event date is the Form 4 filing date. Then for the rest tests, the option award date is set as day 0.

Secondly, I divide the full sample into different subgroups and perform two sets of T-tests to see if there are significant differences between the groups.

1) Reporting gap.

Since previous literature largely criticizes stock options for backdating, the test of report lag with the extent of abnormal return should be tested. An observation is considered to be with no reporting lag if the Form 4 filing date is the same date as the award date, which is not possible to be backdated; otherwise, there is reporting lag. The reporting gap is defined as the days between the option award date and the Form 4 filing date. I separate observations into two subgroups: The *disciplined* group contains observations with reporting gap equal to or less than two business days, and the *late-filing* group consists of those files later than two business days. Perform a T-test to see if there is a significant difference between the two groups.

2) Scheduled and unscheduled groups.

As many companies make compensation awards roughly during the same time every year, the award date could be predicted. Different scholars use different classifications for defining scheduled awards. Firstly, following Aboody and Kasznik (2000) and Daines et al. (2018), I define an award to be *scheduled* if it occurs within 7 days away from the prior year's anniversary, and as *unscheduled* if it occurs more than 15 days away from the anniversary. Secondly, as Lie (2005) criticized the former classification for giving too much room for backdating for those observations defined as scheduled, I tighten the *scheduled* group to *fixed*, with those grants that occur within one day of the anniversary date.

To avoid confounding effects and overlap event periods, I first drop those companies with more than one observation within one fiscal year, and then manually check and add back some observations. I further extend the definition of scheduled awards every year to scheduled awards with regular schemes.[9] And if a company award option to its CEO semi-annually, (e.g., every Jan 4th and July 4th), I consider it has two scheduled awards every year.[10] Also, if the award schedule is every two years, I recalculate the year gap by ½ and then use it for classification. Each company's first observation in the sample period is excluded in this classification to avoid misleading.[11] Also, by observation of the option award patterns, I found that when the CEO changes the award pattern may change, for instance, many companies will grant a portion of the options to the new CEO on his first day in office and then continue to award options on an annual basis as is customary. Thus, I improve the schedule group definition and consider all the awards that can form a continuous pattern with the previous awards after removing the occasional extra award as scheduled. This means, regardless of the year, if the date is within 7 days window of one previously scheduled award, I regard it as scheduled. The reminders are not classified. For these paired two subsamples, test if the stock return patterns are different.

B. Multivariate regression

Next, multivariate regressions are applied to test whether these cumulative abnormal returns remain significant after controlling for firm characteristics, CEO characteristics and year,

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[9] For example, if a company awards an option on May 4th, 2008, then stops in 2009 (or awards a SAR/RSU around the same date in 2009), and gives another option award on May 5th, 2010, I still recognize it as scheduled.

[10] Those companies that award options more frequently like quarterly or monthly are excluded from this test, in case of overlapping event windows.

[11] Heron and Lie (2009) reclassify a first-year grant as scheduled if it is within 2 days of the scheduled grant date in the following years. I don't follow this approach as I think if this observation is the first one to begin the schedule, it doesn't make sense to classify it as scheduled.

quarter and industry fixed effects. The CAR windows of (-30,0) and (1,30) are the independent variables. I also use the "round-trip" return, as adopted by Daines et al. (2018), which captures both pre-grant price decline and post-grant price increase. In my case, the RoundTrip is measured by CAR (1,30) - CAR (-30,0).

Model: (Same for RoundTrip_CAR$_i$ as dependent variables)

$$CAR_{i,(t_1,t_2)} = \alpha_1 + \beta_1 SIZE_i + \beta_2 ROA_i + \beta_3 MTB\_RATIO_i + \beta_4 DIV\_PAYOUT\_RATIO_i + \beta_5 CAP\_PPE_i + \gamma_1 CEO\_DUALITY_i + \delta_1 NEW_i + \delta_2 OLD_i + \delta_3 LONG\_TENURE_i + \delta_4 MEDIUM\_TENURE_i + \delta_5 LATE_i + \delta_6 SCHEDULED_i + \delta_7 UNSCHEDULED_i + \sum \gamma_h Year_h + \sum \gamma_j Quarter_j + \sum \gamma_k Industry_k + \sum \gamma_l SPcode_l + \varepsilon_{i,(t_1,t_2)}$$

There are four main categories of dependent variables, company characteristics, board characteristics, CEO characteristics, and award characteristics. I define the variables as follows. Following previous papers on CEO compensation, I use the logarithm of total sales to represent firms' size, and ROA (return on assets) calculated by the earnings before interest, taxes, depreciation, and amortization (EBITDA), over the firm's lagged total assets to measure the firm performance. Growth opportunity is valued by the market-to-book ratio, which is defined as the market value of equity divided by the book value of equity. The dividend-payout ratio, calculated by dividend per share divided by earning per share, is useful for assessing a dividend's sustainability. CAPE_PPE measures the capital investment, calculated by capital expenditures over total property, plant and equipment at the end of the previous year. To reduce potential endogeneity, the accounting figures of firm characteristics used are lagged by one year. These 5 variables representing firm characteristics are winsorized at the 1st and 99th percentiles to exclude the impact of outliers.

Companies' board data are obtained from the Boardex database. I define the dummy variable CEO_DUALITY to represent if the CEO is also served as the chairman of the board. CEOs with dual roles are perceived to have more chances to exert influence over their own compensation.

A dummy variable NEW is used to label those CEOs who assume office in that fiscal year. CEO's own characteristics like age and tenure are also factors that influence CEO compensation, which may possibly impact the abnormal return. I use a dummy variable OLD to represent the CEO is over 65 years old. Following Grund (2012), I classify CEO's tenure into three groups: 0-5, 6-19, and over 20. I define a dummy variable LONG_TENURE which equals to one if the CEO's tenure is above 20 years,[12] and a dummy variable MEDIUM__TENURE which equals to one if the CEO's tenure is between 6 to 19 years.

Year dummies, quarter dummies, industry dummies, S&P code dummies, and CEO gender are included in the regression. The descriptive statistics of these variables used are presented in Table 5. (See appendix C for the variable description)

*****Insert **Table 6** here*****

[12] Note that the BECAMECEO in COMP database is updated to be stored as the latest date, thus, if a CEO had left the position and then became CEO again after a year or more, this variable only records the new date. As a result, his tenure would be less counted. There is a limitation that those returning CEOs' tenure cannot be calculated correctly. To avoid mistakes, I exclude those CEOs with conflicting BECAMECEO dates. Therefore, the number of observations with TENURE dummies available is less than the full sample, and this LONG_TENURE represents that the CEO stay in position for a long and continuous time, showing his absolute control over the company.

4. Empirical Results

This section discusses the empirical results of my study.

4.1 Abnormal return around Form 4 reporting dates

To observe the pattern of stock price around the announcement of option grants to the CEO, which is the date of the Form 4 filing dates, the full sample of 9,588 unique firm-date observations are tested. I use the Fama-French 3-factor model with the momentum factor and with CRSP equally weighted market index. Define the Form 4 filing date as day 0. The estimation period is 255 days ending 64 days before the event and the minimum estimation length is 30 days. 9,198 security-events with return available are used to perform the event study test after those observations with missing data are excluded. The mean cumulative abnormal return and precision weighted CAAR are calculated for these windows: (-60,0), (-50,0), (-40,0), (-30,0), (-20,0), (-10,0), (-5,0) (-3,0), (-1,1), (1,3), (1,5), (1,10), (1,20), (1,30), (1,40), (1,50) and (1,60). Results are shown in Table 6.

*****Insert **Figure 2** here*****
*****Insert **Table 6** here*****

Figure 2 displays the pattern of the mean of cumulative abnormal return, along with the up-bound and low-bound of the 95% confidence limits, in my estimation period, i.e., from -60 days to 60 days. The V-shaped return reverse pattern is apparent, as we can see that the CAR starts to fall from more than 50 days ago and starts to rise around day -14. Table 6 presents the result that there is a mean CAR of 0.14% and PWCAAR of 0.12% in the event window (-1,1), significant at the 99.9% confidence level, which shows a positive announcement effect on the stock price, which suggests my first hypothesis is true. And it remains significant at the 99% level in the following windows of 3 days, 5 days, 10 days, and 20 days after the filing date. Thus, we may draw the conclusion that the award of CEO option grants, as a form of incentive pay to connect the CEO's compensation to future stock performance, is still valued as a good incentive for the CEO from the investors' perspective. However, it is also shown that in the period before the award, there is statistically significant negative mean CAR and PWCAAR in the window (-60,0), (-50,0), (-40,0), and (-30,0), and then significant positive mean CAR and PWCAAR in the window (-10,0) and (-5,0), at the 95% confidence level, which cannot be explained simply by the announcement effect of Form 4 filings. One possible explanation is that the actual option grant dates lie within these windows, thereby resulting in abnormal returns. Further tests are performed as the event date is the option award date.

4.2 Full sample abnormal return of CEO option awards

Defining the option award date as day 0 and using the Fama-French 3-factor model with a momentum factor and with CRSP equally weighted market index, the full sample of 9,588 unique firm-date observations are tested. The estimation period is 255 days ending 64 days before the event and the minimum estimation length is 30 days. 9,190 security-events with returns available are used. The mean cumulative abnormal return and precision weighted CAAR are calculated for these windows: (-60,0), (-50,0), (-40,0), (-30,0), (-20,0), (-10,0), (-5,0) (-3,0), (-1,1), (1,3), (1,5), (1,10), (1,20), (1,30), (1,40), (1,50) and (1,60). Results are shown in Table 7.

*****Insert **Figure 3** here*****
*****Insert **Table 7** here*****

Similar to Figure 2, Figure 3 also displays the pattern of the mean of cumulative abnormal return, along with the up-bound and low-bound of the 95% confidence limits, with day 0 set as the award date. Overall Figure 3 looks like Figure 2 moved 2 days to the right, which makes sense that the Form 4 filing date is generally 2 business later than the award date. It is illustrated that the CAR begins to decrease at day -48, decreases to below 0 at day -40, and then begins to rise at day -12. Table 7 shows that the abnormal stock returns form a reverse pattern, i.e., generating negative returns before the award and positive returns after the award. And the positive returns after the option award is more obvious, with larger statistical significance. Both tests parametric and non-parametric show strong significance at the 99% confidence level of positive abnormal return in the 3 days, 5 days, 10 days, 20 days, and 30 days windows after the award. Although all the percentages are minor, at around 0.2%. Then, the statistical significance disappears in the 40 days and 50 days window. It can be inferred that the abnormal return pattern mainly occurs in the 30 trading days after the award date. Different from the results in Table 6, there is no significant abnormal return in the (-1,1) window of the event, which in turn proves the existence of the announcement effect on the Form 4 filings of CEO option awards. Before the award, the CAR in the (-60,0), (-50,0), (-40,0), and (-30,0) windows are all significant at the 99% confidence level. The pattern shows that the hypothesis of spring loading and bullet dodging is possibly true and is more tilted towards the spring loading hypothesis that the CEO would hold good news to release after the option award to raise the stock price immediately. The negative return pattern is far from the award date, which may be interpreted since the award date is to be predicted, so it is safer to start earlier. It is also possible that other events within this interval affect the stock price, which I will try to analyze in later parts. However, no figure of these CARs exceeds 1%, so there is no dramatically abnormal return like previous literature spotted in the 1990s and 2000s when backdating is common. Thus, we can say that the abnormal return pattern remains but has been mitigated largely since the year 2006 as a result of the improved disclosure requirement and more regulated corporate behavior.

I also calculate the CAR over shorter time intervals, such as (-30,-20). It is shown that in the pre-award part, the abnormal return happens much earlier in the period, while in the later part, after 20 business days it is basically gone. It can be interpreted this way: if you want to prepare for something that has not happened yet, you will act ahead of time to make sure it is done before the time point you want, so the point of abnormal return turns from negative to positive happens before the actual award date. Besides, the option award plan may leak near the award date and speculators who anticipate a rise in the stock price will trade before that date, driving the stock price slightly upward. Other than those windows by normal cut-offs, I also calculate the CAR within the intervals cut by those turning points, that the PWCAAR in the window (-48,-12) and (-40,-12) are around -1%, and the PWCAAR in the window (-11,30) and (-11,-60) are around 0.4%, with the high significance of both figure and sign.

4.3 T-test for disciplined and late-filing groups

As the regulations have been improved since SOX, the reporting regulation requires option awards to be reported to SEC in Form 4 within two business days following the award. If firms comply with the regulation, that means the days for possible backdating are limited to 2 days before award.

After trimming observations by the reporting gap at the 1st and 99th percentile, the sample of 9,588 observations is divided into two groups *disciplined* and *late-filing*. The *disciplined* group contains observations with reporting gap equal to or less than two business days, and *late-filing* consists of the rest. From the 9,588 observations of option awards, the partition of reporting gap results in two subgroups of 8,677 *disciplined* and 911 *late-filing* observations, and the average reporting gap for these two groups is 1.75 and 5.33 trading days, respectively.

*****Insert **Table 8** here*****

Table 8 shows the CAR in *disciplined* and *late-filing* groups and the t-test result for the mean CAR difference. The abnormal return pattern in the *disciplined* group generally follows the full sample in Table 7, with significant negative CAR in the (-30,0) window, and significant positive CAR in all windows after the award. On the other hand, the *late-filing* group show no significant abnormal return in the pre-award period, however, its post-award period CAR is larger than the *disciplined* group, in the 10 days, 20 days, and 30 days windows after the award. In the t-test of mean CAR in the window (1,30), as the p-value of equality of variances is less than 0.01, the two sample variances are unequal, and the t-value of unequal variances by the Satterthwaite method is -2.17, which means the two groups' mean CAR in the window (1,30) is different, and significant at the 95% confidence level. The CAR is on average 1.23% higher in the *late-filing* group than in the *disciplined* group, in the 30 trading days after the option award.

It can be interpreted that CEO manipulation on option awards reporting result in (part of) the late filing, and the option was slightly backdated within the period. For an observation to be gathered in my sample, whether report late or not, it should be appropriately reported. And I also exclude observations with long reporting gaps at the 99th percentile to exclude those outliers which are mistakenly recorded. Therefore, my result should be better than the actual reporting situation. This result proves my second hypothesis that backdating phenomenon still exists in the post-2006 period, in those observations filed beyond the requirements. The prompt reporting disclosure devotes to helping discipline CEO compensation award and regulating information disclosure, though it is still possible to postpone reporting until the deadline, the delay is limited to only two business days. In the sample that normatively complies with the two business days requirement, the mean CAR is less than 0.1% in the post 30 days window, which is indeed very small. We can also draw the conclusion that backdating only causes positive abnormal returns in the period after the award, but it cannot explain the negative pre-award abnormal return in the sample.

4.4 T-test for scheduled & unscheduled option awards

It is suggested that backdating has been mostly eliminated by regulations enforced after SOX when firms tend to make scheduled awards, which makes it impossible to backdate awards anymore. Instead, scheduled option awards offer CEOs the opportunity to time news around the pre-set award date. The hypothesis of spring loading and bullet dodging states that CEOs can accelerate the release of bad news before the award to depress stock price and delay good news to push the stock to exhibit positive return after the award. The bounce-back of stock return observed in my sample is potentially consistent with the bullet dodging and spring loading hypothesis. Further tests can be conducted by comparing scheduled and unscheduled groups of awards to exploit the hypothesis. However, previous literature shows mixed views on scheduled and unscheduled groups of awards based on different classifications of schedule. Therefore, I test different groups of classification adopted by previous papers.

First, I define *scheduled* (within ±7 days of the anniversary) and *unscheduled* (more than ±15 days of the anniversary) following Aboody and Kasznik (2000) and Daines et al. (2018). The results of the CAR in *scheduled* & *unscheduled* groups of option awards and the t-test results for mean difference are shown in Table 9. This test is mainly focused on the windows before the award date because if the CEO manipulate the stock return before the award by controlling news release before the award date, the pattern will only occur in those scheduled awards and CEO cannot prepare for those unscheduled awards. To construct the subgroup sample, a company must have at least two observations in the sample period to calculate the gap in between, and each company's first observation is excluded in this classification to avoid misleading. The award with a gap to the prior year's award between 358 and 372 days falls in the *scheduled* group and those whose gap is more than 379 days or less than 351 days fall in the *unscheduled* group. The reminders are not classified. The mean and median of the gap between every two consecutive year observations in the sample are 363 days and 364 days, indicating that the majority of the awards are scheduled. After my manual screening explained in the methodology part, the subsample contains 6,447 observations with 4,841 *scheduled* awards within ±7 days of the anniversary and 1,606 *unscheduled* awards falling out of ±15 days of the anniversary.

*****Insert **Table 9** here*****

Table 9 presents the results of the CAR in *scheduled* and *unscheduled* award groups. For the comparison of means, the t-statistic assuming unequal variances is calculated. The result proves my third hypothesis true that the abnormal return pattern is different in scheduled and unscheduled groups. Significant negative abnormal return is spotted in the pre-award period of the *scheduled* group, with the mean CAR of -1.17% in the (-30,0) window and -0.47% in the (-20,0) window, both significant at the 99.9% confidence level. However, the abnormal negative return patterns completely disappear in the pre-award half of the *unscheduled* group, the mean CAR in (-30,0) of *scheduled* group is 1.24% less than the *unscheduled* group, significant at the 95% confidence level. The extent of abnormal returns after the award is slightly larger than the *scheduled* group, but there is no significant difference. For the *scheduled* group, the abnormal return pattern is consistent with the full option award sample in Table 7, and the return reverse pattern is more obvious, with all the pre-award period return being negative, and increased magnitude of significance in (-30,0) and (-20,0) windows, though the abnormal return after award decreases in significance. It indicates that the timing of news before the option award happened in scheduled groups only, which is consistent with my prediction. The strong sign of negative abnormal return suggests that the bullet dodging hypothesis is probably true.

I further defined the *fixed* group of option awards within ±1 day of the anniversary. Contrary to Heron's argument, there is also a sign of abnormal return in this group. In the untabulated test result, the mean CAR is -0.83% in the (-30,0) window, significant at the 99% confidence level; and the mean CAR is -0.36% in the (-20,0) window, significant at the 90% confidence level. I also perform the same test as Huang (2020), which defines scheduled option grants as within one day of the anniversary, and all the other observations as unscheduled, and find no significant difference in these two groups. However, Huang's unscheduled group is much larger than the scheduled group, which actually contains mixed types of observations. Thus, I do not think the result from this classification is meaningful.

4.5 Possible explanations

The multivariate regressions are performed in trying to explain the abnormal return around CEO option awards. From the previous parts, it can be anticipated that the pre-award negative abnormal return is associated with scheduled awards, while the post-award positive abnormal return is partially connected with backdating and late filing. I run multivariate regression on CAR windows (-30,0), (1,30), and RoundTrip which is measured by CAR (1,30) - CAR (-30,0), involving the variables of firm characteristics, board characteristics, CEO characteristics, and year, quarter, and industry dummies. The 5 variables representing firm characteristics, SIZE, ROA, MTB_RATIO, DIV_PAYOUT_RATIO, and CAP_PPE, are winsorized at the 1st and 99th percentiles to exclude the impact of outliers.

*****Insert **Table 10** here*****

The regression results are shown in Table 10. The result shows that the pre-award and post-award halves are quite different. After controlling for firm characteristics, the pre-award negative abnormal return is significantly and negatively correlated with OLD and SCHEDULED and positively correlated with NEW and MEDIUM_TENURE. Since the CAR of the pre-award period is negative, it can be interpreted that CEOs with a medium level of tenure are less likely to time news and the abnormal return is larger in the scheduled group and in those CEOs are old than 65. It means that bullet dodging phenomenon is more likely to occur when the CEO is old, which may be more dominant in the company, and in the scheduled award group. It is still too early to draw a conclusion about CEO tenure, however, as the tenure data obtained do not reflect returning CEOs. In the post-award period, the abnormal return is positively correlated with LATE, with high significance at the 99% confidence level. It is proved in the previous part that the late-filing group is possibly backdated, which generates positive post-award returns. The coefficients on Round Trip show the mixed effect of these two parts. Overall, the coefficient on NEW indicates that CEOs commencing their tenure are less likely to take action to extract abnormal returns on the option awards.

The data merged with the Boardex are less than the full sample, therefore I add it separately in the second stage, which are shown in columns (4)-(6). The coefficients and significance of other variables remain similar, in the post-award period and in the whole round-trip, the abnormal return is negatively correlated with the CEO_DUALITY. Contrary to my hypothesis 4, the CEO with dual roles as chairman of the board is less likely to benefit from spring loading behavior. This may indicate that a CEO with duality actually receives more scrutiny from the board.

5. Additional Tests

Though we know that opportunistic timing behavior exists, it is unclear whether CEOs would time news around the award dates, or time award around certain regular news releases, and no particular sign of which news is timed has been found. To observe the timing pattern, I consider the quarterly earnings announcement as an example to check its impact in the before and after periods of the option award.

The quarterly earnings announcement is a regular event and CEOs would have private information before the announcement. If the CEOs anticipate the stock to rise after the quarterly earnings announcement, it is presumed that he will hold the timing of the announcement with discretion. Aboody and Kasznik (2000) find that the awards before the earnings announcement group have significant negative cumulative abnormal return in the pre-earnings-announcement window while the other group has the opposite sign, which supports the hypothesis of the award before group is more inclined to rush forward bad news and delay good news.

I examine the quarterly earnings announcement dates that fall in the event period of option awards for sample firms. Data is retrieved from the I/B/E/S database. Two groups are constructed with awards made within 60 days before the earnings announcement or 60 days after. Awards made on the same day as the earnings announcement are excluded from either classification. The hypothesis is that if the CEO manages news releases to achieve a low strike price, the cumulative abnormal return for the earnings announcement that happened in the post-award period would be higher than that for the earnings announcement that happened before the award. Test if it is the case.

For sample firms, the average days before the quarter end to the release of quarterly earnings announcement is constant, with a mean of 33 days and median of 31 days, and the interval between one report to the last one is around one quarter. The pattern shows that quarterly earnings announcement is reported on a regular basis. Therefore, there is less possibility that CEOs can control the quarterly earnings announcement date to influence the stock price.

However, CEOs are in possession of a great deal of private information prior to the earnings announcement and may control the news release before the official earnings announcement, such as the management guidance. Beaver et al. (2020) find that the percentage of earnings announcements with concurrent management forecasts increases from less than 3% in 1999 to 36% in 2016, and the stock reaction to earnings announcements with bundled management guidance is greater than that to stand-alone earnings announcements. They interpret that guidance either adds to the informativeness of earnings announcements, is issued selectively with more informative earnings announcements, or affects investors' inferences through some other mechanism.

In my sample, 5,937 observations are matched and used in the test, of which in 4,168 option award observations there is an earnings announcement release within two months before the award, and in 1,769 observations there is an earnings announcement release in the range of two months after the award. Observations with both earnings announcements in before and after periods are excluded. The announcement effect is calculated by the 3-day mean CAR. I further test the difference between scheduled and unscheduled subgroups to check if there are different patterns.

*****Insert **Table 11** here*****

The result is shown in Table 11. The difference of mean CAR is -0.55%, significantly at the 95% confidence level, which means the market reaction to the earnings announcement occurs in the post-award period generates on average 0.55% more return. This infers that my hypothesis 5 is valid. Further tests on the two subgroups show that the difference of CAR remains in the scheduled group but disappears in the unscheduled group, which also proves that the timing of news is present in the scheduled group only, which also proves my previous hypothesis.

6. Robustness Check

Tables calculating CARs are robust to change of estimation model to money market model, change to the value-weighted CRSP market index, and using different dates of estimate windows. These results are not tabulated.

In my sample examination period, I separate wrongly recorded observations with only other incentive compensation, for instance, SAR, RSU, or LTIP, which are 673 observations. I run an event study with the same parameters as in the previous part on these not-option observations. The result is shown in Table 12 and the pattern is completely different from Table 7.

*****Insert **Table 12** here*****

For the multivariate regression, by using a subsample of observations excluding companies from the industries of finance, electronics, and gas, the coefficients remain similar and unchanged in significance.

7. Summary and Conclusion

To the best of my knowledge, this paper presents one of the first comprehensive investigations of the CEO option awards and the SEC's Form 4 filings for option awards, after the year 2006. Although CEO compensation and motivation has become a hot topic for decades, previous study rarely covers this part. I focus on the CEO compensation reporting in the period after 2006, when the enhanced disclosure requirements make corporate information more transparent to the public. For option award, since it is about the change in insider ownership, reporting in Form 4 no later than two business days from the transaction date is required. Detailed information like the content and target of the incentive plan, and the exercise price and the expiration date of options should also be disclosed in reports. These after-SOX regulations enable the public to know about corporate information timelier and precisely.

This paper provides insights into the market reaction to the CEO's option awards. Tests on the abnormal stock return are estimated using the Fama-French-momentum model as the benchmark. I find significant negative abnormal returns in the 60 days window before the award date and positive abnormal returns in the 30 days window after the award. The post-award windows exhibit large significance. However, those numbers are small, and none of them exceed 1%. Generally, the V-shaped abnormal return pattern remains after the prompt disclosure requirement is enforced but has been largely reduced in scale. Though it does not fully remove the abnormal return patterns, the dramatic abnormal return pattern believed to be caused by backdating before awards that have been observed before 2006 has been substantially reduced.

As ongoing stock price manipulation around the CEO option award is documented, further tests have been done to investigate how. I define the *disciplined* group to consist of the observations with the reporting gap between the award date and the corresponding SEC Form 4 filing date that is within 2 business days, otherwise, the remaining observations fit in the *late-filing* group. The mean CAR of window (1,30) is on average 1.23% higher in the *late-filing* group than in the *disciplined* group. Therefore, it can be inferred that the enhanced reporting requirement has mitigated the manipulation of the CEO's compensation awards by effectively discouraging possible fraud like backdating of options. However, the SEC should impose stricter penalties on companies that fail to comply with the required deadlines.

If the company adopts a regular schedule for option grants, which is a predetermined date that is known to executives in advance, the CEO would be personally better off if the stock price on that day is temporarily low. For scheduled option awards, neither backdating nor opportunistic timing of options is likely to be performed, so if the abnormal stock return pattern still holds, it should be attributed to the opportunistic timing of news disclosure. Further tests are performed to address that issue. CEOs can anticipate the predetermined award date and prepare news releases around the award to push stock price move in favor of their self-interest. From this perspective, the option's incentive effect is harmed. As Daines (2018) worries, there may be potential dismissal of firm value as a result of the deliberate release of bad news. Journalists and researchers debate over spring loading behavior as it can not be easily identified and prohibited, and some research shows that directors actually know about this kind of behavior and tolerate it.

The significant positive abnormal return in the post-award period, which begins immediately after the award date, indicates the spring loading hypothesis is probably true, that the CEO holds certain news and releases them right after the award in order to raise the stock price after the award. Also, we should note that there is a concurrent announcement effect of Form 4 filings in around 2 trading days following the award, as the option award may give a good signal to investors and drive a slight increase in stock price.

Tests are performed to test the subgroup of scheduled and unscheduled awards to further investigate this hypothesis. I compared different results from previous literature and find that the difference is due to classifications of "scheduled". In my paper, an award is defined to be *scheduled* if it occurs within 7 days of the prior year's anniversary, and as *unscheduled* if it occurs more than 15 days away from the anniversary. I further extend the definition of scheduled option awards by adding options that are given more than once a year, and those that can form a regular pattern after excluding occasional outliers (mostly due to the change of CEOs). The subgroup of *unscheduled* awards shows no significant abnormal return in the period before the award while the *scheduled* award group exhibits large negative abnormal returns, with a mean CAR close to -1% in (-40,0). Thus, there is also a supplement to the bullet dodging hypothesis that CEOs release bad news to depress the stock price before the award.

The multivariate regression on pre-award and post-award 30-day CAR again proves my previous findings that the negative abnormal return occurs in the scheduled group and that the late-filing group is possibly backdated, which generate positive post-award returns. CEOs who just begin to serve as CEO are less likely to engage in opportunistic timing behavior and therefore are linked with less abnormal return. And CEOs older than 65 years are in possession of higher negative pre-award returns. Contrary to my prediction, CEOs with a dual role as chairman receive less return in the post-award period. The whole pattern of abnormal return before and after the option awards show the mixed effect of these two parts.

One may argue that the abnormal returns found in my study are not big numbers, however, Similar to Schweizer & Ordu (2015)'s argument that top executives have a hedging motive against stock merger announcements in order to avoid short-term losses, it is still possible that CEOs would impose action even for a small gain. In Nov 2021, the SEC released guidance

(Staff Accounting Bulletin No. 120) for companies about how to properly recognize and disclose compensation costs for "spring-loaded awards" made to executives, that as companies measure compensation actually paid to executives, they must consider the impact that the material non-public information will have upon release. Therefore, it is confirmed that SEC has noticed that certain companies would make compensation grants while the company is in possession of positive material non-public information.

Though opportunistic timing behavior exist, it is hard to say how much the effect is. Additional tests can be done to further investigate which news is timed and how it is decided. I test the announcement effect of quarterly earnings announcement fall in the event period of option awards and find that the timing of the release this forecast is generally regular, but the announcement effect is different that the mean CAR in the scheduled group in the pre-award and post-award period is significantly different from zero and in the post-award period it generates 0.5% more CAR on average, while there is no difference in the unscheduled group. It may demonstrate that the timing of news behavior only occurs in the scheduled group and CEO would accelerate good news in the post-award period. CEOs are believed to possess a great deal of private information prior to the earnings announcement and may control the news release before the official earnings announcement, such as the management guidance. Though I fail to detect specific examples of deliberate news control. It may also be non-quantized information related to goodwill or intangible assets. This problem needs further attention.

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Figures and tables

Figure 1: Form 4 Reporting Gaps

The Days Gap is defined as the calendar days in between the option award date and the Form 4 filing date, and the Trading Days Gap is defined as the trading days in between the option award date and the Form 4 filing date. The sample is 9,684 observations of Form 4 filings. The average gaps of the calendar days and trading days are shown.

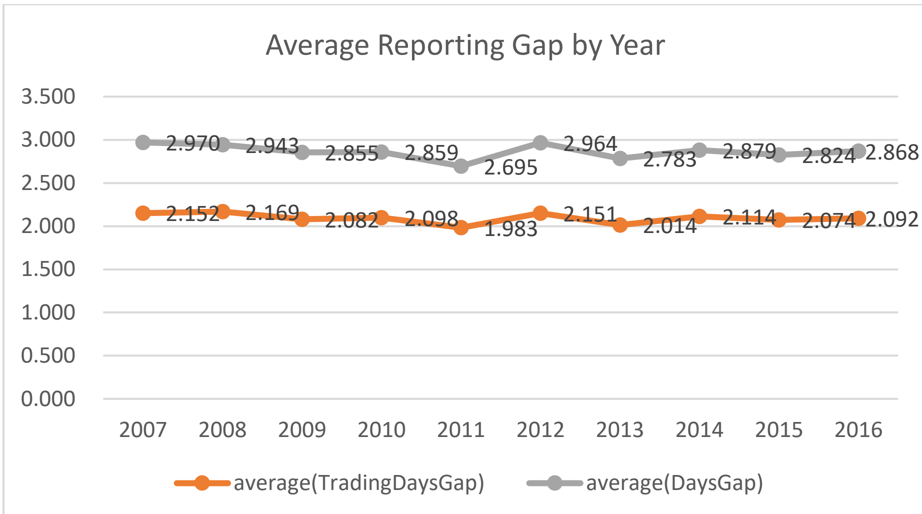


Figure 2: CAR Around Form 4 Filings Dates

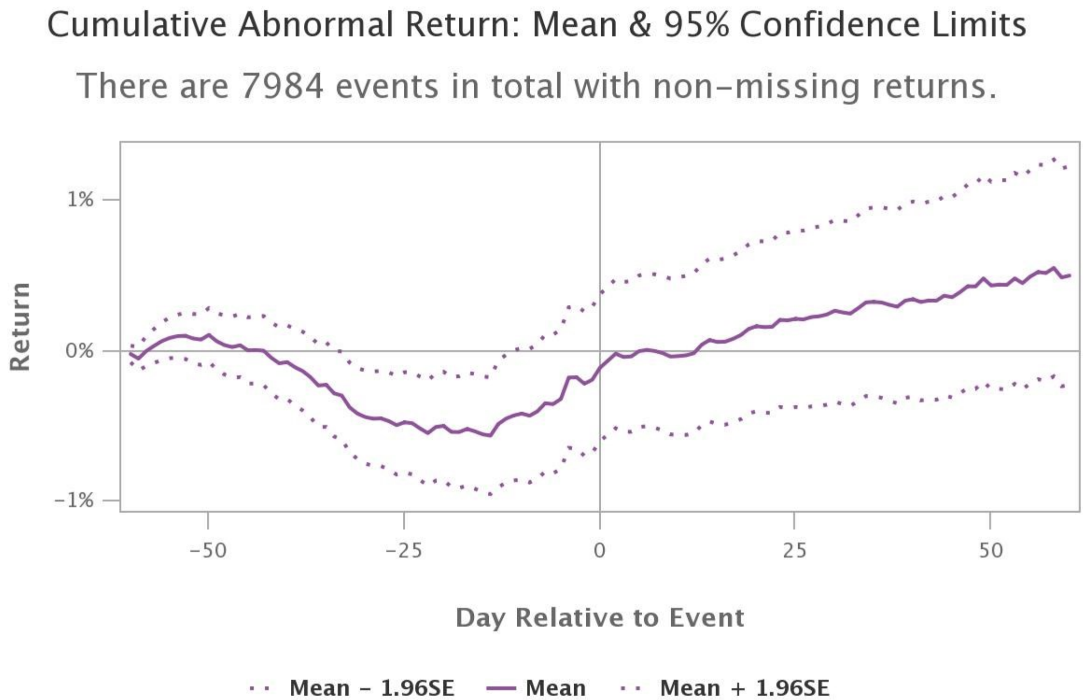


Figure 3: CAR Around CEO Option Awards Dates

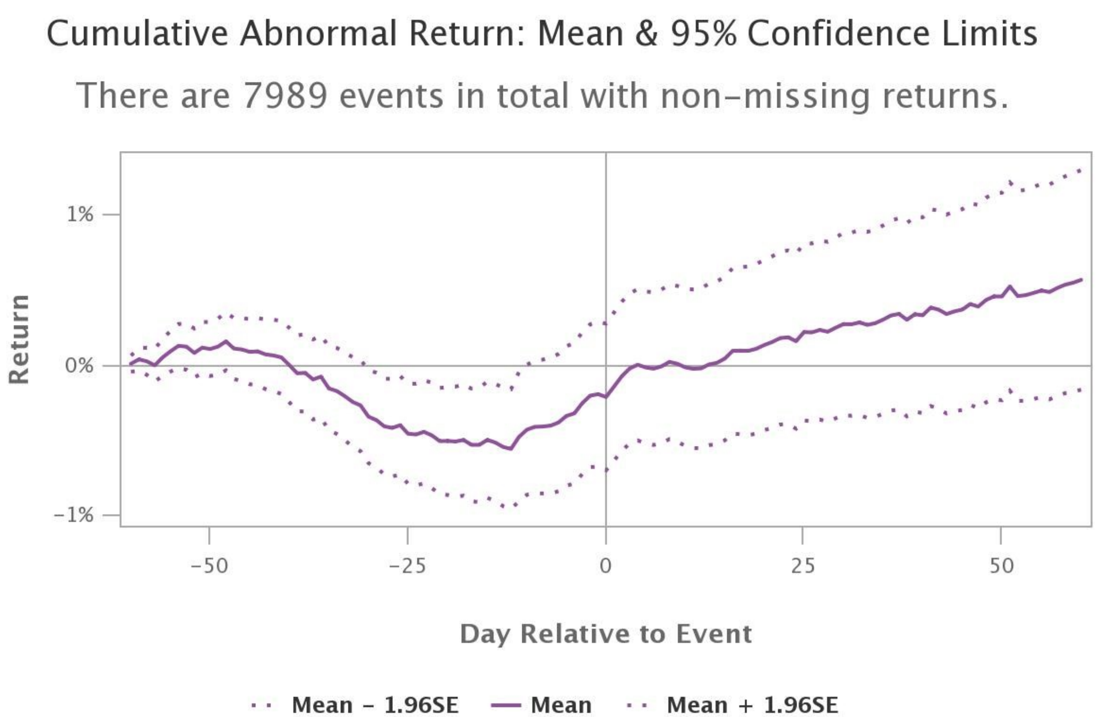


Table 1: Summary of Regulation Evolution on Executive Option Awards

Time	Regulations
Before SOX	Options grants were reported on Form 5, which was due 45 days after the fiscal year-end, or alternatively reported on Form 4, which had to be filed within the first 10 days of the month following the month of the grant.
August 29, 2002	Option grants must be reported within two business days of the date of issue in Form 4, took effect after the SOX.
July 30, 2003	The SEC required mandated electronic filing and website posting for Forms 3, 4 and 5 via the EDGAR system.
2004	SFAS 123R required the recognition of share-based remuneration as a cost that is expensed in the Profit and Loss Account and the Compensation Committee Report should be included in company's proxy statement and its annual report on Form 10-K.
November 7, 2006	The SEC required disclosure of executive compensation arrangements on Form 8-K current report within four business days after the award.
2007	The SEC required management to disclose the reasons for selecting particular grant dates for awards and to state whether management granted options "in coordination with the release of material non-public information."
2009	The grand-date fair value of option or stock grants and unrealized payouts from non-equity-based bonus plans should be reported in the summary compensation table in proxy statement.

Table 2: Sample Selection

	N. of observations
Panel A: PBA with CEO data	
Matched plan-based awards with sample firms	41,900
With award dates available	32,826
After dropping out of range observations	32,745
With option grants (OPTs_GRT)	10,767
Unique awards dates	10,116
Panel B: SEC Filing data	
Matched with SEC filings (after adding observations[13])	10,477
Drop observations with no options	(673)
Final sample	9,804
Observations with unique awards dates	9,695

[13] I manually check some companies that appeared to have a continuous option plan but were occasionally missing specific years and added those observations, if they existed, for consistency.

Table 3: Summary Statistics

	N	% of total
Panel A: Year Distribution		
2007	1142	11.78%
2008	1174	12.11%
2009	1135	11.71%
2010	1076	11.10%
2011	1039	10.72%
2012	906	9.35%
2013	908	9.37%
2014	836	8.62%
2015	788	8.13%
2016	691	7.13%
Panel B: Month Distribution		
January	993	10.24%
February	2652	27.35%
March	1286	13.26%
April	538	5.55%
May	740	7.63%
June	437	4.51%
July	440	4.54%
August	509	5.25%
September	355	3.66%
October	432	4.46%
November	615	6.34%
December	698	7.20%
Panel C: Quarter Distribution		
Quarter 1	4931	50.86%
Quarter 2	1715	17.69%
Quarter 3	1304	13.45%
Quarter 4	1745	18.00%
Total	9695	100.00%
Panel D: S&P Distribution		
EX	693	42.49%
MD	244	14.96%
SM	332	20.36%
SP	362	22.19%
Total	1631	100.00%

Table 4: Form 4 Reporting Gaps

The Days Gap is defined as the calendar days in between the option award date and the Form 4 filing date, and the Trading Days Gap is defined as the trading days in between the option award date and the Form 4 filing date. The sample is 9,684 observations of Form 4 filings. The mean, median, maximum and 99th percentile of the calendar days and trading days are shown.

Type	Mean	Median	Max	99th
Days Gap	4.497	2	884	41
Trading Days Gap	3.259	2	632	29

Table 5: Descriptive Statistics

Definition of variables are shown in Appendix C. Reported values of firm characteristics are based on the data winsorized at the 1st and 99th percentiles.

Variables	No.	Mean	Median	Std Dev	Min	Max
Firm characteristics						
SIZE	8365	7.4155	7.4207	1.6737	3.2978	11.2925
ROA	8365	0.0463	0.0530	0.1065	-0.4246	0.3246
MTB_RATIO	8365	3.1680	2.3294	5.2341	-19.9256	31.5012
DIV_PAYOUT_RATIO	8365	0.0343	0.0022	0.0690	-0.0733	0.4599
CAP_PPE	8365	0.2752	0.2078	0.2324	0.0172	1.4229
Board characteristics						
CEO_DUALITY	7456	0.4824	0	0.4997	0	1
CEO characteristics						
NEW	8365	0.0980	0	0.2974	0	1
AGE	8365	55.5127	55	6.7362	30	86
TENURE	8003	7.1255	5	6.6058	0	49
FEMALE	8365	0.0377	0	0.1904	0	1
Award characteristics						
LATE	8365	0.0954	0	0.2938	0	1
SCHEDULED	7708	0.5579	1	0.4967	0	1
UNSCHEDULED	7708	0.1811	0	0.3851	0	1

Table 6: CAR around Form 4 Filing Dates

Abnormal returns are calculated by Fama-French 3 factor model with momentum and equally weighted CRSP market index. Est=-64 estlen=255 Minestn=30 autodate. 9,190 security-events with useable return are used. Define the Form 4 filing date as day 0, CAAR and PWCAAR windows of (-60,0), (-50,0), (-40,0), (-30,0), (-20,0), (-10,0), (-5,0) (-3,0), (-1,1), (1,3), (1,5), (1,10), (1,20), (1,30), (1,40), (1,50) and (1,60) are calculated. StdCsect Z statistics and generalized sign Z statistics are reported. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels, respectively, using a two-tailed test. The symbols (,< or),> etc. correspond to $,* and show the direction and significance of a generic one-tail generalized sign test.

Window	Mean Cumulative Abnormal Return	Precision Weighted CAAR	Positive:Negative	StdCsect Z	Generalized Sign Z
(-60,0)	-0.52%	-0.61%	4394:4793	-3.753***	-0.944
(-50,0)	-0.78%	-0.79%	4380:4806	-5.316***	-1.226
(-40,0)	-0.63%	-0.71%	4369:4817	-5.363***	-1.456
(-30,0)	-0.17%	-0.27%	4482:4704	-2.322**	0.903
(-20,0)	0.22%	0.08%	4598:4588>>>	0.794	3.325***
(-10,0)	0.25%	0.18%	4648:4538>>>	2.558**	4.369***
(-5,0)	0.16%	0.13%	4602:4584>>>	2.338**	3.409***
(-3,0)	0.02%	0.02%	4582:4604>>	0.560	2.991**
(-1,1)	0.14%	0.12%	4645:4541>>>	3.450***	4.307***
(1,3)	0.12%	0.10%	4633:4553>>>	2.883***	4.056***
(1,5)	0.16%	0.14%	4613:4573>>>	3.196***	3.639***
(1,10)	0.15%	0.18%	4632:4554>>>	2.933***	4.035***
(1,20)	0.22%	0.22%	4679:4508>>>	2.649***	5.006***
(1,30)	0.12%	0.19%	4622:4566>>>	1.831*	3.806***
(1,40)	0.03%	0.08%	4618:4570>>>	0.675	3.722***
(1,50)	0.04%	0.15%	4694:4494>>>	1.065	5.309***
(1,60)	0.09%	0.22%	4692:4497>>>	1.373	5.257***
N	9190				

Table 7: CAR around CEO Option Award Dates

Abnormal returns are calculated by Fama-French 3 factor model with momentum and equally weighted CRSP market index. Est=-64 estlen=255 Minestn=30 autodate. 9,198 security-events with useable return are used. Define the option award date as day 0, CAAR and PWCAAR windows of (-60,0), (-50,0), (-40,0), (-30,0), (-20,0), (-10,0), (-5,0) (-3,0), (-1,1), (1,3), (1,5), (1,10), (1,20), (1,30), (1,40), (1,50) and (1,60) are calculated. StdCsect Z statistics and generalized sign Z statistics are reported. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels, respectively, using a two-tailed test. The symbols (,< or),> etc. correspond to $,* and show the direction and significance of a generic one-tail generalized sign test.

Window	Mean Cumulative Abnormal Return	Precision Weighted CAAR	Positive:Negative	StdCsect Z	Generalized Sign Z
(-60,0)	-0.62%	-0.70%	4401:4794	-4.330***	-0.897
(-50,0)	-0.93%	-0.91%	4309:4885<<	-6.213***	-2.807**
(-40,0)	-0.92%	-0.94%	4265:4929<<<	-7.101***	-3.725***
(-30,0)	-0.42%	-0.50%	4404:4790	-4.327***	-0.824
(-20,0)	0.08%	-0.08%	4543:4651>	-0.773	2.077*
(-10,0)	0.18%	0.09%	4570:4624>>	1.260	2.640**
(-5,0)	0.10%	0.05%	4505:4689	0.976	1.284
(-3,0)	0.06%	0.01%	4475:4719	0.311	0.658
(-1,1)	0.03%	0.00%	4519:4675	0.085	1.576
(1,3)	0.18%	0.15%	4650:4544>>>	4.355***	4.310***
(1,5)	0.23%	0.20%	4671:4523>>>	4.561***	4.748***
(1,10)	0.23%	0.24%	4657:4537>>>	4.021***	4.456***
(1,20)	0.26%	0.30%	4684:4511>>>	3.423***	5.009***
(1,30)	0.21%	0.29%	4675:4521>>>	2.700***	4.811***
(1,40)	0.13%	0.19%	4639:4557>>>	1.500	4.060***
(1,50)	0.12%	0.24%	4696:4500>>>	1.631	5.249***
(1,60)	0.22%	0.33%	4719:4478>>>	2.045**	-3.402***
(-30,-20)	-0.54%	-0.46%	4290:4902<<	-7.202***	-3.183***
(-20,-10)	-0.07%	-0.15%	4441:4752	-2.146**	-0.042
(-10,-3)	0.18%	0.10%	4621:4572>>>	1.754*	3.715***
(3,10)	0.10%	0.13%	4565:4629>	2.398**	2.536**
(10,20)	0.01%	0.04%	4585:4610>>	0.649	2.943***
(20,30)	-0.05%	0.00%	4589:4607>>	0.038	3.016***
(-48,-12)	-1.17%	-1.01%	4233:4960<<<	-8.392***	-4.383***
(-40,-12)	-1.16%	-1.02%	4129:5064<<<	-9.584***	-6.554***
(-11,+30)	0.45%	0.36%	4699:4497>>>	2.731***	5.312***
(-11,+60)	0.46%	0.41%	4723:4474>>>	2.252**	5.802***
N	9198				

Table 8: CAR of Disciplined and Late-Filing Groups

Abnormal returns are calculated by Fama-French-momentum model and equally weighted CRSP market index. Est=-64 estlen=255 Minestn=30 autodate. From the 9,588 observations, group 1 (*disciplined*) contains 8,677 observations with reporting gap equal to or less than two business days, and group 2 (*late-filing*) consists of 911 observations, with reporting gap longer than two business days. 9,198 security-events with useable return are used. Define the option award date as day 0, CAR windows of (-30,0), (-20,0), (-10,0), (-5,0), (-3,0), (-1,1), (1,3), (1,5), (1,10), (1,20) and (1,30) are calculated. StdCsect Z statistics are reported. For the comparison of means, the t-statistic assuming unequal variances is calculated. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

	Disciplined		Late-Filing		Difference	
Window	Mean CAR	StdCsect Z	Mean CAR	StdCsect Z	Mean CAR	t Value
(-30,0)	-0.48%	-4.079***	0.23%	-1.445	-0.72%	-0.76
(-20,0)	0.01%	-0.831	0.77%	0.028	-0.76%	-0.85
(-10,0)	0.19%	1.333	0.11%	-0.062	0.07%	0.23
(-5,0)	0.10%	0.908	0.12%	0.364	-0.02%	-0.06
(-3,0)	0.05%	0.122	0.20%	0.667	-0.15%	-0.73
(-1,1)	0.02%	0.053	0.16%	0.107	-0.14%	-0.67
(1,3)	0.19%	4.244***	0.10%	1.042	0.09%	0.47
(1,5)	0.24%	4.525***	0.12%	0.833	0.11%	0.47
(1,10)	0.22%	3.621***	0.35%	1.843*	-0.13%	-0.4
(1,20)	0.23%	2.856***	0.54%	2.279**	-0.31%	-0.74
(1,30)	0.09%	2.004**	1.32%	2.560**	-1.23%	-2.17**
N	8331		867			

Table 9: CAR of Scheduled & Unscheduled Option Awards

Abnormal returns are calculated by Fama-French-momentum model and equally weighted CRSP market index. Est=-64 estlen=255 Minestn=30 autodate. An award is defined as *scheduled* if it occurs within 7 days of the prior-year's anniversary, and as *unscheduled* if it occurs more than 15 days away from the anniversary. Each company's first observation in the sample period is excluded in this classification. Define the option award date as day 0, CAR windows of (-30,0), (-20,0), (-10,0), (-5,0), (-3,0), (-1,1), (1,3), (1,5), (1,10), (1,20) and (1,30) are calculated. StdCsect Z statistics are reported. For the comparison of means, the t-statistic assuming unequal variances is calculated. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

	Scheduled		Unscheduled		Difference	
Window	Mean CAR	StdCsect Z	Mean CAR	StdCsect Z	Mean CAR	t Value
(-30,0)	-1.17%	-6.853***	0.07%	-1.432	-1.24%	-1.84*
(-20,0)	-0.47%	-3.477***	0.53%	-0.431	-1.00%	-1.63
(-10,0)	-0.12%	-1.397	0.15%	0.501	-0.28%	-0.84
(-5,0)	-0.05%	-0.757	0.17%	0.799	-0.23%	-0.91
(-3,0)	-0.03%	-1.119	0.06%	0.317	-0.09%	-0.46
(-1,1)	-0.04%	-1.216	-0.01%	-0.295	-0.03%	-0.19
(1,3)	0.15%	2.625***	0.25%	1.749*	-0.10%	-0.62
(1,5)	0.17%	2.343**	0.31%	2.089**	-0.14%	-0.71
(1,10)	0.18%	2.136**	0.36%	1.971**	-0.17%	-0.69
(1,20)	0.13%	1.058	0.30%	1.683$	-0.17%	-0.48
(1,30)	-0.02%	0.593	0.28%	1.325	-0.30%	-0.65
N	4737		1541			

Table 10: Multivariate Regression on CARs

	(1)	(2)	(3)	(4)	(5)	(6)
	(-30,0)	(1,30)	Round Trip	(-30,0)	(1,30)	Round Trip
Intercept	0.04682**	0.0168	-0.03100	0.05657**	0.01068	-0.04589
	(2.18)	(0.83)	(-1.10)	(2.48)	(0.49)	(-1.53)
SIZE	-0.00054	-0.0029**	-0.0023	-0.00043	-0.00184	-0.00141
	(-0.38)	(-2.17)	(-1.24)	(-0.28)	(-1.27)	(-0.70)
ROA	0.00477	0.0031	-0.00151	0.00223	-0.00486	-0.00709
	(0.27)	(0.19)	(-0.07)	(0.12)	(-0.28)	(-0.30)
MTB_RATIO	0.00121***	0.0002	-0.00095*	0.00115***	0.000328	-0.00082
	(3.07)	(0.66)	(-1.84)	(2.76)	(0.83)	(-1.50)
DIV_PAYOUT_RATIO	-0.05847**	0.0099	0.06544*	-0.05911*	0.00921	0.06832*
	(-2.03)	(0.37)	(1.73)	(-1.91)	(0.31)	(1.68)
CAP_PPE	-0.02364***	-0.0351***	-0.01184	-0.02269***	-0.0337***	-0.01098
	(-2.92)	(-4.63)	(-1.12)	(-2.66)	(-4.17)	(-0.98)
CEO_DUALITY				0.00301	-0.00625*	-0.00927*
				(0.75)	(-1.65)	(-1.76)
NEW	0.01652***	0.00382	-0.01381*	0.01645**	0.00393	-0.01253
	(2.68)	(0.66)	(-1.71)	(2.50)	(0.63)	(-1.45)
OLD	-0.01376*	0.00749	0.01934**	-0.01699**	0.00624	0.02323**
	(-1.83)	(1.06)	(1.96)	(-2.12)	(0.82)	(2.21)
LONG_TENURE	0.01170	0.00872	-0.00245	0.00528	0.01201	0.00673
	(1.46)	(1.16)	(-0.23)	(0.62)	(1.48)	(0.60)
MEDIUM_TENURE	0.00959**	-0.00058	-0.01011**	0.01039**	-0.00274	-0.01079*
	(2.55)	(-0.16)	(-2.05)	(2.55)	(-0.81)	(-2.01)
FEMALE	0.00015	0.01418	0.01409			
	(0.02)	(1.72)	(1.22)			
LATE	-0.00224	0.01131**	0.01375*	-0.00240	0.01063*	0.01303
	(-0.39)	(2.09)	(1.82)	(-0.39)	(1.83)	(1.62)
SCHEDULED	-0.01914***	0.0007	0.02040***	-0.01919***	0.00223	0.02142***
	(-3.79)	(0.15)	(3.08)	(-3.59)	(0.44)	(3.05)
UNSCHEDULED	-0.00877	-0.00094	0.00854	-0.00926	-0.00140	0.00786
	(-1.48)	(-0.17)	(1.10)	(-1.48)	(-0.24)	(0.34)
Industry dummy	YES	YES	YES	YES	YES	YES
Year dummy	YES	YES	YES	YES	YES	YES
Quarter dummy	YES	YES	YES	YES	YES	YES
S&P index dummy	YES	YES	YES	YES	YES	YES
No. of Obs.	7406	7407	7406	6587	6587	6587
R-Square	0.0218	0.0226	0.013	0.0232	0.024	0.0143

T-statistics are reported in parentheses. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

Table 11: Earnings Announcement in Scheduled and Unscheduled Groups

Abnormal returns are calculated by Fama-French-momentum model and equally weighted CRSP market index. Est=-64 estlen=255 Minestn=30 autodate. Define the option award date as day 0, if there is earnings announcement in the 60 days period before award then it is classified in the "before award" group; otherwise, there is earnings announcement in the 60 days period after the award, it falls in the "after award" group. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

Quarterly earnings announcement	N	(-1,1) mean CAR	t-value
Panel A: Full			
Before award	4132	0.374%	2.856***
After award	1660	0.925%	4.556***
Difference		-0.551%	-2.22**
Panel B: Scheduled			
Before award	2273	0.222%	0.75
After award	869	0.733%	3.069***
Difference		-0.511%	-1.69*
Panel C: Unscheduled			
Before award	580	0.390%	1.527
After award	273	0.820%	1.578
Difference		-0.437%	-0.58

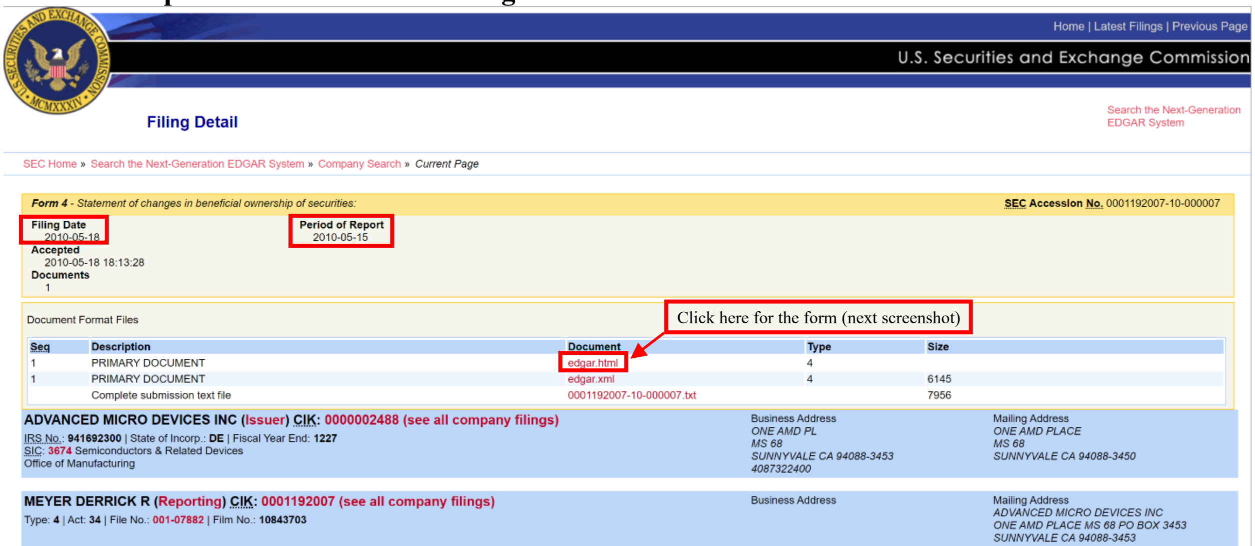
Table 12: CAR around Not-Option Awards

Abnormal returns are calculated by Fama-French-momentum model and equally weighted CRSP market index. Est=-64 estlen=255 Minestn=30 autodate. 652 security-events with useable return are used. Define the compensation award date as day 0, CAAR windows of (-60,0), (-50,0), (-40,0), (-30,0), (-20,0), (-10,0), (-5,0) (-3,0), (-1,1), (1,3), (1,5), (1,10), (1,20), (1,30), (1,40), (1,50) and (1,60) are calculated. StdCsect Z statistics are reported. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

Window	Mean Cumulative Abnormal Return	StdCsect Z
(-60,0)	0.70%	0.601
(-50,0)	0.52%	0.120
(-40,0)	-0.10%	0.008
(-30,0)	-0.48%	-0.787
(-20,0)	0.34%	0.674
(-10,0)	0.26%	1.192
(-5,0)	0.19%	0.544
(-3,0)	0.22%	0.812
(-1,1)	0.05%	0.950
(1,3)	0.08%	0.754
(1,5)	0.30%	1.220
(1,10)	0.60%	1.713*
(1,20)	0.82%	1.856*
(1,30)	0.70%	1.072
(1,40)	0.67%	0.565
(1,50)	0.34%	-0.089
(1,60)	0.56%	0.078
N	652	

Appendix

A. An example of the SEC Form 4 filing[14]



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U.S. Securities and Exchange Commission

Filing Detail

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Form 4 - Statement of changes in beneficial ownership of securities:

SEC Accession No. 0001192007-10-000007

Filing Date 2010-05-18

Period of Report 2010-05-15

Accepted 2010-05-18 18:13:28

Documents 1

Document Format Files

Click here for the form (next screenshot)

Seq	Description	Document	Type	Size
1	PRIMARY DOCUMENT	edgar.html	4	
1	PRIMARY DOCUMENT	edgar.xml	4	6145
	Complete submission text file	0001192007-10-000007.txt		7956

ADVANCED MICRO DEVICES INC (Issuer) CIK: 0000002488 (see all company filings)

IRS No.: **941692300** | State of Incorp.: **DE** | Fiscal Year End: **1227**
SIC: **3674** Semiconductors & Related Devices
Office of Manufacturing

Business Address
ONE AMD PL
MS 68
SUNNYVALE CA 94088-3453
4087322400

Mailing Address
ONE AMD PLACE
MS 68
SUNNYVALE CA 94088-3450

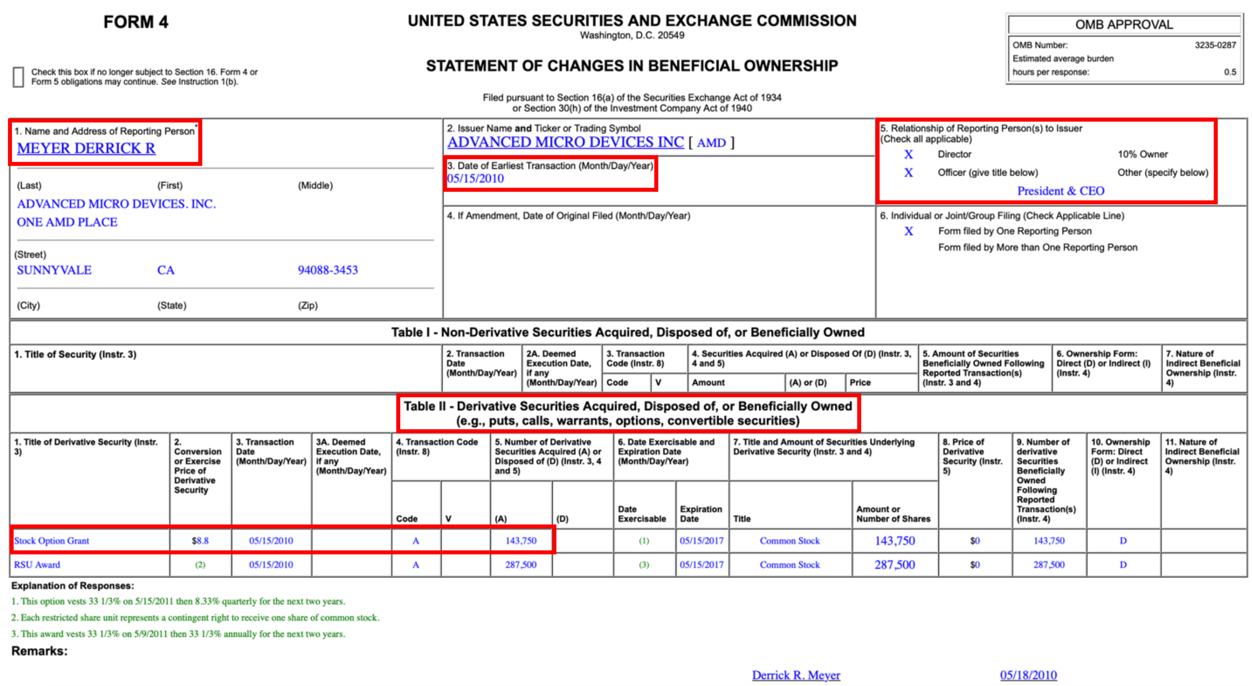
MEYER DERRICK R (Reporting) CIK: 0001192007 (see all company filings)

Type: **4** | Act: **34** | File No.: **001-07882** | Film No.: **10843703**

Business Address

Mailing Address
ADVANCED MICRO DEVICES INC
ONE AMD PLACE MS 68 PO BOX 3453
SUNNYVALE CA 94088-3453

Filing date: the date that company file the form online
Period of report: the earliest date mention in this form, equals to the "3. Date of Earliest Transaction" in the next screenshot



FORM 4

UNITED STATES SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

STATEMENT OF CHANGES IN BENEFICIAL OWNERSHIP

Check this box if no longer subject to Section 16. Form 4 or Form 5 obligations may continue. *See* Instruction 1(b).

Filed pursuant to Section 16(a) of the Securities Exchange Act of 1934 or Section 30(h) of the Investment Company Act of 1940

OMB APPROVAL	
OMB Number:	3235-0287
Estimated average burden hours per response:	0.5

1. Name and Address of Reporting Person*: MEYER DERRICK R
(Last) (First) (Middle)
ADVANCED MICRO DEVICES. INC.
ONE AMD PLACE
(Street)
SUNNYVALE CA 94088-3453
(City) (State) (Zip)

2. Issuer Name **and** Ticker or Trading Symbol: ADVANCED MICRO DEVICES INC [AMD]

3. Date of Earliest Transaction (Month/Day/Year): 05/15/2010

4. If Amendment, Date of Original Filed (Month/Day/Year)

5. Relationship of Reporting Person(s) to Issuer (Check all applicable)
X Director — 10% Owner
X Officer (give title below) — Other (specify below)
President & CEO

6. Individual or Joint/Group Filing (Check Applicable Line)
X Form filed by One Reporting Person
Form filed by More than One Reporting Person

Table I - Non-Derivative Securities Acquired, Disposed of, or Beneficially Owned

1. Title of Security (Instr. 3)	2. Transaction Date (Month/Day/Year)	2A. Deemed Execution Date, if any (Month/Day/Year)	3. Transaction Code (Instr. 8)		4. Securities Acquired (A) or Disposed Of (D) (Instr. 3, 4 and 5)			5. Amount of Securities Beneficially Owned Following Reported Transaction(s) (Instr. 3 and 4)	6. Ownership Form: Direct (D) or Indirect (I) (Instr. 4)	7. Nature of Indirect Beneficial Ownership (Instr. 4)
			Code	V	Amount	(A) or (D)	Price			

Table II - Derivative Securities Acquired, Disposed of, or Beneficially Owned (e.g., puts, calls, warrants, options, convertible securities)

1. Title of Derivative Security (Instr. 3)	2. Conversion or Exercise Price of Derivative Security	3. Transaction Date (Month/Day/Year)	3A. Deemed Execution Date, if any (Month/Day/Year)	4. Transaction Code (Instr. 8)		5. Number of Derivative Securities Acquired (A) or Disposed of (D) (Instr. 3, 4 and 5)		6. Date Exercisable and Expiration Date (Month/Day/Year)		7. Title and Amount of Securities Underlying Derivative Security (Instr. 3 and 4)		8. Price of Derivative Security (Instr. 5)	9. Number of derivative Securities Beneficially Owned Following Reported Transaction(s) (Instr. 4)	10. Ownership Form: Direct (D) or Indirect (I) (Instr. 4)	11. Nature of Indirect Beneficial Ownership (Instr. 4)
				Code	V	(A)	(D)	Date Exercisable	Expiration Date	Title	Amount or Number of Shares				
Stock Option Grant	$8.8	05/15/2010		A		143,750		(1)	05/15/2017	Common Stock	143,750	$0	143,750	D	
RSU Award	(2)	05/15/2010		A		287,500		(3)	05/15/2017	Common Stock	287,500	$0	287,500	D	

Explanation of Responses:
1. This option vests 33 1/3% on 5/15/2011 then 8.33% quarterly for the next two years.
2. Each restricted share unit represents a contingent right to receive one share of common stock.
3. This award vests 33 1/3% on 5/9/2011 then 33 1/3% annually for the next two years.

Remarks:

Derrick R. Meyer — 05/18/2010
** Signature of Reporting Person — Date

CEO is shown in the top right column, it can be written as "CEO", "C.E.O", or "Chief executive", etc., or in the note below if the title is too long, e.g., "chairman, president and chief executive officer".
Option is presented in Table II "Derivatives Securities Acquired, Disposed of, or Beneficially Owned", with code A in column 4 means award.
Award date: transaction date, in column 3.
Exercise price: in column 2.

[14] https://www.sec.gov/Archives/edgar/data/1192007/000119200710000007/0001192007-10-000007-index.htm

B. Definition of concepts

Noun	Explanation
long-term incentive plan (LTIP)	A long-term incentive plan (LTIP) is a company policy that rewards employees for reaching specific goals that lead to increased shareholder value.
Stock option	Employee stock options are offered by companies to their employees as equity compensation plans. These grants come in the form of regular call options and give an employee the right to buy the company's stock at a specified price for a finite period of time.
Backdating	People retroactively report fake award date with a low stock price before the actual award date to achieve a low strike price of the stock option.
Restricted stock	Restricted stock is a form of stock that is not transferable until a future date or until a specific corporate milestone is reached.
Phantom stock	A phantom stock, or 'shadow stock', is a form of compensation that confers the benefits of owning company stock without the actual ownership or transfer of any shares.
Stock appreciation right (SAR)	Stock appreciation rights (SARs) are a type of employee compensation linked to the company's stock price during a predetermined period. Employees do not have to pay the exercise price, instead, they receive the sum of the increase in stock or cash.
Bullet dodging	Bullet dodging is an employee stock options practice in which the options release is delayed until a negative press release comes out, causing the stock's price to drop and granting employees an optimal entry point.
Spring loading	Spring loading is a practice in which options are given to employees ahead of an expected positive news event, such as a product launch or quarterly results.

C. Variable description

Variables	Description
Firm characteristics	
SIZE	SIZE uses the logarithm of sales from the previous year-end as a proxy for firm size.
ROA	ROA is calculated by Income Before Extraordinary Items over total assets at prior year-end.
MTB_RATIO	MTB is defined as the market value of equity divided by the book value of equity.
DIV_PAYOUT_RATIO	It represents the dividend per share divided by earning per share.
CAP_PPE	It is defined as the capital expenditures over total property, plant and equipment at the end of the previous year.
Board characteristics	
CEO_DUALITY	A dummy variable that equals to 1 if the role name of the CEO is either "Chairman/CEO" or "Chairman/President/CEO"; otherwise, zero.
CEO characteristics	
NEW	A dummy variable that equals to 1 if the CEO starts as CEO in that fiscal year; otherwise, zero.
OLD	A dummy variable that equals to 1 if the CEO is above 65 years old; otherwise, zero.
LONG_TENURE	A dummy variable that equals to 1 if the CEO has been CEO at the firm for at least 20 years; otherwise, zero.
MEDIUM_TENURE	A dummy variable that equals to 1 if the CEO has been in office between 6 and 19 years; otherwise, zero.
FEMALE	A dummy variable that equals to 1 if the CEO is female; otherwise, zero.
Award characteristics	
LATE	A dummy variable that equals to 1 if the Form 4 is filed later than 2 business days; otherwise, zero.
SCHEDULED	A dummy variable that equals to 1 for those awards within 7 days of the anniversary date; otherwise, zero.
UNSCHEDULED	A dummy variable that equals to 1 if it occurs more than 15 days away from the anniversary date; otherwise, zero.
Industry dummy	Using two-digit SIC code to classify industry groups
Year dummy	Dummy variables for each fiscal year
Quarter dummy	Dummy variables for each quarter
S&P index dummy	Dummy variables "SM" "EX" and "MD" to classify S&P index groups