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Executive Stock Options and Manipulated Stock-Price Performance: Evidence from Retiring CEOs[*]

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Executive Stock Options and Managerial Manipulation of Stock-Price Performance: Evidence from Retiring CEOs

ABSTRACT

Previous studies have examined the manipulation of executive stock option awards and exercises, focusing on information timing by managers. In this paper, we investigate managerial manipulation of stock-price performance motivated by stock options. To distinguish performance manipulation from information timing, we examine stock returns surrounding the departure of retiring CEOs, whose option holdings typically expire shortly after their departure and whose chances to manipulate option awards and exercises are minimized. Consistent with manipulated performance, we find significant abnormal stock returns in the months surrounding CEO departure for those with strong option incentives, which are reversed shortly after CEO departure.

1. Introduction

The use of stock options in executive compensation has increased dramatically over the past few decades, but the role of executive stock options remains open to debate. Some argue that stock options provide an important incentive scheme for corporate managers and help firms retain key employees. On the other hand, there is an increasing concern among academics and the public that executive stock options are costly to shareholders and motivate executives to behave opportunistically. Opportunistic managerial behaviors can be divided into two categories. In the first category, executives opportunistically time option awards and exercises: they manage to receive option grants before the release of favorable information on the company (e.g., Yermack, 1997; Bebchuk et al., 2010), or they choose to exercise options and sell their shares at favorable times to realize high profits (e.g., Aboody et al., 2008; Cicero, 2009). Such opportunistic behaviors rely on executives' private information about the firm and hence are referred to as information timing. In the second category, executives directly manipulate corporate performance: by taking actions to temporarily elevate the company's share value, executives maximize capital gains from exercising stock options at high share prices. Unlike information timing, such opportunistic behavior induces managers to directly manipulate corporate decisions or take other actions to influence share value in the short term. In this study, we focus on the effect of this type of managerial opportunistic behavior and document evidence on manipulated performance motivated by executive stock option exercises.

Prior studies identify a link between corporate decision manipulation and executive stock options. For instance, Bergstresser and Phillippon (2006) document that managers with more option and stock holdings are more likely to manipulate reported earnings through

discretionary accruals; Efendi et al. (2007) observe a higher likelihood of a misstated financial statement when the CEO has sizable holdings of in-the-money stock options; Aboody and Kasznik (2000) study scheduled option grants and find that managers time their voluntary disclosures by accelerating bad news and delaying good news around the option grant date. These studies confirm that stock options motivate executives to manipulate corporate decisions. [1] However, without direct evidence on manipulated stock-price performance, these studies do not answer the following questions: Can executives effectively manipulate stock price (or is there evidence of manipulated stock returns)? If the answer is yes, can executives acquire economically significant benefit from manipulated stock-price performance?

We address these issues in a unique setting: we examine stock-price performance for a sample of firms over a period surrounding CEO retirement. By dividing retiring CEOs into two groups, one with high-option incentives and the other with low-option incentives, we compare abnormal stock returns between the two groups.

Our empirical strategy is based on the following considerations. As our data show, retiring CEOs often have sizable option holdings in their final year in office and thus exercise significantly more options in the final year than in previous years. Because unexercised stock options are expected to lapse shortly after departure,[2] retiring CEOs should have unusually

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[1] Aboody and Kasznik (2000) document abnormal stock returns from voluntary disclosure timing. Such an effect is broadly consistent with the manipulation effect we examine though it does not necessarily cause stock-price reversal.

[2] Firms usually allow a post-retirement period of 60 to 90 days for option exercises. In recent years, some firms such as Disney have further extended the time for post-retirement option exercises. For non-retirement departures, firms often specify that stock options terminate on the last day of employment (e.g., Air Products and Chemicals, Inc.).

strong option incentives, and option-induced behaviors should be evident with such CEOs. In particular, as any effect of option-motivated decisions by an outgoing CEO must show up in the months or years surrounding his departure, there is a clear performance window that allows us to trace the role of his option incentives. This is a distinct advantage of our approach, since it is usually difficult to identify a performance window for non-retiring CEOs. Restrictions on vesting and exercising stock options determine the long-term nature of option incentives, and managerial behaviors change according to complex time-varying structures of unexercised options and expiration dates that are not observed by econometricians. Moreover, their behaviors also depend on their expectation of future option grants. Hence, for non-retiring CEOs, there is no simple link between a given year's performance and their option status in that year or some early years. In addition, the unique performance window in our setting allows us to identify manipulated performance without being concerned with information timing by managers. For normal retirement, the CEO's departure is typically predetermined and the timing of departure is difficult to manipulate shortly before the event. Therefore, with limited chance for information timing, the outgoing CEO can only manipulate the share price to increase capital gains from his terminal-period option exercises.

We divide our sample of retiring CEOs into a high-option holding group and a low-option holding group based on their unexercised options at the time one year before their departure. After matching for size and book-to-market between the two groups, we compare their industry-adjusted buy-and-hold abnormal returns (BHAR) for the two-year period from one year before until one year after CEO departure. We find an inverted V-shaped difference in BHAR between the two groups: the abnormal return is higher for the high-option group than for the low-option group, and the difference peaks in the month of CEO departure at a level of

as high as 13 percentage points. After CEO departure, the difference diminishes and quickly become insignificant.

Our finding indicates a temporary positive effect of executive stock options on stock price that is reversed shortly after the CEO leaves office. This effect coincides with the fact that CEOs exercise an unusually high number of options in their final year in office. Our finding cannot be explained by firm heterogeneity, CEO heterogeneity, or any market-related variables. We view our finding as evidence of manipulated stock-price performance that helps the retiring CEO maximize capital gains from his terminal option exercises. The economic benefit the CEO can capture is economically significant. Under the assumption that a quarter of the retiring CEO's unexercised exercisable options in the final year are exercised in the month of his departure, the average abnormal capital gains to the CEO would be as high as $2.3 million.

The share price revision in the post-CEO departure period is a strong indication of performance manipulation. We then further examine some corporate decisions in the years surrounding CEO retirement, including accruals, R&D expenditure, seasoned equity offerings (SEOs), and repurchases that may directly affect the share price. We find mixed evidence of manipulation of such decisions. Before CEO departure, firms in the high-option group are less likely to conduct SEOs and, with weaker evidence, more likely to repurchase shares. Both decision preferences are associated with an immediate upward effect on the share value that helps the retiring manager exit from his option positions. On the other hand, consistent with previous studies regarding horizon problems facing retiring CEOs, we find no evidence of option-induced earnings management or R&D expenditure reduction in the final years.

The paper is organized as follows. Section 2 discusses the literature and our research strategy. Section 3 describes the data we use in this study. Section 4 presents our main

empirical results. Section 5 concludes.

2. Background and Research Method

2.1. Related Literature

Stock options have become increasingly important in executive compensation contracts. Based on the Black-Sholes value, executive stock options have become the most important component of managerial incentives (see Hall and Liebman, 1998; Murphy, 1999). A number of previous studies have examined various issues regarding executive stock options. These issues can be divided into two broad lines of research that address two important and closely related research questions: How are executive stock options awarded? Do executive stock options affect firm performance?

To answer the first question, Yermack (1995) examines determinants of option grants to CEOs and finds little evidence that option grants follow the optimal compensation practices suggested by theory. He concludes that cross-sectional variations in option grants are not well explained by agency theory or financial contract theory. More recently, Hall and Murphy (2003) explore problems with the wide use of executive stock options. They argue that options are often an inefficient way to attract and motivate corporate executives, and that options are overused because boards and managers falsely perceive stock options to be inexpensive. Narayanan and Seyhun (2008) document evidence of a dating game that entails picking a grant date after the board's compensation decision is made. Bebchuk et al. (2010) find that CEOs receive an abnormally high number of "lucky" grants that are awarded at the lowest price of the grant month.

Other studies in this line examine the link between stock option awards and corporate

decisions. Yermack (1997) finds that CEOs receive stock option awards shortly before favorable corporate news, which is interpreted as evidence of managers' influence on the compensation committee to award them options at favorable times. By studying scheduled option grants, Aboody and Kasznik (2000) document evidence that managers time their voluntary disclosures by accelerating bad news and delaying good news around the option grant date. Hanlon et al. (2003) find that the predicted component of option grant value attributable to economic determinants exhibits a strong positive relation with future earnings. Ittner et al. (2003) examine the use of options in new economy firms and observe that lower than expected option grants are associated with lower accounting performance in the two subsequent years.

More recent studies examine opportunistic executive behavior in option exercises. Carpenter and Remmers (2001) find evidence that corporate insiders use private information to time the exercises of their executive stock options. Aboody et al. (2008) document strong evidence that executives are exploiting positive private information when they exercise the options but hold the shares obtained beyond a certain period. Cicero (2009) examines different option exercise strategies executives use and finds that by manipulating option exercises, executives use private information to increase the profitability of different option exercise strategies.

The second research question involves a more fundamental issue: Do executive stock options ultimately work in the best interest of shareholders, regardless of how options are awarded? Direct studies on this issue are scarce, in part because the long-term incentive nature of stock options makes it difficult to link stock-price performance to a previous time's option grants or holdings. The literature on the ownership-performance relationship is related to this

issue. In their influential work, Morck et al. (1988) document evidence that higher managerial ownership, except at very high levels, is associated with better company performance. McConnell and Servaes (1990) show that this relationship is non-monotonic. Mehran (1995) reports that firm performance is positively related to the percentage of equity held by managers and to the percentage of their compensation that is equity-based. Core and Larcker (2002) find that firms' operation performance improves following the establishment of a target ownership plan. On the other hand, other researchers, including Demsetz and Lehn (1985), argue that firms and managers contract optimally and, on average, equity incentives are set at the value-maximizing levels and hence there should be no systematic relations between managerial equity ownership and corporate performance.

Recent studies in the accounting literature examine the dysfunctional behavior of management association with the use of stock options. Because reported earnings may affect stock price movement in the short term, managers may have an incentive to manipulate earnings so that they can benefit from exercising options at high share prices. Several recent studies examine this proposition. Cheng and Warfield (2005) document that managers with high equity are more likely to engage in earnings management and reporting earnings that meet or beat analysts' forecasts. Bergstresser and Phillippon (2006) find that managers holding more options and stock shares are more likely to manipulate reported earnings through discretionary accruals. Burns and Kedia (2006) observe that the sensitivity of the CEO's option portfolio to stock price is positively correlated to the propensity to misreport. Efendi et al. (2007) find that the likelihood of a misstated financial statement increases when the CEO has sizable holdings of in-the-money stock options.

These findings are consistent with those of Bartov and Mohanram (2004) and Bergstresser

and Phillippon (2006), who identify a link between option exercises and earnings management. Bartov and Mohanram focus on large exercises of executive stock options, where the incentive for private-information-based exercises is suspected to be high. They find that abnormally positive earnings performance in the pre-exercise period turns to disappointing earnings performance in the post-exercise period. Bergstresser and Phillippon find that CEOs exercise unusually large numbers of options and sell large quantities of shares during years of high accruals.

This literature suggests two possibilities: managers possess private information and accordingly "passively" time option awards and exercises, or they "actively" manipulate share price via earnings management, to maximize their private benefits. These two possibilities imply different causal relations regarding the option scheme. The first possibility points to managers' opportunistic behavior in timing option grants and exercises, but it has no implication for potential performance effects of stock options. The second possibility suggests that stop options play a role in motivating executives to directly manipulate corporate performance. Previous studies do not directly identify the effect of executive stock options on stock price performance. Indeed, it is difficult to estimate this effect. Because of the long-term nature of option incentives and intertemporal variation in stock option awards and the vesting process, there is no simple link between option grants or holdings at one time and a subsequent option exercise at another time. Therefore, those studies do not determine whether executives can effectively manipulate stock-price performance and whether they can obtain economically significant benefits from suspected performance manipulation.

2.2. Research Method

We focus on the stock-price performance for a sample of firms with a retiring CEO. To

identify normal retirement-based departures, we follow previous studies (e.g., Murphy and Zimmerman, 1993) and consider a departure as normal retirement if the CEO was 64 or older when he left office. We divide such CEOs into two groups, one with high-option holdings and the other with low-option holdings. After controlling for market capitalization and the book-to-market ratio, we compare industry-adjusted abnormal stock returns between the two groups for one year before and one year after CEO departure.

In this approach, we use CEO age at departure above 64 as the criterion for identifying a normal retirement. This criterion is clearly imperfect since a CEO may retire at a younger age while a forced departure may occur with an older CEO. On the other hand, according to the indicated reason for CEO departure recorded in the *ExecuComp* database, this age criterion works well in highlighting normal retirements. For our sample, among the CEOs who departed at age above 64, close to 80% of the departures are specified as retired. This high percentage applies to both the low- and high-option holding groups. In contrast, for CEOs departed at age below 60, only 28% of the departures are specified as retired.[3]

Our study has distinct features in contrast to previous studies on the effects of executive stock options. First, retiring CEOs typically have sizeable option holdings in their final year in office, and they exercise significantly more options in the final year than in previous years. Because any unexercised stock options will lapse soon after retirement, retiring CEOs are expected to have strong option incentives. Therefore, if stock options play an important role in managerial motivation, this role should be particularly evident with retiring CEOs.

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[3] An alternative approach is to use the indicated departure REASON in the *ExecuComp* database as the proxy for normal retirement. However, this data field is also imperfect for this purpose. In addition to being imprecise, this information is available only for about 55% of CEO departures.

Because the timetable for CEO retirement is typically predetermined, potential reverse causality associated with information timing is minimized in our setting. Intuitively, it would be difficult for a retiring CEO to justify new and large option grants when there is apparently insufficient time for such options to be vested and exercised. At the same time, the retiring CEO's unexercised options have to be exercised or forfeited due to the retirement clock that is often beyond the manager's control.

Second, any performance effect resulting from an outgoing CEO's decisions should necessarily show up in the years surrounding his departure, so there is a clear window of corporate performance that allows us to trace the role of the CEO's option positions. For non-retiring CEOs, it is difficult to identify such a performance window; thus, their opportunistic behaviors and decisions at a given time point are related to complex time-varying option holding structures that are not observed by econometricians.

Third and last, by examining the decisions made by retiring CEOs, we can analyze the types of corporate decisions that are likely to be option motivated and are likely to cause a performance effect. Such an examination is related to the horizon problem discussed in the literature. Theory suggests that managers close to retirement are associated with stronger compensation and equity incentives (Eaton and Rosen, 1983; Gibbons and Murphy, 1992). So far, the evidence is mixed on managerial decisions facing a horizon problem, such as earnings management and R&D expenditures (Dechow and Sloan, 1991; Murphy and Zimmerman, 1993; Naveen, 2006). We extend this literature by also examining corporate decisions on SEOs and repurchases.

3. Data and Sample

Our sample is based on the dataset of Standard & Poor's *ExecuComp*. This dataset provides

detailed information on executive stock options, as well as on executive direct pay and turnover, for top executives in the S&P 500, S&P Midcap 400 and S&P SmallCap 600 firms. Because we need to examine the firm's performance in the years surrounding a CEO change, we require the CEO in our sample to be with his firm for at least two years before his departure, and the firm must have at least two years' data after the departure. We confine our data to the period of 1994-2002. We obtain various firm financial data from Standard & Poor's *Compustat* dataset and stock-price performance data from the Center for Research in Security Prices (CRSP) data tape. In addition, we obtain the information on corporate decisions in the years surrounding CEO change from the Securities Data Company (SDC) database.

After we eliminate CEOs without information on age and departure time, our total sample consists of 1,337 CEO turnover events. Among these events, 402 are identified as normal retirements, in which the departing CEO was 64 or older when he left office. Table 1 presents summary statistics for selected variables for retiring and non-retiring CEOs, separately. There are notable differences between the two groups. Apparently, retiring CEOs are older and have stayed with their firm longer than non-retiring CEOs. When they leave office, retiring CEOs are 67.7 years old on average and have stayed with their firm for 13.4 years; in contrast, non-retiring CEOs have an average age of 55.6 and average tenure of 7.4 years. The firms of retiring and non-retiring CEOs are quite similar in size (measured by assets, sales, and market capitalization) and growth potential (measured by Tobin's Q and book-to-market). Retiring CEOs are likely to perform well, and therefore their firms are associated with significantly higher stock returns and accounting returns in the turnover year.

Figure 1 plots the distribution of stock options held by CEOs one year before they leave office. The distribution suggests a large variation in option incentives across CEOs. If options

are important in affecting managerial behavior and performance, the option effects should be strong for those who are close to retirement and who still hold many unexercised options. Table 2 presents further statistics regarding outgoing CEOs' option positions in their final years. We divide retiring CEOs and non-retiring CEOs into high- and low-option holding groups, respectively, based on their final year holdings at the median level. As expected, retiring CEOs of the high-option holding group receive fewer and fewer options as they approach retirement, and they exercise more options in the final year than in the previous three years combined. In contrast, retiring CEOs of the low-option group, who in all years have very low levels of option awards, exercises and holdings, do not show any notable pattern.

4. Empirical Results

Different approaches are used in the finance literature to examine long-run stock-price performance; among these, matching-sample comparison is a common technique (Barber and Lyon, 1997). In this study, we also use a matching-sample approach to examine the effect of executive stock options on stock returns. We divide the total sample into two groups at the median level of CEO option holdings, and after matching for firm characteristics we compare abnormal stock returns between the two groups.

Our first step is to divide the total sample into two groups of firms with different CEO option holdings. As a CEO approaches retirement, the pressure from unexercised stock options increases and his option incentives are expected to be strongest in his final year in office. Evidence for this point is shown in Table 2; in the final year, CEOs exercise more than twice as many options as they do in any earlier year. As the final year should highlight option-induced managerial behaviors, we divide the sample based on CEOs' option holdings one year before they leave office. More specifically, we first identify the date of each CEO turnover (which we

denote as t=0) and determine the CEO's option holding 12 months before this date (which we denote as t=-1), and we then divide the total sample according to this option holding level. CEOs with option holdings higher than the sample median belong to the high-option holding group, and others belong to the low-option holding group, which we treat as control CEOs.

The next step is to match the two groups by firm characteristics. As usual, we perform a one-to-one match by size (market capitalization) and growth (book-to-market ratio). We first match the two groups by size: for each firm in the high-option holding group, we obtain one matching firm in the low-option holding group. The matching firm's size must be in the range of 0.7 to 1.3 times the size of the high-option counterpart and should be the closest. In the matching, each observation is used only once. This single-dimension matching results in 464 pairs of size-matched firms. We then further match these firms by book-to-market ratio. We also require that the matching firm's book-to-market ratio be in the range of 0.7 to 1.3 times the size of, and be closest to, the high-option counterpart. The two-dimension matching procedure yields 431 pairs of size- and book-to-market matched firms.

Since retiring CEOs are our main focus, we separately divide such CEOs into high- and low-option holding groups based on their unexercised options 12 months before their departure. In a similar approach, we match the two groups by size and book-to-market ratio, which leads to 147 pairs of size-matched retiring CEOs and 135 pairs of size- and book-to-market matched retiring CEOs.

4.1 The effect of executive stock options on performance

Our control firms are expected to capture firm heterogeneity and any abnormal changes in firm value associated with CEO turnover events (Murphy and Zimmerman, 1993). Because we do not match for the date of CEO change, which is essentially infeasible because of the sample

13

size constraint, we further remove market-related effects by adjusting for industry returns. Our performance measure is the firm's buy-and-hold abnormal returns (BHAR) over the two-year period from 12 months before CEO change until 12 months after. For firm i during the period from 12 months before CEO turnover until month t (relative to CEO turnover), the performance measure is calculated as:

$$BHAR_{it} = \prod_{\tau=-12}^{t} (1+RET_{\tau}^{i}) - \prod_{\tau=-12}^{t} (1+RET_{\tau}^{Industry}), \qquad (1)$$

where τ denotes the month relative to CEO turnover, RET_{τ}^{i} is the firm's stock return in month τ, and $RET_{\tau}^{Industry}$ is the equal-weighted industry average return in month τ. Industry returns are calculated based on Fama-French 48 industry classification codes. For a stock and its matching counterpart to be included in the calculation, we require their return data to be available for at least one year before and one year after the turnover month.

Table 3 presents our main results for the effect of executive stock options on stock-price performance. We test for the difference in BHAR between the high- and low-option holding firms surrounding the retiring CEO's departure. For comparison purposes, we perform the test both with the unmatched sample and with the two matched samples. Panels A, B, and C present the results for the unmatched sample, the size-matched sample, and the size- and book-to-market matched sample, respectively. In each panel, we report the two groups' BHAR and their difference every three months for the two-year period surrounding CEO departure.

The results are similar and quite consistent across the three panels. For the high-option holding group, BHAR is positive in all time intervals and the highest level occurs in the month of CEO departure. On the contrary, for the low-option holding group, BHAR is negative for all time intervals and it reaches the lowest level in the months surrounding CEO departure. It is

worth noting that we expect the negative abnormal returns of the control firms to reflect increased uncertainty due to CEO change (Murphy and Zimmerman, 1993). This CEO-change effect is most serious during the several months surrounding CEO departure.[4] Compared to the results in Panels A and B, in Panel C the difference in BHAR is weaker though still statistically significant. One possible reason for this difference is the reduced sample size.

Our key observation is that all panels indicate an inverted V-shaped difference in BHAR between the high- and low-option groups. While the abnormal return is higher for the high-option holding group, the difference between the two groups peaks and becomes statistically significant only in the few months surrounding CEO departure; after that, the difference diminishes and essentially disappears within one year after CEO departure. Figures 2 to 4 show this observation graphically, which further highlight the difference in stock-price performance between the two groups.

Taking the difference as a result of executive stock options, we obtain a strong implication of this finding: Executive stock options have a temporary positive effect on the share value, and this effect is reversed shortly after the CEO leaves office. This effect coincides with our observation that CEOs exercise significantly more options in their final year in office, and it indicates manipulated stock-price performance that helps the retiring CEO maximize capital

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[4] Previous studies document evidence of stock-price performance surrounding CEO turnover that is consistent with the pattern we report for the low-option-holding group. For instance, Huson, Malatesta, and Parrino (2004) find that "accounting measures of performance relative to other firms deteriorate prior to CEO turnover and improve thereafter. The degree of improvement is positively related to the level of institutional shareholdings."(pp 237-275) Clayton, Hartzell, and Rosenberg (2005) report that "volatility increases following a CEO turnover, even when the CEO leaves voluntarily and is replaced by someone from inside the firm. … We attribute this volatility change to increased uncertainty over the successor CEO's skill in managing the firm's operations." (pp 1779-1808)

gains from exercising stock options. The economic benefit arising from the abnormal returns is also significant economically. Under the assumption that a quarter of the retiring CEO's unexercised exercisable options in the final year (averaged at 0.88% of the firm's total shares outstanding) are exercised, the abnormal capital gains to the retiring CEO are $2.3 million.

On the other hand, our results do not show a sustained impact on the firm's value; hence, executive stock options do not seem to benefit shareholders. Clearly, this observation does not support the presumably important role of stock options in improving executive working incentives, which, according to our data, is either negligibly weak or insignificant relative to the manipulation effect. This point has interesting implications for managerial incentive contracts. In theory, explicit incentives in an optimal compensation contract must be strongest for managers close to retirement, because their career concern is weakest (Gibbons and Murphy, 1992). However, when retiring managers are motivated to manipulate short-term share price instead of working harder to promote shareholder value, stock options – an increasingly important component of compensation – may not work in the way financial economists predict.

Our finding of stock-price reversion in the post-CEO turnover period is particularly interesting. First, it is a strong indication of manipulated performance instead of information timing. In information timing, the opportunistic behavior of managers leads to timed option awards and exercises for anticipated corporate news (e.g., Yermack, 1997; Hanlon et al., 2003; Ittner et al., 2003; Aboody et al., 2008; Cicero, 2009). When the firm's intrinsic value is bound to increase for anticipated good news or decline for anticipated bad news, there is no reason for the price to be revised unless the news is fabricated or manipulated. In other words, the

opportunistic behaviors in information timing involve reversed causality (in which it is the anticipated stock price change that determines the executive's handling of stock options), but they do not lead to performance reversal. On the other hand, performance manipulation is not driven by valuable private information and should not reflect the firm's fundamentals. Because of the very nature of manipulation, any manipulated stock-price performance would necessarily be reversed regardless of the means of manipulation. Therefore, manipulation is a necessary condition for performance reversal, and it does not involve reversed causality.

Second, the observation of stock return reversal reinforces our argument that the results are not driven by firm or managerial heterogeneity, or any market-related factors. Figure 5 illustrates two hypothetical scenarios of the effect of uncontrolled heterogeneity. In the first scenario, there is a persistent difference in firm or managerial characteristics between the high- and low-option groups that our matching strategy fails to remove, and the pre-turnover difference in BHAR is driven by such heterogeneity. In such a case, the difference should continue to develop after CEO turnover. In the second scenario, heterogeneity exists before CEO turnover and disappears after the new CEO takes office. In this case, the difference would have to cease to grow after the turnover event. In either case, we should not observe stock performance reversal. Regarding market-related factors, while they may cause certain differences between the two groups, these differences should be irregular and occur at irregular times. Again, there is no reason for the stock return pattern to be reversed and for the reversal to occur just after the CEO leaves office.

As a comparison, Table 4 presents the same test with the sample of total outgoing (both retiring and non-retiring) CEOs. In this test, the difference in BHAR between the two groups does not show a clear pattern: the coefficient for the difference is either positive or negative

and none is statistically significant. Noting that non-retiring CEOs are the majority and account for 70 percent of the total sample, this result is not surprising. When the CEO is changed for reasons other than normal retirement, the change is usually for one of the following three reasons: poor health (including sudden death), poor performance, and voluntary departure for greener pastures. Without a predetermined timetable for terminal employment, non-retiring CEOs in all situations either, *ex ante*, do not have a plan to leave or, after the firm decides to change the CEO, are no longer in a position to effectively manipulate corporate decisions. Therefore, the results in Table 4 are not unexpected and do not conflict with the finding shown in Table 3.

The results in Table 4 further imply that the pattern of the difference in BHAR between the high- and low-option groups reported in Table 3 is not driven by executive heterogeneity. Our matching strategy is designed to remove firm heterogeneity, but it does not directly deal with managerial heterogeneity. If option holdings depend on executive characteristics, such as managerial ability and risk-taking attitude, then the grouping of CEOs based on their option holdings would reflect such unobserved heterogeneity. For example, if more capable CEOs receive more options and hence are with higher option holdings, the departure of such CEOs would be a loss to the firm. This possibility is dismissed by the marked difference in the results between Table 3 and Table 4. If executive heterogeneity were the driving factor, it would have dictated the results for retiring CEOs and non-retiring CEOs alike. Hence we would have observed similar patterns of abnormal returns in both tables, and even stronger patterns in Table 4 because of the more efficient test with the much larger sample size.

To further understand our results, we also examine the stock-price performance with respect to retiring CEOs' stock ownership. Unlike options, the CEO's ownership is perhaps

determined by his long-run investment strategy in managing his personal wealth, which is not constrained by any terminal period conditions. Using the same strategy we use for stock options, we divide the total sample into high- and low-stock ownership groups, match the two groups by market capitalization and book-to-market ratio, and then compare the industry-adjusted abnormal returns between the two groups. As expected, the results of this examination (which we do not report) indicate no meaningful difference in stock-price performance between the two groups. This examination further confirms that our finding is driven by executive stock options.

4.2 The effect of stock options on managerial decisions

Having established the performance effect of stock options, we now examine corporate decisions in the years before the CEO leaves office. If the performance effect indeed comes from manipulation by the outgoing manager, there should be a link between his option position and certain corporate decisions in the final years that coincides with the pattern of abnormal returns documented in Table 3.

In this examination, we consider four decision variables that are potential manipulative vehicles managers can use to influence the share price in the short run: earnings management, R&D expenses, share repurchases, and seasoned equity offerings (SEOs). Of these variables, earnings management is most often cited by financial and accounting economists as evidence of manipulative activities motivated by executive stock options. Prior studies suggest that CEOs are more likely to engage in earnings management when they hold more options (Cheng and Warfield, 2005; Burns and Kedia, 2006; Efendi et al., 2007) or when they need to exercise more options (Bartov and Mohanram, 2004; Bergstresser and Phillippon, 2006). We expect the high-option group of retiring CEOs to be associated with stronger earnings management.

R&D expenses depend on the firm's development strategy, which balances the current year's earnings and the firm's long-term goals. When the CEO has more unexercised options, he is likely to have stronger incentives to boost current earnings by cutting R&D spending. We therefore predict lower R&D expenses for the high-option holding group. Prior studies have examined this horizon problem regarding R&D expenses; so far, the evidence is inconclusive.

Repurchases and SEOs are relevant because of the well-documented regularities of equity market reactions to such corporate events: the firm's stock price increases in response to a repurchase and decreases in response to an SEO. Hence, if the CEO wishes to support share price in the short term in favor of his exercising options, he is likely to be motivated to unnecessarily conduct share repurchases and avoid SEOs. Few researchers have examined these issues. One exception is Jolls (1998), who documents a link between the firm's repurchase policy and executive stock options.

Following the accounting literature, we measure earnings management by accruals, which are defined as the difference between earnings and cash flows from operating activities. Early studies use total accruals as the proxy for earnings management (e.g., Healy, 1985; Murphy and Zimmerman, 1993). More recent studies decompose total accruals into discretionary and nondiscretionary components and consider the discretionary component as a better proxy (Dechow et al., 1995). We use both in our examination. To obtain discretionary accruals, we follow Kothari et al. (2005) to estimate the following model:

$$\frac{TACCRUAL_{i,t}}{A_{i,t-1}} = \beta_0 \times \frac{1}{A_{i,t-1}} + \beta_1 \times \frac{\Delta REV_{i,t}}{A_{i,t-1}} + \beta_2 \times \frac{\Delta PEP_{i,t}}{A_{i,t-1}} + \beta_3 \times ROA_{t,t-1} \qquad (2)$$

where $TACCRUAL_{i,t}$ is firm i's total accrual in the current year, $A_{i,t-1}$ is last year's total assets, $\Delta REV_{i,t}$ is the change of net revenue from last year, $PPE_{i,t}$ is the current-year gross property,

plant and equipment, and $ROA_{i,t-1}$ is last year's return on total assets. The residual of this cross-sectional regression model is our estimate of discretionary accruals.

The first two panels of Table 5 present our test for earnings management for the three fiscal years surrounding CEO turnover ($t = -1$, 0 and 1), with Panel A for total accruals and Panel B for discretionary accruals. The results in this table are obtained based on fiscal years; hence $t=0$ is the fiscal year when the CEO is changed. In all years and with all samples, there is statistically no difference in the two accrual statistics between the high- and low-option holding groups. In particular, for the two years $t = -1$ and 0 when the outgoing CEO can influence the earnings statements, the difference is also insignificant and the sign is frequently in the unexpected direction. Therefore, this test does not support option-induced earnings management by retiring CEOs.

Some previous studies examine CEOs' pre-retirement years, and most find no evidence of earnings management (e.g., Murphy and Zimmerman, 1993). Our test is consistent with this literature, and it further shows that options do not alter such CEOs' decisions in this regard. This observation is not surprising, however. As Murphy and Zimmerman (1993) put it, "managerial discretion over accruals in any given year period is limited in part by the income-inflating decisions exercised in prior years." Even if retiring CEOs have an incentive to inflate earnings, it is possible that they are no longer in a position to do so effectively or freely because of the apparent concern that any inflated earnings by the outgoing CEO in the final year impose a direct burden on the successor.

Panel C presents the test for annual R&D spending scaled by total sales. With all three samples, the difference in R&D expenditure between the two groups is insignificant and the sign is mixed. The test therefore does not show R&D expenditure manipulation associated with

executive stock options. Because cutting R&D expenditure may hamper the strategic development that the firm already has in place, the concern of potential successors, who are mostly insider executives, may well limit such manipulation by the outgoing CEO.

Table 6 presents our comparison for SEOs and share repurchases between the high- and low-option groups. We calculate the number of SEO and repurchase events during the four-year period surrounding (two years before and two years after) CEO turnover.[5] In the upper panel, the frequency of SEOs shows a pattern consistent with the effort of the high-option group in price support. This pattern is more evident with the size- and book-to-market matched sample. In the 12 months one year before CEO departure, ten firms in the low-option group conduct an SEO, while only five in the high-option group do so. This difference suggests that CEOs with more options tend to avoid issuing new equity in order to minimize downward pressures on the share price. In the 12 months before CEO departure, the frequency of SEOs becomes similar between the two groups. In this period, the high-option group has high abnormal returns (which encourages the issuing of new equity). This observation is also consistent with the outgoing CEO's influence in supporting the share price.

On the other hand, in the two years after the new CEO is in control, the difference in the SEO frequency between the two groups is reversed: while it increases with the high-option group, it declines dramatically with the low-option group. Consequently, the high-option group conducted many more SEOs than the low-option group in the two years immediately after the new CEO takes office. This reversed difference may suggest that the new CEO is compensating for the "skipped" SEOs in the previous years.

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[5] We extend the examination period for repurchases and SEOs to four years surrounding CEO departure due to a concern with the low frequency of such events.

The lower panel presents our comparison for share repurchases. Consistent with the result for SEOs, the difference in the number of repurchases between the two groups also indicates price support from the high-option holding group. Consider the size and book-to-market matched sample. In the 12 months before CEO departure, 24 repurchases were conducted by firms in the high-option group and 19 were conducted by firms in the low-option group. This difference is reversed after CEO departure; in the 12 months before CEO departure, while the number of repurchases jumps to 26 for the low-option group, it drops slightly to 22 for the high-option group.

We further run regressions to test the stock-option effects on SEOs and share repurchases. Table 7 reports the results for our test for SEOs. The first six columns present probit regressions, where the dependent variable equals one if one or more SEOs are conducted in the specified period before CEO turnover, and zero otherwise. The coefficient on the dummy variable for the high-option holding group captures the option effect. Market capitalization, stock return performance, and debt ratio are controlled in the regressions. Consistent with the observation from the statistics in Table 6, the coefficient on the dummy variable is negative in all regressions, and it becomes statistically marginally significant with the subsample matched for size and book-to-market.

The remaining three columns in Table 7 present OLS regressions for the change in the number of SEOs from the two-year period before CEO turnover to the two-year period after. The control variables in these regressions are in difference, calculated as the corresponding change from the pre-turnover period to the post-turnover period. The economic rationale for these regressions is as follows: if fewer SEOs in the two-year period before CEO change are due to the outgoing CEO's manipulation, we expect some compensating actions by the new

CEO to raise more equity capital in the post-CEO change period. Therefore, we expect the coefficient on the high-option holding dummy to be positive. Consistent with this expectation, the coefficient is positive and statistically highly significant in all three regressions. These three regressions are essentially a difference-in-differences test, which provides a robust estimation uncontaminated by potential firm heterogeneity. We consider the results of this test as evidence of SEO manipulation by the outgoing CEO, motivated by executive stock options.

Table 8 presents our test for share repurchases, using the same approach as for SEOs. Consistent with the statistics from Table 6, the coefficient on the high-option dummy is positive in the first six regressions. However, except in one regression, the coefficient is insignificant. In the remaining regressions, the difference-in-differences test identifies no meaningful difference in the coefficient between the high- and low-option groups. Therefore, this test does not indicate any compensating decisions by the new CEO in conducting share repurchases.

4.3 Discussion

We interpret the inverted V-shaped pattern of abnormal stock returns surrounding CEO departures as evidence of manipulated performance motivated by CEO option incentives. We now discuss some further issues regarding our finding and interpretation, which have direct implications for possible alternative mechanisms behind the finding.

First, our test is based on the presumed concern of the departing CEO about his unexercised stock options that are to lapse shortly after retirement. However, in the real world not all retiring CEOs face such a terminal-period incentive problem. Some retired CEOs continue staying with the firm and some even become the board chairmen, who are unlikely to have an urgent need to exit from their option positions. Even for such CEOs, their option incentives can

still be strong because after leaving the top management position, they no longer run the company and their influence on corporate decisions would be substantially reduced. To the extent that such retiring CEOs have weaker incentives to manipulate the share value, the presence of such CEOs in our sample should have weakened our results.

In addition, as we note earlier, due to limitations of data we are unable to obtain a clean sample of CEO normal retirements. Our sample inevitably includes some forced turnovers or unexpected voluntary departures. The CEOs in such departures are likely to face more constraints in dealing with unexercised stock options and making corporate decisions before their departure than those in a normal retirement. Hence, such CEOs should have weaker incentives to manipulate performance and it should be more difficult for them to effectively manipulate performance. Therefore, data imperfections in this regard should also have weakened our results.

Second, the interpretation of our finding as evidence of performance manipulation (in contrast to information timing as in previous studies) is based on an important assumption: the departure date of the retiring CEO is predetermined. This assumption should hold for typical normal retirements in which the change in top management is anticipated and usually well planned. When the old CEO is expected to retire, there should be little uncertainty in the final year as when his contract expires. To prepare for the management change, it is also necessary for the board to decide on the successor carefully and in advance, thus leaving sufficient time for a smooth transition and avoiding any unexpected outcomes.

Nevertheless, in some circumstances, the departure date can still be influenced or manipulated by the retiring CEO. To the extent that the departure date is manipulated by the CEO, our finding would be a result of manipulated timing of retirement rather than

manipulated performance. To evaluate this possibility, it is important to note that the option incentives in the terminal period are supposed to motivate the CEO to leave office later rather than sooner. This means that the desirable manipulation of a departure date is to delay the departure. There are two situations in which the retiring CEO may have a legitimate reason to delay his departure. In the first situation, the firm has difficulty in appointing the successor so the retiring CEO needs to stay beyond his pre-determined departure date. Given the nature of such delayed departures, the chance for and extent of CEO manipulation should be limited. In the second situation, there is some flexibility in the actual departure date relative to the officially announced departure date. However, as long as the official departure date is not manipulated, on which our test is based, the variation in the actual departure date arising from the departing CEO's intended delay becomes irrelevant. Therefore, although manipulated departure dates are possible, they are unlikely to be common with normal retirements and hence should not pose a serious challenge to our interpretation.

Third, we have ignored a possible alternative explanation of the inverted V-shaped abnormal stock returns surrounding CEO departure: it is a combined effect of the pre-departure positive abnormal returns of some firms and the post-departure negative abnormal returns of some other firms. Although we cannot rule out the possibility that such firms present in our sample and have affected our results, we explain below: (i) our finding is unlikely to be driven by this effect, and (ii) this alternative explanation does not necessarily conflict with our interpretation.

A direct check for this possibility is to examine the correlation between a firm's abnormal return before CEO departure and the same firm's abnormal return after the departure. Consistent with the notion of performance manipulation, this correlation is negative for the

abnormal returns between one-year before and one-year after CEO departure. However, the significance level of this correlation is low and it declines as the performance window shrinks. The low significance level and changing pattern of this correlation are not unexpected. Because the correlation test requires each firm's share value to peak around the departure date, it is bound to be more restrictive and thus weaker than our difference-in-difference test. Indeed, for various reasons, the effect of manipulation can vary greatly in magnitude, shape, and peaking time. Such variation becomes even greater with the pair-wise differences that depend on the underlying patterns of both the high- and low-option holding groups.

While the negative pair-wise correlation is consistent with our interpretation, it does not reject the possibility that some firms only contribute to one side of the abnormal returns. Our empirical strategy has ruled out outliers or missing-variable problems for this possibility. However, some corporate decisions can cause such a one-sided performance effect. For instance, when the retiring CEO pushes for a stock repurchase shortly before his departure or delay a seasoned equity offering until after his departure while he does acquire supportive inside information, the performance effect will be sustainable and consequently contribute to one side of the abnormal returns. Similarly, when the CEO manipulates corporate news release as in Aboody and Kasznik (2000), the performance effect will be one-sided if the news is information based instead of fabricated. It is difficult for us to have a clear picture of the presence of such scenarios. However, based on our discussion in the previous section about the effect of managerial decisions, we suspect that their role is limited. Nevertheless, as long as the CEO's departure date is predetermined, the corporate decisions in those scenarios are a manipulated outcome no matter whether the resulting performance is reversed.

5. Conclusion

By examining stock-price performance for a sample of firms with the retiring CEO, we document evidence of manipulated stock returns motivated by executive stock options. In our examination, we divide retiring CEOs into high- and low-option holding groups and, after matching for firm characteristics and adjusting for industry returns, we compare stock-price performance in the two years surrounding (one year before and one year after) CEO departure. We find higher buy-and-hold abnormal returns for the high-option group than for the low-option group in the year before CEO departure. This difference is reversed after the CEO leaves office and essentially disappears within one year after the CEO's departure. The inverted V-shaped BHAR of the high-option group relative to the low-option group coincides with the timing of CEO change, which cannot be explained by firm heterogeneity, CEO heterogeneity, or market-related variables. We interpret this finding as evidence of option-induced manipulation of stock price by the outgoing CEO.

Previous studies have examined opportunistic patterns of executive stock option awards and exercises, focusing on information timing. Others have also examined manipulated corporate decisions motivated by anticipated option grants and exercises. Contributing to this growing literature, we present the first direct evidence of manipulated stock-price performance associated with executive stock options. Our results suggest that retiring CEOs can effectively manipulate stock price and, by exercising options at high share prices, realize economically significant abnormal returns.

On the other hand, in this study we are unable to draw a conclusion about corporate decisions that retiring CEOs may use to effectively manipulate share price. We find a significant pattern of SEOs surrounding CEO retirement in support of price manipulation. However, given the infrequency of SEO events, the effect of this pattern is too small to account

for the significant abnormal returns. In addition to corporate decisions, there may be other channels for manipulation, such as unjustified favorable corporate news and, possibly, insider trading. We believe that a separate study is necessary to carefully examine this issue.

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Table 1
Summary Statistics

We obtain corporate executive data from Standard & Poor's *ExecuComp* and company financial data from COMPUSTAT. After we eliminate observations with missing data, our sample consists of 1,337 CEO turnovers for the period 1994-2002. We divide CEO departure events into two categories: normal retirement and others. A CEO departure is considered to be normal retirement if the outgoing CEO is 64 or older in the year of CEO turnover. This table presents summary statistics for selected CEO and firm variables for retiring CEOs and non-retiring CEOs, separately. All variables are reported for the fiscal year of CEO change. Grants and exercises of stock options are reported as the percentage of firm's total shares outstanding. Tobin's Q is the ratio of the market value of the firm's common stock plus the book value of debt over the firm's book value of total assets.

	Observation	Mean	Median	Minimum	Maximum	Standard Deviation
A. Retiring CEOs						
CEO age (years)	402	67.60	66	64	87	4.65
Tenure as CEO (years)	358	13.42	10	1	54	10.67
Grants of CEO stock options (%)	347	0.09	0.00	0.00	4.15	0.28
Unexercised CEO stock options (%)	346	0.69	0.39	0.00	13.51	1.07
Total assets ($million)	401	12,165	1,692	28	621,764	47,694
Sales ($million)	401	5,331	1,523	10	165,639	14,862
Market capitalization ($million)	400	8,049	1,411	18	397,832	29,579
Book-to-market ratio	394	0.57	0.48	0.02	8.61	0.64
Stock return (%)	392	12.54	6.65	-88.96	1026.50	63.20
Return on assets (%)	401	3.71	4.48	-79.88	38.67	9.44
Tobin's Q	394	1.77	1.40	0.62	12.48	1.28
B. Non-retiring CEOs						
CEO age (years)	935	55.62	57	29	63	5.93
Tenure as CEO (years)	862	7.37	6	1	43	5.51
Grants of CEO stock options (%)	842	0.11	0.00	0.00	10.22	0.43
Unexercised CEO stock options (%)	842	0.91	0.47	0.00	64.57	2.49
Total assets ($million)	928	10,222	1,378	6	902,210	46,067
Sales ($million)	924	4,832	1,229	0	180,557	11,850
Market capitalization ($million)	926	6,569	1,009	2	422,640	23,345
Book-to-market ratio	869	0.67	0.49	0.01	12.11	0.89
Stock return (%)	880	2.18	-5.00	-97.23	632.95	63.06
Return on assets (%)	927	-5.42	2.14	-584.48	36.33	36.14
Tobin's Q	869	1.85	1.35	0.60	11.22	1.38

Table 2
Option awards, exercises, and holdings of outgoing CEOs

This table reports mean option grants, exercises and holdings of outgoing CEOs for the four years before CEO turnover. The sample is described in Table 1. All option variables are reported as the percentage of total shares outstanding at the fiscal year end. Panel A presents the statistics for the subsample of 402 retiring CEOs, and Panel B for the subsample of 935 non-retiring CEOs. In both panels, CEOs are further divided into high- and low-option holding groups based on their option holdings at the year end before the turnover year ($t = -1$). Hence, in each panel, the high- (low-) option holding group consists of observations with CEO option holding above (below) the median.

	Year as of CEO turnover			
	-3	-2	-1	0
A. Retiring CEOs				
High-option holding CEOs				
Option grants (%)	0.27	0.19	0.18	0.13
Exercised options (%)	0.08	0.06	0.10	0.17
Unexercised exercisable options (%)	0.77	0.85	0.94	0.88
Unexercised unexercisable options (%)	0.41	0.43	0.41	0.24
Low-option holding CEOs				
Option grants (%)	0.05	0.04	0.06	0.03
Exercised options (%)	0.02	0.03	0.02	0.02
Unexercised exercisable options (%)	0.10	0.09	0.12	0.13
Unexercised unexercisable options (%)	0.07	0.07	0.09	0.06
B. Non-retiring CEOs				
High-option holding CEOs				
Option grants (%)	0.41	0.41	0.39	0.14
Exercised options (%)	0.10	0.11	0.10	0.22
Unexercised exercisable options (%)	0.87	0.95	1.11	1.01
Unexercised unexercisable options (%)	0.73	0.75	0.74	0.30
Low-option holding CEOs				
Option grants (%)	0.07	0.08	0.08	0.06
Exercised options (%)	0.04	0.04	0.04	0.04
Unexercised exercisable options (%)	0.15	0.14	0.16	0.19
Unexercised unexercisable options (%)	0.13	0.13	0.15	0.08

Table 3
Stock-Price Performance: Retiring CEOs

This table presents the test for stock-price performance for retiring CEOs in the two-year period surrounding (one year before and one year after) CEO departure. The sample of retiring CEOs is described in Table 1. Retiring CEOs are divided into high- and low-option holding groups based on their option holdings 12 months before their departure. The high- (low-) option holding group consists of CEOs with an option holding above (below) the median. Then, firms are matched, one for one, between the two groups by size and market-to-book ratio. The unmatched sample consists of 192 pairs of observations, the size-matched sample consists of 147 pairs of observations, and the size and market-to-book-matched sample consists of 135 pairs of observations. We measure stock-price performance using industry-adjusted buy-and-hold-abnormal return (BHAR). Industry returns are calculated based on Fama-French 48 industry classification codes. Beginning from 12 months prior to CEO departure, we calculate BHAR for every three months for each group. The performance windows indicate the beginning month and the ending month relative to CEO departure. The difference in BHAR between the two groups and the *t*-statistic are reported. ***, **, and * represent significance levels at 1%, 5%, and 10%, respectively.

Performance window	High-option holding group	Low-option holding group	Difference (high–low)	t-statistic for difference	Pairs of observations
A. BHAR since 12 months before CEO departure: Firms unmatched					
[-12, -9]	2.21	-1.49	3.70	1.58	192
[-12, -6]	3.41	-2.41	5.82**	2.00	192
[-12, -3]	4.77	-3.83**	8.59**	2.18	192
[-12, 0]	11.45**	-5.32**	16.77***	3.00	192
[-12, +3]	8.22	-4.62	12.83*	1.72	192
[-12, +6]	7.10	-4.19	11.29*	1.77	192
[-12, +9]	7.12	-2.90	10.01	1.63	192
[-12, +12]	6.60	-4.10	10.70	1.50	192
B. BHAR since 12 months before CEO departure: Firms matched by size					
[-12, -9]	0.63	-1.41	2.04	0.91	147
[-12, -6]	2.19	-3.02	5.20*	1.78	147
[-12, -3]	2.02	-5.05**	7.08*	1.72	147
[-12, 0]	10.01*	-7.05***	17.05***	2.81	147
[-12, +3]	7.63	-6.70**	14.33	1.60	147
[-12, +6]	3.42	-4.02	7.44	1.24	147
[-12, +9]	5.74	-3.28	9.02	1.43	147
[-12, +12]	6.68	-2.21	8.90	1.24	147
C. BHAR since 12 months before CEO departure: Firms matched by size and book-to-market ratio					
[-12, -9]	0.33	-1.05	1.38	0.58	135
[-12, -6]	0.32	-1.80	2.12	0.72	135
[-12, -3]	0.34	-2.90	3.24	0.91	135
[-12, 0]	7.89*	-5.25**	13.14**	2.52	135
[-12, +3]	4.00	-4.92	8.92	1.60	135
[-12, +6]	5.71	-4.36	10.07*	1.77	135
[-12, +9]	5.22	-2.07	7.29	1.16	135
[-12, +12]	3.24	-3.84	7.08	0.99	135

Table 4
Stock-Price Performance: All CEOs

This table presents the test for stock-price performance for all retiring and non-retiring CEOs in the two-year period surrounding (one year before and one year after) CEO departure. The sample is described in Table 1. CEOs are divided into high- and low-option holding groups based on their option holdings 12 months before their departure. The high- (low-) option holding group consists of CEOs with an option holding above (below) the median. Then, firms are matched, one for one, between the two groups by size and market-to-book ratio. The unmatched sample consists of 622 pairs of observations, the size-matched sample consists of 464 pairs of observations, and the size- and market-to-book-matched sample consists of 431 pairs of observations. We measure stock-price performance using industry-adjusted buy-and-hold abnormal return (BHAR). Industry returns are calculated based on Fama-French 48 industry classification codes. Beginning from 12 months prior to CEO departure, we calculate BHAR for every three months for each group. The performance windows indicate the beginning month and the ending month relative to CEO departure. The difference in BHAR between the two groups and the t-statistic are reported. ***, **, and * represent significance levels at 1%, 5%, and 10%, respectively.

Performance window	High-option holding group	Low-option holding group	Difference (high – low)	t-statistic for difference	Pairs of observations
A. BHAR since 12 months before CEO departure: Firms unmatched					
[-12, -9]	-1.03	-1.50*	0.47	0.36	622
[-12, -6]	-2.62*	-2.87***	0.25	0.14	622
[-12, -3]	-4.20**	-4.84***	0.64	0.26	622
[-12, 0]	-7.61***	-6.70***	-0.91	-0.30	622
[-12, +3]	-8.97***	-8.39***	-0.58	-0.15	622
[-12, +6]	-9.34***	-6.92***	-2.42	-0.64	622
[-12, +9]	-7.81**	-5.57**	-2.24	-0.51	622
[-12, +12]	-9.85***	-5.66**	-4.19	-0.95	622
B. BHAR since 12 months before CEO departure: Firms matched by size					
[-12, -9]	-0.44	-0.87	0.43	0.28	464
[-12, -6]	-1.70	-2.38*	0.68	0.31	464
[-12, -3]	-4.95**	-3.85**	-1.09	-0.40	464
[-12, 0]	-7.94***	-6.18***	-1.77	-0.55	464
[-12, +3]	-10.23***	-6.50**	-3.73	-0.97	464
[-12, +6]	-7.15***	-4.77*	-2.38	-0.53	464
[-12, +9]	-4.42	-2.31	-2.10	-0.39	464
[-12, +12]	-6.42	-2.09	-4.33	-0.82	464
C. BHAR since 12 months before CEO departure: Firms matched by size and book-to-market ratio					
[-12, -9]	-0.86	-0.64	-0.22	-0.14	431
[-12, -6]	-1.84	-2.68**	0.84	0.39	431
[-12, -3]	-3.81*	-4.53***	0.72	0.26	431
[-12, 0]	-7.26***	-7.45***	0.18	0.05	431
[-12, +3]	-10.00***	-9.72***	-0.28	-0.07	431
[-12, +6]	-9.32***	-7.69***	-1.63	-0.38	431
[-12, +9]	-7.16**	-5.64**	-1.53	-0.33	431
[-12, +12]	-8.23**	-5.55**	-2.67	-0.51	431

Table 5
Accruals and R&D Expenditure Surrounding CEO Retirement

This table presents the test for annual accruals and R&D expenditure for firms with a retiring CEO in the three-year period from one fiscal year before ($t = -1$) to one fiscal year after ($t = 1$) CEO turnover, with Panel A for total accruals, Panel B for discretionary accruals, and Panel C for R&D expenditure. The sample of retiring CEOs is described in Table 1. CEOs are divided into high- and low-option holding groups based on their option holdings 12 months before their departure. The high- (low-) option holding group consists of CEOs with an option holding above (below) the median. Then, firms are matched, one for one, between the two groups by size and market-to-book ratio. The unmatched sample consists of 192 pairs of observations, the size-matched sample consists of 147 pairs of observations, and the size- and market-to-book-matched sample consists of 135 pairs of observations. Total accruals are calculated as income before extraordinary items minus operating cash flows scaled by year-beginning total assets. Discretionary accruals are obtained as the residual from regression model (2). R&D expenditure is annual R&D expenses scaled by total sales. t-statistics for the difference between the high- and low-option holding groups are reported. ***, **, and * represent significance levels at 1%, 5%, and 10%, respectively.

	High-option holding group	Low-option holding group	Difference (high − low)	t-statistic for difference	Pairs of observations
A. Total accruals					
Unmatched:					
Year -1	-0.051	-0.043	-0.008	-1.14	178
Year 0 (CEO departure)	-0.063	-0.054	-0.009	-1.20	178
Year 1	-0.068	-0.058	-0.010	-1.42	177
Matched by size:					
Year -1	-0.049	-0.043	-0.005	-0.69	137
Year 0 (CEO departure)	-0.061	-0.054	-0.007	-0.88	137
Year 1	-0.060	-0.059	-0.001	-0.08	136
Matched by size and book-to-market ratio:					
Year -1	-0.043	-0.040	-0.003	-0.37	122
Year 0 (CEO departure)	-0.056	-0.054	-0.001	-0.14	122
Year 1	-0.064	-0.057	-0.008	-0.84	122
B. Discretionary accruals					
Unmatched:					
Year -1	0.012	0.010	0.001	0.11	175
Year 0 (CEO departure)	-0.013	-0.007	-0.006	-0.50	173
Year 1	-0.009	-0.011	0.001	0.08	172
Matched by size:					
Year -1	0.011	0.015	-0.005	-0.32	136
Year 0 (CEO departure)	-0.018	-0.003	-0.015	-1.13	134
Year 1	-0.002	-0.007	0.005	0.26	134
Matched by size and book-to-market ratio:					
Year -1	0.002	0.007	-0.005	-0.41	121
Year 0 (CEO departure)	-0.002	-0.003	0.001	0.10	118
Year 1	0.002	-0.001	0.003	0.16	120

C. R&D expenses

Unmatched:

Year -1	0.021	0.016	0.004	0.95	193
Year 0 (CEO departure)	0.020	0.016	0.004	0.95	193
Year 1	0.021	0.019	0.002	0.44	193

Matched by size:

Year -1	0.021	0.015	0.006	1.16	148
Year 0 (CEO departure)	0.019	0.014	0.006	1.18	148
Year 1	0.021	0.017	0.004	0.64	148

Matched by size and book-to-market ratio:

Year -1	0.017	0.018	-0.001	-0.16	134
Year 0 (CEO departure)	0.015	0.017	-0.002	-0.41	134
Year 1	0.015	0.019	-0.004	-0.67	134

Table 6
SEOs and Repurchases Surrounding CEO Retirement: Summary Statistics

This table presents the number of seasoned equity offerings (SEOs) and share repurchase events surrounding the departure of retiring CEOs. The sample of retiring CEOs is described in Table 1. CEOs are divided into high- and low-option holding groups based on their option holdings 12 months before their departure. The high- (low-) option holding group consists of CEOs with an option holding above (below) the median. Their firms are matched, one for one, between the two groups by size and market-to-book ratio. The unmatched sample consists of 193 pairs of observations, the size-matched sample consists of 147 pairs of observations, and the size- and market-to-book-matched sample consists of 135 pairs of observations. The information on SEO and repurchase events is obtained from the Securities Data Company (SDC) database.

	Unmatched			Matched by size			Matched by size and book-to-market ratio		
	High option	Low option	Pairs of observation	High option	Low option	Pairs of observation	High option	Low option	Pairs of observation
SEOs:									
Months -24 to -12	8	11	192	8	11	147	5	10	135
Months -12 to 0 (CEO departure)	7	6	192	7	6	147	6	5	135
Months 0 to 12	12	2	192	12	2	147	9	2	135
Months 12 to 24	8	3	192	8	3	147	7	1	135
Repurchases:									
Months -24 to -12	27	21	192	27	21	147	24	19	135
Months -12 to 0 (CEO departure)	23	30	192	23	30	147	22	26	135
Months 0 to 12	23	25	192	23	25	147	22	21	135
Months 12 to 24	24	25	192	24	25	147	22	22	135

Table 7
Regressions for SEOs Surrounding CEO Retirement

This table presents the regressions for seasoned equity offerings (SEOs) in the years surrounding CEO retirement. The sample of retiring CEOs is described in Table 1. CEOs are divided into high- and low-option holding groups based on their option holdings 12 months before their departure. The high- (low-) option holding group consists of CEOs with an option holding above (below) the median. Their firms are matched, one for one, between the two groups by size or style (i.e., size and market-to-book ratio). The information on SEOs is obtained from the Securities Data Company (SDC) database. The first six columns present probit regressions, where the dependent variable equals one if one or more SEOs are conducted in the specified period before CEO turnover, and zero otherwise. Market capitalization, stock return, and debt ratio are annual data for the year one year before the turnover year. The remaining three columns present OLS regressions for the change in the number of SEOs from the two-year period before CEO turnover to the two-year period after turnover. Market capitalization, stock return, and debt ratio are in difference, calculated as the corresponding change from the pre-turnover period to the post-turnover period. t-statistics are reported in parentheses. ***, **, and * represent significance levels at 1%, 5%, and 10%, respectively.

Independent variables	Probability of SEO during months -24 to -12			Probability of SEO during months -24 to 0			Change in SEOs from months (-24 to 0) to months (0 to 24)		
	(Unmatched)	(Size-matched)	(Style-matched)	(Unmatched)	(Size-matched)	(Style-matched)	(Unmatched)	(Size-matched)	(Style-matched)
High-option holding dummy	-0.319	-0.312	-0.433	-0.171	-0.299	-0.363	0.115**	0.152**	0.150***
	(-1.40)	(-1.26)	(-1.59)	(-0.89)	(-1.37)	(-1.53)	(2.31)	(2.56)	(2.67)
ln (Market capitalization)	0.040	0.045	0.012	0.021	0.030	0.011	0.064	0.062	0.048
	(0.60)	(0.50)	(0.12)	(0.36)	(0.37)	(0.12)	(1.45)	(1.17)	(0.92)
Stock return	0.149	0.195	0.474*	0.255**	0.212	0.638***	0.075	0.033	0.077
	(1.01)	(1.33)	(1.79)	(2.15)	(1.57)	(2.63)	(1.43)	(0.53)	(1.23)
Debt ratio	-0.319	0.885	0.777	1.135*	1.109*	0.652	0.028	-0.060	0.416
	(-1.40)	(1.14)	(0.88)	(1.89)	(1.64)	(0.83)	(0.11)	(-0.20)	(1.26)
Constant	-1.974***	-1.914***	-1.712**	-1.637***	-1.642***	-1.507**	-0.104***	-0.109**	-0.125***
	(-3.43)	(-2.77)	(-2.20)	(-3.34)	(-2.71)	(-2.22)	(-2.87)	(-2.49)	(-2.92)
Scaled or adjusted R-squared	0.014	0.013	0.025	0.021	0.020	0.038	0.016	0.018	0.025
Number of observations	369	280	258	369	280	258	331	249	235

Table 8
Regressions for Repurchases Surrounding CEO Retirement

This table presents the regressions for repurchases in the years surrounding CEO retirement. The sample of retiring CEOs is described in Table 1. CEOs are divided into high- and low-option holding groups based on their option holdings 12 months before their departure. The high- (low-) option holding group consists of CEOs with an option holding above (below) the median. Their firms are matched, one for one, between the two groups by size or style (i.e., size and market-to-book ratio). The information on stock repurchases is obtained from the Securities Data Company (SDC) database. The first six columns present probit regressions, where the dependent variable equals one if one or more repurchases are conducted in the specified period before CEO turnover, and zero otherwise. Market capitalization, stock return, and debt ratio are annual data for the year one year before the turnover year. The remaining three columns present OLS regressions for the change in the number of repurchases from the two-year period before CEO turnover to the two-year period after turnover. Market capitalization, stock return, and debt ratio are in difference, calculated as the corresponding change from the pre-turnover period to the post-turnover period. t-statistics are reported in parentheses. ***, **, and * represent significance levels at 1%, 5%, and 10%, respectively.

| Independent variables	Probability of repurchase during months -24 to -12			Probability of repurchase during months -24 to 0			Change in repurchases from months (-24 to 0) to months (0 to 24)		
	(Unmatched)	(Size-matched)	(Style-matched)	(Unmatched)	(Size-matched)	(Style-matched)	(Unmatched)	(Size-matched)	(Style-matched)
High-option dummy	0.284*	0.286	0.198	0.196	0.148	0.122	0.007	-0.026	0.020
	(1.65)	(1.47)	(0.98)	(1.32)	(0.89)	(0.70)	(0.08)	(-0.27)	(0.21)
ln (Market capitalization)	0.088*	0.138**	0.090	0.062	0.121**	0.093	-0.013	0.010	-0.070
	(1.69)	(2.02)	(1.15)	(1.34)	(2.06)	(1.37)	(-0.17)	(0.11)	(-0.80)
Stock return	0.023	0.023	0.432*	-0.037	-0.043	0.330	-0.084	-0.026	0.034
	(0.17)	(0.14)	(1.87)	(-0.30)	(-0.29)	(1.56)	(-0.95)	(-0.25)	(0.33)
Debt ratio	-1.538**	-1.050	-1.345*	-1.919***	-1.430**	-2.653***	-0.652	-0.482	-1.389**
	(-2.43)	(-1.46)	(-1.72)	(-3.61)	(-2.39)	(-3.83)	(-1.49)	(-0.98)	(-2.54)
Constant	-1.561***	-2.054***	-1.668***	-0.769**	-1.285***	-0.913*	0.015	0.015	0.017
	(-3.56)	(-3.84)	(-2.82)	(-2.02)	(-2.84)	(-1.81)	(0.25)	(0.21)	(0.24)
Scaled or adjusted R-squared	0.028	0.028	0.031	0.044	0.039	0.075	0.003	-0.012	0.012
Number of observations	369	280	258	369	280	258	331	281	235
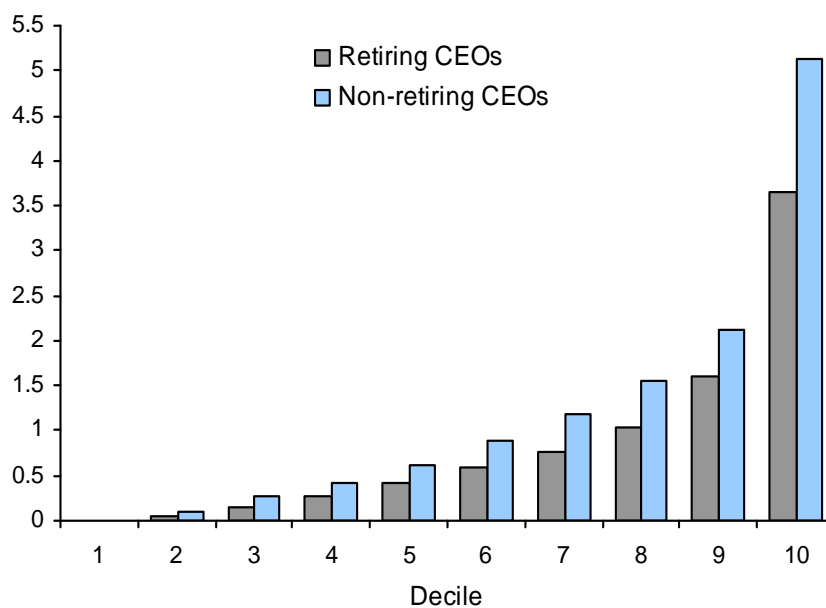
Figure 1. Distribution of CEO Stock Option Holdings

This figure plots the distribution of stock options held by outgoing CEOs one year before their departure, separately for retiring CEOs and non-retiring CEOs. Retiring CEOs are defined as those who leave office at age 64 or above. Our sample is from Standard and Poor's *ExecuComp* for the period 1994-2002, which consists of 402 retiring CEOs and 935 non-retiring CEOs. Option holdings are reported as the percentage of the firm's total shares outstanding.
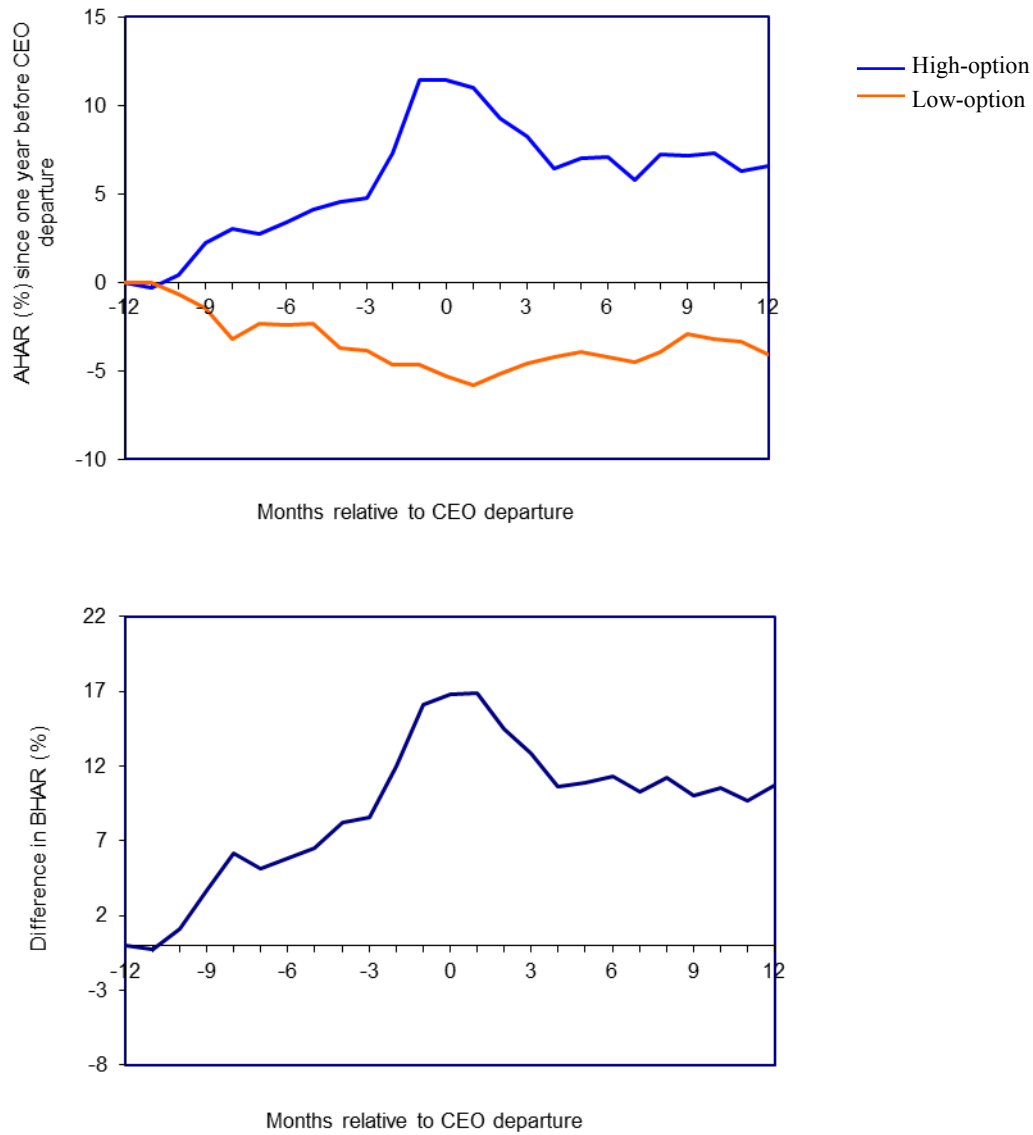
Figure 2. Abnormal Returns Surrounding CEO Retirement: The Unmatched Sample

This figure shows stock-price performance for the unmatched sample of retiring CEOs in the two-year period surrounding (one year before and one year after) CEO departure. Retiring CEOs are those who leave office at age 64 or above. The sample consists of 384 CEOs, who are divided into high- and low-option holding groups based on their option holdings 12 months prior to their departure. The high- (low-) option holding group includes CEOs with option holdings above (below) the median. We measure stock-price performance by industry-adjusted buy-and-hold abnormal return (BHAR) beginning from 12 months before CEO departure. The upper panel shows BHAR for the high- and low-option holding groups, separately, and the lower panel shows the difference in BHAR between the two groups.
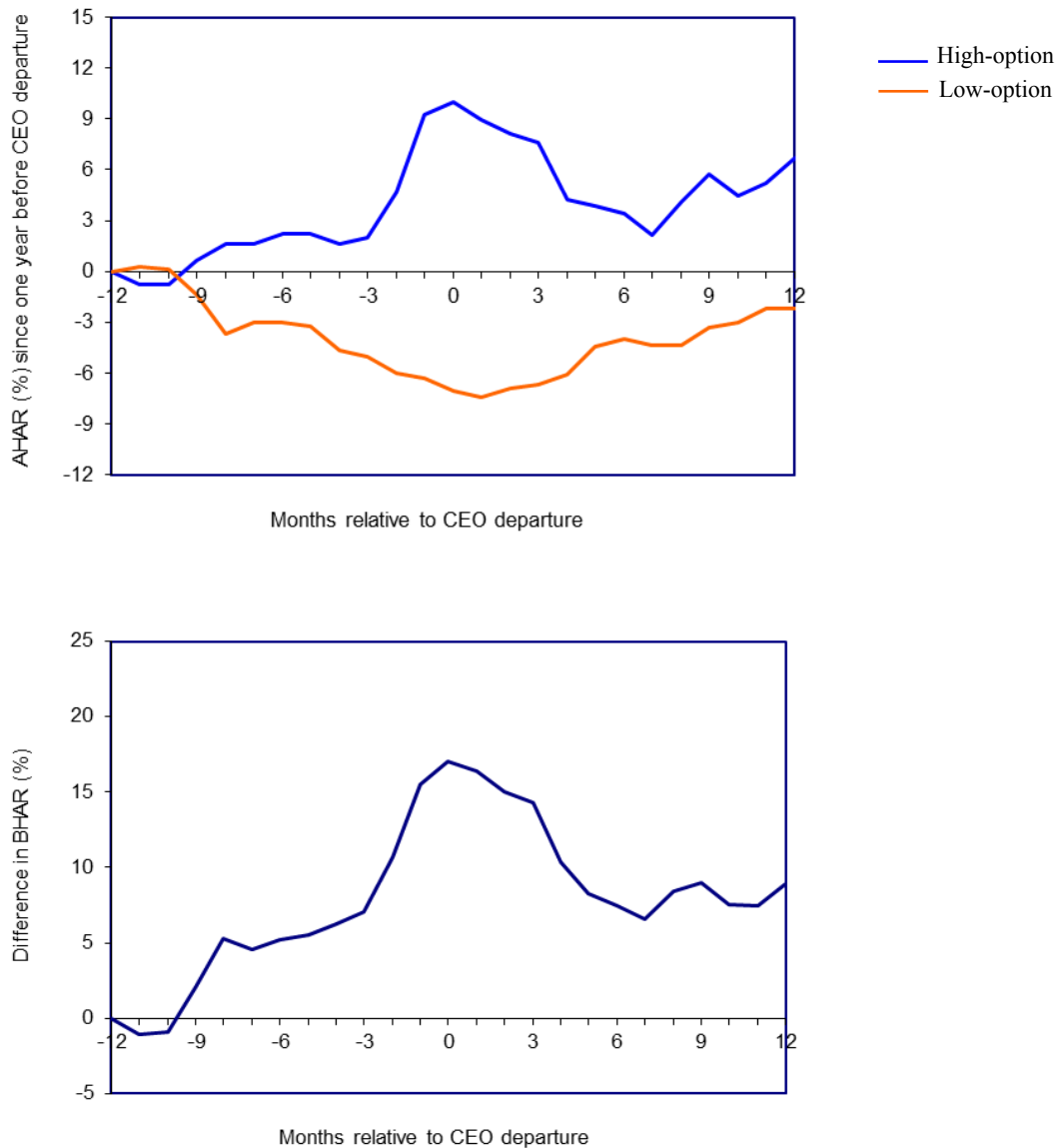
Figure 3. Abnormal Returns Surrounding CEO Retirement: The Size-Matched Sample

This figure shows stock-price performance for the size-matched sample of retiring CEOs in the two-year period surrounding (one year before and one year after) CEO departure. Retiring CEOs are those who leave office at age 64 or above. We divide CEOs into high- and low-option holding groups based on their option holdings 12 months prior to their departure. The high- (low-) option holding group thus consists of CEOs with option holdings above (below) the median. We then match firms between the two groups by market capitalization. The resulting sample consists of 147 pairs of size-matched firms. We measure stock-price performance by industry-adjusted buy-and-hold abnormal return (BHAR) beginning from 12 months before CEO departure. The upper panel shows BHAR for the high- and low-option holding group, separately, and the lower panel shows the difference in BHAR between the two groups.
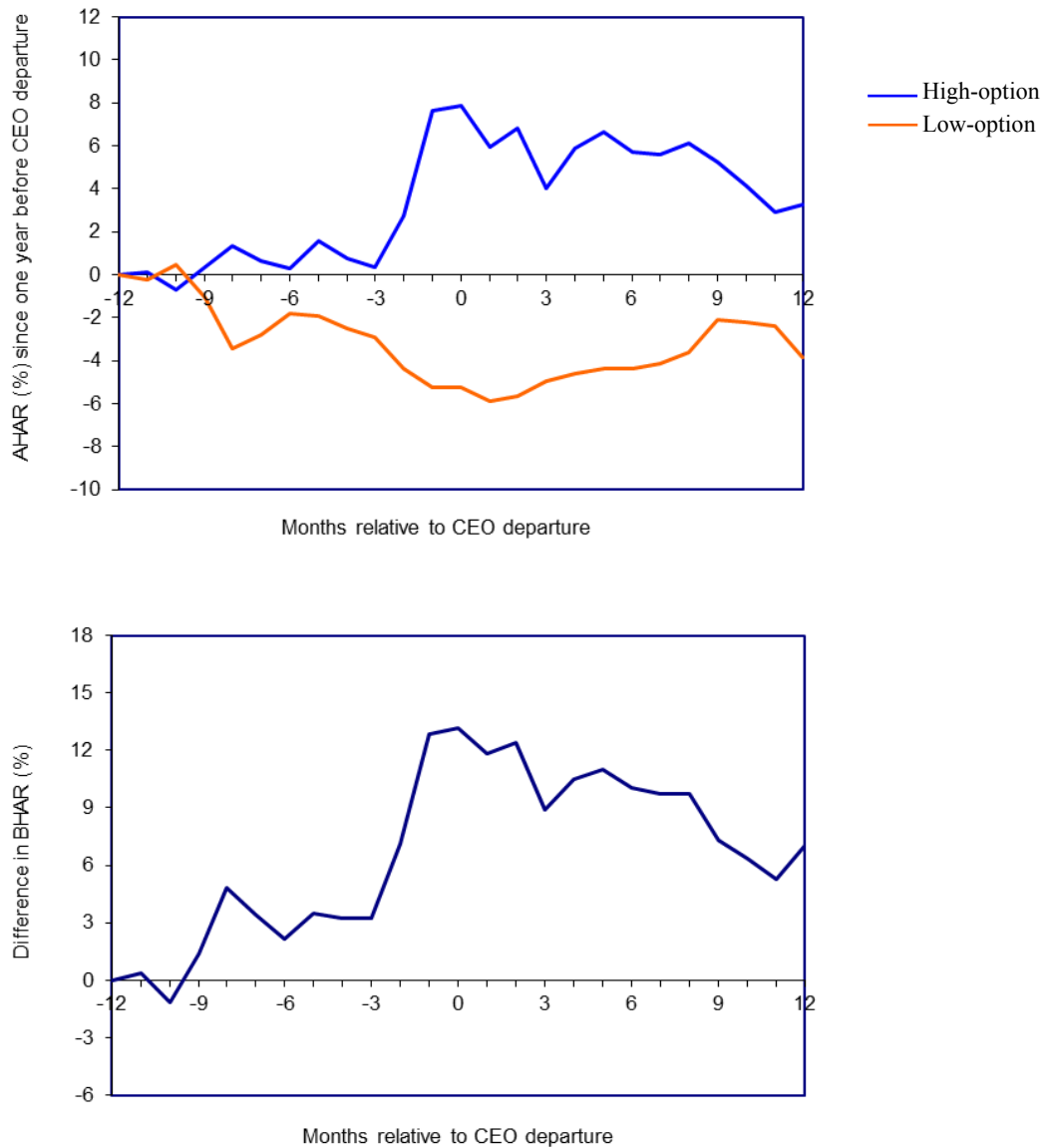
Figure 4. Abnormal Returns Surrounding CEO Retirement: The Size- and Market-to-Book-Matched Sample

This figure shows stock-price performance for the size- and market-to-book-matched sample of retiring CEOs in the two-year period surrounding (one year before and one year after) CEO departure. Retiring CEOs are those who leave office at age 64 or above. We divide CEOs into high- and low-option holding groups based on their option holdings 12 months prior to their departure. The high- (low-) option holding group thus consists of CEOs with option holdings above (below) the median. We then match firms between the two groups by market capitalization and market-to-book ratio. The resulting sample consists of 135 pairs of size- and market-to-book-matched firms. We measure stock-price performance by industry-adjusted buy-and-hold abnormal return (BHAR) beginning from 12 months before CEO departure. The upper panel shows BHAR for the high- and low-option holding groups, separately, and the lower panel shows the difference in BHAR between the two groups.

Case A. Persistent Firm and Managerial Heterogeneity
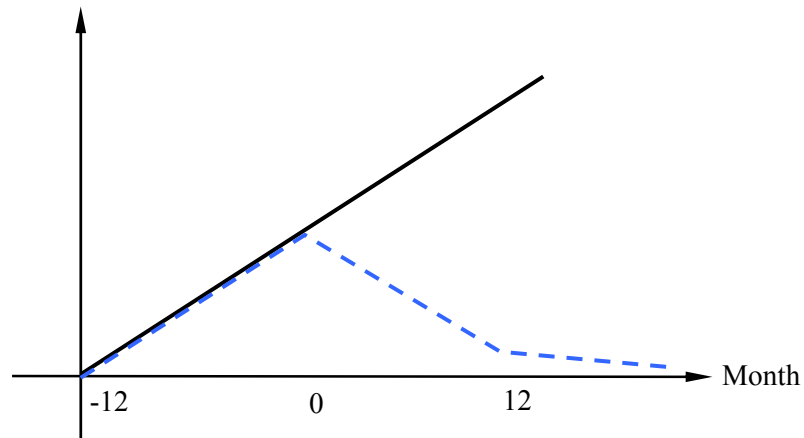
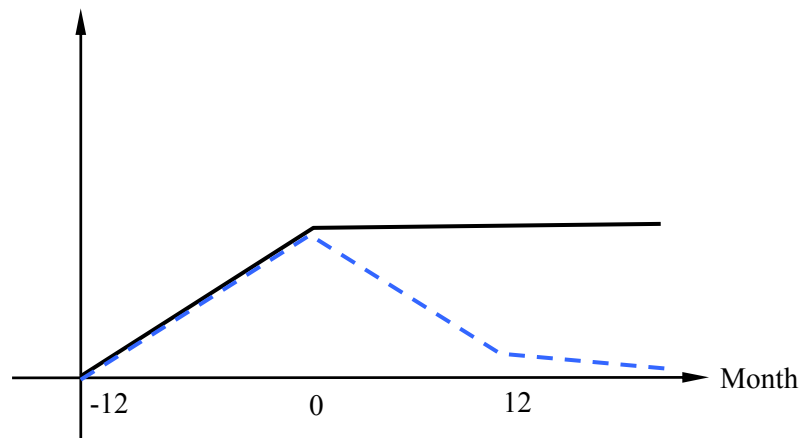Case B. Pre-CEO Turnover Firm and Managerial Heterogeneity

Figure 5. Difference in BHAR in the Presence of Firm and Managerial Heterogeneity

This figure illustrates two patterns of the difference in BHAR between the high- and low-option holding groups in the presence of firm and managerial heterogeneity. The dotted line represents the case of manipulated stock price performance. Case A shows the case in which the performance difference is driven by persistent firm and managerial heterogeneity. Case B shows the case in which the performance difference is driven by pre-CEO turnover firm and managerial heterogeneity that disappears after the CEO is changed.

46