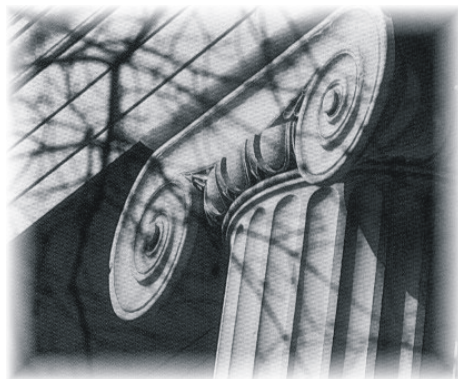


THE UNIVERSITY OF ALABAMA

ECONOMICS, FINANCE AND LEGAL STUDIES

# WORKING PAPER SERIES



**Working Paper No. 09-08-07**

## **Private Information and the Exercise of Executive Stock Options**

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# Private Information and the Exercise of Executive Stock Options

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We examine a large sample of executive stock option exercises over the period 1996-2005 and find strong evidence that executives use private information in exercising their stock options. The most informed executives tend to exercise early, do not exercise in anticipation of dividends, exercise a high percentage of their options, and sell a large proportion of acquired stock. The most costly options to exercise are associated with the most private information, and the least costly are associated with the least private information. We also find that higher ranked executives show greater exploitation of private information than do lower ranked executives.

August, 2009

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**JEL Classification Code:** G11, G14, G32, G39, M52

**Key words:** executive stock options, stock options, option exercises, private information, executive compensation, insider trading, insider information

## **Private Information and the Exercise of Executive Stock Options**

The use of private information by executives in conducting stock transactions has been an important and controversial issue to academics, practitioners, and especially regulators. But stock transactions are not the only manner in which executives can exploit private information. The extensive use of stock options as compensation and incentives provides executives with another means of exploiting private information. This paper examines a large sample of exercises of executive stock options over a ten-year period to determine if these exercises show evidence of the use of private information.

Exercise of an option starts with the purchase of the stock at the exercise price, which can initially be viewed as an insider purchase. If the stock is sold, however, the transaction is clearly an insider sale. Evidence reported elsewhere and confirmed in this study shows that most stock acquired upon exercise is sold. Hence, option exercises are analogous to insider stock sales. Thus, it is reasonable to question whether executives avoid loss of value by exercising their options using private information.

It is well-established by previous research that executive stock options are commonly exercised early. In addition to the use of private information, there are other reasons for early exercise. In the absence of liquidity, exercising an option substitutes for selling the option. Because there are many reasons for selling an option unrelated to private information, a study of the use of private information must separate those exercises that could be motivated by private information from those that would not.

The primary hypothesis of this study is that executives exercise options prior to periods of significant negative abnormal stock performance. We develop several plausible hypotheses and separate exercises that are likely to be based on private information from those that should not. Our tests are conducted on a large data set of insider option exercises reported to the SEC between 1996 and 2005. For some of the tests we use the full sample of all exercises with available stock return data and for others we use a sub-sample of exercises that have the necessary supplemental data available from ExecuComp. We find strong evidence supporting the private information hypothesis. Exercises that should be motivated by private information are associated with post-exercise stock price performance that is significantly lower than that for exercises that should not be associated with private information. In addition, we conduct several tests that examine possible overlooked factors that could influence the results.

The remainder of the paper is organized as follows. Section I discusses the relevant literature. In Section II, we discuss our data, hypothesis development, and methodology. Section III reports the empirical findings. Section IV discusses additional tests, and Section V presents our conclusions.

## I. Previous Research

There is an extensive literature that addresses the costs of owner-manger conflicts. This diverse body of research ranges from the arguably seminal theory of agency costs of Jensen and Meckling (1976) to empirical work such as Yermack's (2006a) estimates of the cost to shareholders when executives use company aircraft for personal reasons. Insider trading, while developed in a separate thread of literature, is nonetheless an important component in understanding how the objectives of management clash with those of the shareholders.

Indeed insider trading is one the most widely-examined topics in finance research. Seyhun (1998) provides an excellent summary of the research on insider trading, which includes Jaffe (1974), Finnerty (1974), Rozeff and Zaman (1988), Lin and Howe (1990), Jeng, Metrick, and Zeckhauser (2003), and Lakonishok and Lee (2001). The findings suggest that inside information has value in earning abnormal returns after transaction costs, with most of the information contained in insider purchases. There is some evidence that the value of inside information is greater in small firms than in large firms and that insider trading is more profitable for top executives than for other insiders. Insider trades are also more informative when they involve a larger number of shares.

Although there is a large body of literature devoted to insider trading in general, there have been few studies of insider trading in the form of executive or employee stock option exercises. To understand this line of research, we must first note that prior to May 1991, insiders were required to hold shares acquired upon exercise for at least six months. After May 1991 insiders could dispose of acquired shares immediately provided that the options had been held for at least six months. Hence, prior to May 1991 insiders would not necessarily exercise their options when they had strong reason to believe that the stock would perform poorly in the short-run. If they were in possession of such information after May 1991, they would likely be far more inclined to exercise, given that they could usually sell the stock right away. Thus, it is in the post-1991 period that we concentrate our focus.

The frequent occurrence of early exercise is well-documented in the literature. The early exercise behavior of executives is studied by Hemmer, Matsunaga, and Shevlin (1996) and Bettis, Bizjak, and Lemmon (2005). Non-executive employees also exercise options early as found in Huddart and Lang (1996).

### *A. Private Information as a Motivating Factor in Early Exercise*

Seyhun (1998) examines insider option exercises in the post-1991 period and finds that the shares underperform the market by 0.8% following exercises. Carpenter and Remmers (2001) examine periods prior to and after May 1991 and find that exercises precede positive abnormal performance prior to May 1991. Following May 1991, however, they find no significant abnormal returns for their broad sample, but do find some evidence that top executives at small firms exploit their private information in exercising

their options. In a study of exercises in the United Kingdom over 1995-1998, Kyriacou, Luintel, and Mase (2008) find some evidence that these options are exercised based on private information. Significant negative abnormal returns occur following exercises in which a relatively high proportion of acquired stock is sold. Core and Guay (2001) and Huddart and Lang (1996) find no evidence to support the notion that lower-level employees exercise based on private information. In a later study, however, Huddart and Lang (2003) do find such evidence. Cicero (2009) examines the interaction of exercising on private information and backdating of exercises and finds that when the shares are sold immediately, there is evidence of the use of private information. When the shares are not disposed of immediately, he finds evidence of both timing and the backdating of the exercise date, though the incidence of backdating was reduced by the Sarbanes-Oxley Act of 2002. Cai (2007) finds similar evidence and concludes that five to twelve percent of exercises involve manipulation of dates or exercise prices. In Section IV we examine the possible effects of backdating in our sample.

Another thread of research has examined the relationship between option exercises by insiders and the flexibility afforded by accounting rules. Bergstresser and Philippon (2006), Bartov and Mohanram (2004), Wei (2004), and Safdar (2004) all find evidence that exercises are commonly associated with earnings manipulation, often in the form of discretionary accruals. Safdar, however, concludes that the degree to which earnings are manipulated appears to be somewhat small.

Clearly there are several explanations other than private information for the early exercise of these options. To identify exercises that could have been motivated by private information, it is necessary that we identify those that are motivated by other reasons. In the following sub-sections, we discuss the various justifications given for the early exercise of executive stock options.

#### *B. Factors Motivating Exercise Unrelated to Private Information*

Because executives are so heavily compensated with stock and options, their portfolios are typically poorly diversified. Lambert, Larcker, and Verrecchia (1991) propose that exercising options, followed by sale of the stock, is a reasonable strategy to achieve greater diversification, and this idea is supported by the empirical work of Hemmer, Matsunaga, and Shevlin (1996). Of course, exercise by itself does not eliminate exposure but Ofek and Yermack (2000) find that managers typically sell nearly all shares of stock acquired through the exercise of their options immediately. They also find that grants are correlated with vesting so if the options are not exercised upon vesting, the executive not only retains the vested options but acquires more options, which makes him even less diversified. Thus, there is a strong incentive to exercise options at the vest date.

Although insiders holding ESOs cannot sell or transfer their options, they could exercise early for liquidity purposes. For example, the executive could be planning to pay tuition or purchase an expensive

automobile or house.<sup>1</sup> But if any of these scenarios apply, we should expect that a small portion of the vested options would be exercised. In other words, exercises motivated by information are likely to involve exercise of the largest number of options, if not all of them. Exercise motivated by liquidity is likely to require only the exercise of a smaller fraction of eligible options.

Cuny and Jorion (1995) note that executive departure typically forces early exercise of options. If the executive leaves the company, whether by choice or by force, she typically has 90 days to exercise her options or else forfeit their entire value. Regardless of the reason for leaving the company, in-the-money options would be exercised early.

Another possible reason for early exercise is to capture dividends that are sufficiently large to justify discarding the option's remaining time value. Although Carpenter and Remmers (2001) find that controlling for exercises that fall between a dividend announcement date and an ex-dividend date leaves their results unchanged, we shall attempt to identify exercises motivated by capture of a dividend in a different manner.

Early exercise could also be attractive because of tax benefits. Goolsbee (2000) shows empirically that the anticipation of a tax increase has apparently led to increased exercise of options. Carpenter and Remmers (2001), and McDonald (2003) demonstrate that there are superior strategies than exercise-and-hold. McDonald notes, however, that exercise in anticipation of a tax increase or moving to a higher tax bracket could be justified. The backdating issues referenced above from the papers by Cicero (2009) and Cai (2007) consider the possibility that exercises without immediate disposition of the stock might be part of a tax-minimization strategy and could induce manipulation of the exercise date. Following Carpenter and Remmers and given the difficulty of identifying how tax-related considerations could motivate an exercise, we defer this question for future research.<sup>2</sup>

Before proceeding with our analysis, we should acknowledge that the use of private information, while largely viewed as detrimental to shareholders, is not without some potential benefits. Laux (2007) argues that early exercise on private information can induce executives to abandon poorly performing projects. In light of this and other possible benefits of the use of private information by executives, we limit our study to an examination of the incidence of exercise using private information but not an attempt to take a policy position on whether the social costs outweigh the benefits.

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<sup>1</sup>See Liu and Yermack (2007) for an exploration into home purchases by CEOs and option exercise. Their evidence leads one to infer that a home purchase could be used to conceal an option exercise based on private information.

<sup>2</sup>A justification for why tax-motivated exercises are not a major concern here and in Carpenter and Remmers is that any potential bias would be of a conservative nature, as it would allow tax-motivated exercises into a sample of exercises that should be motivated by private information and render it more difficult to find evidence of the use of private information. Nonetheless, we do examine the possible effects of backdating later in the paper.

## II. Data, Hypothesis Development, and Methodology

In this section we identify the data set and formally develop testable hypotheses. We also describe the methodology we use to test these hypotheses.

### A. Data

The primary data set used in this study consists of option exercises by corporate insiders that were obtained from the Table II File of the Thomson Financial Insider Filing Data (TFI). TFI defines corporate insiders as those that have “access to non-public, material, insider information” who are required to file SEC forms 3, 4, or 5 when trading in their company stock as required by Section 16(a) of the Securities and Exchange Act of 1934.<sup>3</sup> Prior to the enactment of Sarbanes-Oxley in 2002, insiders were required to report transactions by the tenth day of the calendar month following the month in which the trade occurred. Sarbanes-Oxley reduced the reporting time to two business days following exercise.

We collect insider derivative transactions from TFI, which contains all Table II transactions and holdings information reported on SEC Forms 3, 4, or 5. The information reported consists of derivative transactions such as options, warrants, and convertible securities. The data fields include open market derivative transactions as well as information on the award, such as the type of option received, the number of shares involved, the strike price, the vest date, and the expiration date. After removal of amended transactions, information on 447,089 exercises is obtained. Because we measure stock performance following exercise, we restrict the potential sample to firms that have returns available on CRSP, leaving 411,366 exercises by 59,733 insiders from 7,569 firms. This data set is referred to as the “full sample” and is used to test some of the hypotheses outlined in the next sub-section.

Certain hypotheses require additional information about the exercises and the executives. For these purposes, we construct a subset of the original data set containing all insider trades in the original data set that can be matched with the necessary insider compensation data reported in Standard and Poor’s ExecuComp. These restrictions reduce the total number of exercises to 92,960 and include 9,703 executives from 2,105 firms. We refer to this group as the “merged sample.”

### B. Hypotheses

The general approach of the tests is to examine the behavior of long-term abnormal returns around the exercise date. If the abnormal returns are significantly negative following exercise, there is support for, though not confirmation of, the use of private information. Tests comparing the differences in abnormal returns between two groups are then used to examine the case for whether the negative

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<sup>3</sup>Form 3 is called “Initial Statement of Beneficial Ownership of Securities.” Form 4 is called “Statement of Changes in Beneficial Ownership,” which covers purchases, sales, option grants, option exercises, gifts, and any other transaction that changes an insider’s ownership position. Form 5 is called “Annual Statement of Changes in Beneficial Ownership of Securities” and contains information regarding activity for exempt transactions, which includes small transactions and small transfers within the company that are not required in Form 4.

abnormal returns reflect the use of private information. In the next sub-section we describe our methodology for measuring abnormal returns. At this juncture, let us assume that abnormal returns can be measured.

A straightforward test of whether executives effectively time option exercises can be conducted by measuring abnormal returns following exercise. To conduct a test on the entire sample, however, reveals only whether the sample is dominated by information-motivated exercises or by non-information motivated exercises. We will examine the overall characteristics of the sample with respect to abnormal returns, but the formal hypotheses will be developed by stratifying the sample into groups that should be motivated by private information, or by different degrees of private information, and those that should not.

There is no reason to believe that private information is associated with exercises at expiration. Thus, we should expect exercises that occur at expiration are conducted merely to capture the value of expiring in-the-money options, while exercises that occur prior to expiration are motivated by private information. Hypothesis 1 addresses this point as follows:

*H1: Options exercised early are based on private information and therefore exhibit significant negative abnormal returns while options exercised at expiration are not based on private information and therefore exhibit no significant abnormal returns.*

To test Hypothesis 1 we first define an exercise at expiration as any exercise that occurs within 30 days of the expiration date. H1 is supported if early exercises are followed by abnormal returns that are negative and significantly lower than the abnormal returns that follow exercises at expiration.

Executives typically hold investment portfolios that are sub-optimally diversified, with the company's stock constituting an abnormal proportion of the executive's overall wealth. Risk-averse executives could rationally choose to exercise their options to rebalance their portfolios. Since executive stock options cannot be exercised prior to vesting, one might expect some rebalancing activity to occur on the vest date. Insiders that hold private negative information would still choose to exercise at this time and therefore some negative abnormal returns should be present; however, the private information effect could be dominated by portfolio-rebalancing transactions that contain no private information. Indeed, Fu and Ligon (2009) find that executives with greater diversification needs and riskier underlying stocks are more likely to exercise on the vest date. Thus, our hypothesis is stated as follows:

*H2: Early exercises on the vest date contain less private information and therefore exhibit smaller negative abnormal returns than those exercised after the vest date.*

To test this hypothesis we define an exercise on the vest date as one occurring within 30 days after the vest date. H2 is supported if abnormal returns following exercises not on the vest date are negative and significantly lower than abnormal returns following exercises on the vest date.

The standard and only justification for exercise of a traded call option on an asset is to capture the underlying stock's dividend payment. Executive stock options could also be exercised early to capture a dividend, but these exercises should not contain private information.<sup>4</sup> This hypothesis is therefore:

*H3: Early exercises occurring prior to but close to the ex-dividend date contain less private information and therefore exhibit smaller negative abnormal returns than those exercised just after the ex-dividend date.*

To test this hypothesis we examine the pattern of exercises in relation to the ex-dividend date following a procedure we explain later. We classify exercises into two categories, those not likely to be motivated by dividends and, therefore, could be motivated by private information, and those that are likely to be motivated by dividends. This procedure is a conservative one in that the latter category could include a number of exercises that are motivated by private information. Thus, we bias the test against finding evidence of private information.

The first three hypotheses use the full data set. The remaining hypotheses require additional information about the exercises and executives and are tested using the merged data set. For example, some early exercises are motivated by the fact that the executive leaves the firm. We hypothesize that these exercises are less informative than early exercises in which the executive remains with the firm. This hypothesis is therefore:

*H4: Early exercises motivated by departure of the executive are based on less private information than are early exercises that are not motivated by departure.*

The departure date variable in ExecuComp enables us to identify options that are exercised early because the executive left the company and would otherwise have had to forfeit the options.<sup>5</sup>

Some exercises could be undertaken because the executive needs cash. These liquidity-motivated exercises are likely to be non-informative. It seems likely that information-motivated exercises in contrast to liquidity motivated exercises would involve exercise of a greater percentage of vested options. Stronger private information should be revealed in higher negative abnormal post-exercise returns, leading to the following hypothesis:

*H5: Early exercises in which the number of options exercised relative to the number of vested options not exercised is large contain more private information than exercises in which the number of options exercised relative to the number of vested options not exercised is small.*

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<sup>4</sup>It is possible that the dividends themselves contain information. A decrease (increase) in the dividend could, for example, signal the expectation of poor (good) firm-specific performance. Exercises that appear to be motivated by dividend capture could contain private information, but consistent with our hypothesis, dividend-motivated exercises should contain less private information than exercises not motivated by dividends.

<sup>5</sup>As we will show later, there is another possible explanation of how exercises associated with departure can be motivated by private information.

The ExecuComp data set enables us to obtain a proxy for liquidity using the proportion of options exercised to those vested but not exercised.<sup>6</sup>

We also consider that when options are exercised and the stock is not sold, the executive is unlikely to possess negative information. Therefore, we propose this hypothesis:

*H6: Early exercises in which the executive retains a large proportion of the stock acquired upon exercise contain less private information and therefore exhibit smaller negative abnormal returns than those in which the executive sells a large proportion of stock acquired.*

Following the methodology of Ofek and Yermack (2000), we use the ExecuComp database to approximate the amount of stock acquired upon option exercise that is sold. As noted previously, the majority of shares acquired upon exercise are sold, but we shall divide our sample into two groups based on percentage of stock sold and determine if this measure has discriminatory power.<sup>7</sup>

An important cost in exercising early is the loss of time value of the option. Of course, only in-the-money options are exercised, and options that are barely in-the-money have the most time value to lose. Deep in-the-money options have the least time value to lose. Therefore, options only slightly in-the-money are the most costly and those deep in-the-money are the least costly. By considering this cost, we can make a prediction about which options should have the most private information.

*H7: Early exercises of deep in-the-money options are the least costly to exercise and should be associated with the least private information. Early exercises of slightly in-the-money options are the most costly to exercise and should be associated with the most private information.*

We should note that there may be interactions between the various motivations for exercise that are unrelated to private information. For example, an executive in need of cash but holding an unvested option would surely exercise as soon as it is vested. If the cash is not needed at a specific time, the executive might wait until shortly before the ex-dividend date. These motivations are impossible to disentangle, but they cause no problems because they are consistent with our objective of separating exercises based on private information from those that are not. And if some exercises based on private information are contained in samples of exercises that should not be based on private information, we have merely raised the barrier in detecting the presence of private information.

Each hypothesis is tested by examining abnormal performance following exercise with one-tailed t-tests. A one-tailed test is appropriate because any private information that leads to exercise is likely to

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<sup>6</sup>Interestingly, *The Wall Street Journal* (Tam, 2006) stated almost precisely the point of this hypothesis in an article on the large increase in option exercises in the technology industry, noting that “Tech executives are also cashing in a bigger proportion of their vested options, suggesting many want to take profits while they can.” This statement suggests that exercises are often motivated by a view that recent increases in the stock price are unlikely to continue.

<sup>7</sup>In a later section, we describe similar tests in which we eliminate all exercises in which the shares are not completely sold in an open-market transaction on the day of exercise.

be only negative in nature. Optimistic information should not trigger exercise because exercise would result in loss of time value and the benefits of the information would be captured by the option as well as the stock. . The actual returns are then subtracted from the expected returns to obtain the abnormal returns and appropriate statistical tests are applied to determine if the abnormal returns and cumulative abnormal returns are significant in the expected direction. Exercises of stock options, however, pose a special difficulty that can induce a subtle bias. The parameters required for estimating expected returns are typically estimated over a period prior to the event that is assumed to be a term of normal (vis-a-vis “abnormal”) stock price behavior. But stock option exercises usually occur following a potentially long period of strong positive performance of the stock. Thus, the alphas would be estimated over a period of primarily rising stock prices and would be biased upward, which would bias expected returns upward and would increase the likelihood of finding negative abnormal returns after exercise. Thus, even if there are truly negative abnormal returns afterwards, we could overstate their magnitude. Alternatively, there could be no true abnormal performance afterwards and it appears as negative abnormal performance. Thus, estimation period bias is particularly acute in studies of executive stock option exercises. In addition, this pattern of an event occurring after a period of rising prices can potentially induce a form of pseudo-timing bias, which we discuss later.

To avoid this bias, we follow Barber and Lyon (1997) in adopting an event-time matching-firm portfolio as a benchmark for calculating buy-and-hold abnormal returns for our sample firms. Because there is no parameter estimation, this method eliminates the bias discussed above. Our sample firm is, therefore, benchmarked against a portfolio of comparable firms over the same time period that did not experience exercises.<sup>8</sup>

For each event date, we identify five firms matched according to industry, size, and book-to-market in the following manner.<sup>9</sup> Consider a single exercise event that is a component of a sub-sample. All exercises in that sub-sample have a common characteristic. Let us assume they are all vest date exercises and the firm is called XYZ. We identify the industry of the firm and select all firms in that industry as potential benchmark firms. We first eliminate XYZ from the benchmark set and then eliminate all other firms from the benchmark set that also have a vest date exercise within one year of the

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<sup>8</sup>We also conducted most of our tests using market-adjusted and raw returns. Our results were only slightly different and our conclusions are still supported.

<sup>9</sup>There are technically two choices: the number of firms and the matching variables. Barber and Lyon (1997) make no recommendation on the number of firms. Jegadeesh (2000) uses ten firms. We attempted to use ten firms but were unable to obtain a sufficiently high quality match on size and book-to-market for firms without the corresponding type of exercise, probably due to the fact that executive stock option exercises are such a common event. Choosing a small number of firms makes the benchmark relatively undiversified, which will make it more difficult to find consistent results. To this extent, our results are biased against finding abnormal returns. With respect to the matching variables, we match on the most common criteria of industry, size, and book-to-market, which should be adequate for obtaining a satisfactory match.

event date. We then eliminate all firms with a market capitalization at the end of the previous year that differs by more than 30% from that of XYZ. We then select the five firms in the benchmark set that are closest to XYZ with respect to the book-to-market value ratio at the end of the previous year. We now have a benchmark portfolio for each unique exercise and can compare the returns following exercise of the options to those of a comparable group.<sup>10</sup>

The tests are conducted using daily returns. We observe performance over three post-event periods: 365 days, 182 days, and 90 calendar days. For a given day, the arithmetic mean daily return of these five matching firms is calculated to obtain the matching portfolio return. Performance is then measured by calculating the difference between the buy-and-hold returns of firms that had options exercised and the corresponding buy-and-hold matching portfolio returns in the following manner:

$$BHR_{EX}(T) = \prod_{t=1}^T (1 + R_t) - 1$$

$$BHM_{MP}(T) = \prod_{t=1}^T [1 + (r_{1t} + r_{2t} + r_{3t} + r_{4t} + r_{5t}) / 5] - 1$$

$$BHAR(T) = BHR_{EX}(T) - BHM_{MP}(T)$$

where the subscript *EX* refers to the firm with the option exercise and *MP* refers to the matching portfolio,  $t = 1$  is the first day following exercise,  $T$  is the selected day (365, 182, or 90) after exercise or the delisting day, whichever comes first,  $R_t$  = return on day  $t$  of the firm with the exercised option, and  $r_{it}$  = return of matching firm  $i$  on day  $t$ .

Many exercises in our sample overlap in event time, so we are unable to assume that the events are independent. To address this concern, we assess significance using a calendar-time portfolio approach as described in Jaffe (1974) and which has been widely used in similar studies (e.g., Carpenter and Remmers (2001), Kyriacou, Luintel, and Mase (2008), and Mandelker (1974)). Exercises are placed into portfolios according to event date. A portfolio standard deviation is estimated from the time series of BHARs in the estimation period and used to standardize the portfolio return. A cross-sectional t-test is then performed on the standardized buy-and-hold abnormal returns.

The following tests are primarily univariate tests. Hence, there could be overlaps and interactions between certain groups. We address this concern later in the paper with a set of multivariate regressions of the buy-and-hold abnormal returns following exercises on certain variables.

### III. Results

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<sup>10</sup>The use of industry as a matching factor is fairly standard but comes at the expense of preventing us from examining whether executives exercise based on information about the industry. We regard this broader interpretation of private information as an interesting question for future research that will require careful attention to this empirical design issue.

This section is divided into seven sub-sections, according to the hypotheses presented above. Table I reports summary statistics for the full and merged samples and the various stratifications described above. These statistics are frequently referenced throughout this section.

We impose one other constraint on the sample. In many cases, there are multiple exercises of the same or different executives of the same firm in a single day. To avoid double counting these exercises we eliminate multiple exercises on the same day by an executive of the same firm.<sup>11</sup> Because each exercise event does not necessarily have the same relationship to the exercise or vest date, however, we make these eliminations separately on each sub-sample. For example, assume there are five exercises for various executives for a firm in a day. Suppose in constructing our overall sample, we select the first exercise and delete the other four. It is possible that the deleted exercises could be liquidity-motivated or departure-motivated. If we deleted them, we would lose these observations from subsequent tests in which they would be most needed. Hence, we construct each sub-sample separately and then choose only the first exercise per company per day.

As noted previously, we do not formally develop hypotheses for the full or merged samples. These samples are not stratified, and therefore do not reveal whether abnormal returns following exercises that should be motivated by private information are different from those following exercises that should not be motivated by private information. We do, however, examine the overall and merged samples. Figures 1 and 2 illustrate the mean buy-and-hold abnormal returns (BHARs) from day -365 to day +365 and Table II shows the statistical results, including calendar time t-tests. As expected, the stock exhibits strong firm-specific performance prior to exercise. For the full sample the results are significantly negative for 182 and 365 days following exercise, suggesting that private information could be a dominating factor. For the merged sample, however, BHARs are positive and significant for 365, 182, and 90 days after exercise so the results do not appear to be dominated by users of private information. One reason for this finding could be that the merged sample, which requires ExecuComp data, will tend to consist of larger firms. Consistent with Carpenter and Remmers (2001), the use of private information could be more prevalent in smaller firms.

Of course, these full and merged sample results are not stratified and merely indicate that exercises motivated by private information could dominate those not motivated by private information for the full sample, and exercises not motivated by private information could dominate those motivated by private information for the merged sample. The more critical tests are those that examine whether

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<sup>11</sup>This procedure is also used by Cicero (2009). Carpenter and Remmers (2001) likewise recognize this problem with their monthly data and its potential for overstating the significance of the results. They use only the first exercise of an executive of a firm in a month.

exercises that are hypothesized to be motivated by private information are followed by significantly lower abnormal performance than those that are not.

Note in Figures 1 and 2 that we do indeed see the pattern previously noted: prices rise prior to exercise. For the full sample, prices began falling thereafter. For the merged sample, the rate of increase drops off around the exercise date, but the BHAR series continues to increase. Both graphs, however, suggest a pattern of near-perfect timing. This result is likely to be nothing more than *pseudo timing* as discussed by Schultz (2003) in relation to the performance of IPOs. Pseudo timing arises when an event follows and is often triggered by a period of rising stock prices. Of course, IPOs and stock option exercises would have this characteristic. Pseudo timing can mean that abnormal returns will tend to be negative following the event. Hence, the existence of negative abnormal returns is not by itself proof of the use of private information. Pseudo timing, however, is an absolute but not relative concept. Pseudo timing can appear to explain the near perfect timing of a group of common exercises, but it cannot explain the post-exercise differences across groups distinguished by a factor such as early exercise versus maturity exercise, vest date exercise versus not vest date exercise, and so forth. Thus, separation into groups is critical and is the principal basis for the conclusions we draw.<sup>12</sup>

#### A. Results According to Early Exercise versus Exercise at Expiration

In this sub-section we report our tests to determine whether there is any difference in abnormal performance according to whether the options are exercised early or at expiration. Relevant summary statistics are presented in Panel A of Table I. About 93% of usable exercises in the full sample occur prior to expiration, an average of 2.87 years after vesting and 5 years before expiration, which is consistent with previous studies. Statistics for the merged sample are similar to those of the full sample, but the merged sample exercises occur slightly later.

Figure 3 shows the BHARs from day -365 to day +365 for both the early and expiration exercises in the full sample and Panel A of Table III provides statistical details. As expected, the BHARs for maturity exercises do not show much of a pattern prior to exercise. These options would, of course, be in-the-money, but their exercise is principally motivated by the expiration itself. Following exercise, their BHARs rise slightly for a brief period but then fall slowly over a longer period of time. For 90 days, the BHAR is positive but not significant. For 182 and 365 days, the BHARs are negative and significant with  $t$ 's of -1.92 and -2.95. Of course, we know that pseudo timing could explain this apparent use of private information when it is unlikely to exist. For options exercised prior to expiration, the BHARs are sharply

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<sup>12</sup>The pseudo-timing effect could be weaker for certain exercises that are targeted to specific dates, such as expiration, vest date, or ex-dividend, and are less dependent on price run-ups. Nonetheless, exercised options must be in-the-money so some upward price pressure would be expected for most exercises, and this is confirmed in the figures that we will show. There is a substantial price run-up for vest-date and dividend-motivated exercises and a moderate price run-up for expiration date exercises.

lower following exercise with  $t$ 's of -4.01, -2.70, and -1.49 for 365, 182, and 90 days respectively. The differences between the BHARs for all three horizons are significant in the expected direction. Thus, options exercised early have negative BHARs that are significantly lower than those of options exercised at expiration.

Thus, the evidence supports H1, which states that options exercised early appear to be associated with the use of private information. Those exercised at expiration indicate some evidence of private information but are followed by significantly weaker performance than options exercised early.

#### *B. Results According to Vest Date Exercise*

We now partition all early exercises according to whether the exercise occurred on the vest date. As noted earlier, we define a vest date exercise as one in which exercise occurs within 30 days after the vest date.<sup>13</sup> Summary statistics are presented in Panel A of Table I. Of 350,922 early exercises, we find that almost 93% occur after the defined vest date period. Thus, the premise that a substantial amount of exercising occurs on the vest date for diversification purposes does not seem to be supported. Figure 4 shows the BHARs from day -365 to +365 for early exercises on the vest date and those after the vest date. As expected, both series rise sharply prior to exercise and appear to peak around the exercise date. Of course this result is likely to be a sampling phenomenon as previously discussed. But BHARs following vest date exercises are mostly flat, while BHARs following exercises not on the vest date continue to fall for 365 days. Table III, Panel B reports summary statistics. Exercises on the vest date have BHARs that are slightly negative for all three holding periods but not significantly different from zero for any of the three periods. Exercises after the vest date, however, have BHARs that are significantly negative for all three periods. A  $t$ -test for the differences between the BHARs for these groups is significant for 365 and 90 days though not for 182 days ( $t = -1.13$ ).

Thus, evidence from the analysis based on whether the options are exercised on the vest date is consistent with H2. Vest date exercises appear to contain less private information than exercises that occur after the vest date but before expiration. Nonetheless, we will return to this question later before drawing a final conclusion.

#### *C. Results According to Dividend-Motivated Exercise*

As noted previously, standard option theory demonstrates that one reason any call option holder could choose to exercise early is to capture an upcoming dividend payment. Exercises that are motivated by the capture of dividends should not be based on private information. To remove exercises that are likely to be motivated by dividends, we identify the exercises that occur close but prior to the ex-dividend date. We first capture the ex-dividend dates from CRSP and then merge them with our full sample of

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<sup>13</sup>Although these exercises occur after the vest date (no more than 30 days), we refer to them as occurring on the vest date. This terminology is used only for expositional ease.

exercises. Using only early exercises, each exercise event is assigned a date measured in weeks relative to the upcoming dividend, in which a week is defined as five business days. We then examine the number of exercises per week and observe a convex pattern in which the number of exercises begins to decrease following the ex-dividend dates, reaches a floor, and then begins increasing with the number sharply increasing in the last few weeks before the ex-dividend date.

The observed pattern of exercises prior to an ex-dividend date suggests that dividend-motivated early exercise could start occurring much earlier than the day before the ex-dividend date. We define a dividend-motivated exercise as one occurring within 15 business days before the ex-dividend date, which we refer to as weeks -1, -2, and -3. Exercises not motivated by dividends are defined as those occurring in weeks -7, -8, -9, and -10 as well as exercises of options on stocks that do not pay dividends. Exercises occurring -4, -5, and -6 weeks relative to the ex-dividend date could contain both dividend-motivated and non-dividend-motivated exercises. Because these exercises cannot be clearly classified either way, we omit this group from consideration in testing this hypothesis. After removing observations with insufficient data, there are 44,951 dividend-motivated exercises and 263,005 not-dividend motivated exercises. Summary statistics are presented in Table I.

Figure 5 shows the BHARs from day -365 to +365 for dividend-motivated and non-dividend-motivated early exercises. As expected, both sets of BHARs rise prior to exercise and peak at the exercise date, but there are clear distinctions between the two groups following exercise. Table IV reports the statistics. BHARs for exercises not motivated by dividends are negative and significant with  $t$ 's of -4.68, -3.37, and -2.24 for 365, 182, and 90 days. BHARs for exercises motivated by dividends, however, are positive and significant for 365 days at  $t$ 's of 1.65, and 2.18, and negative and not significant for 90 days. Tests for the differences are highly significant in the expected direction with  $t$ 's larger than -6.5 for each period. Thus, H3 is strongly supported.<sup>14</sup>

#### *D. Results According to Executive Departure*

In this sub-section we conduct tests to determine whether options exercised when an executive leaves the firm are based on private information. We define a departure exercise as one that occurs within plus or minus 270 days of the executive departure date. For this test, we require the departure date, so we

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<sup>14</sup>We also considered the possibility that blackout periods, which have been studied by Bettis, Coles, and Lemmon (2000), could interact with dividends. Thus, some apparently dividend-motivated exercises could occur as option holders come out of blackout periods. But if there is any such bias, then exercises motivated by private information will simply be included in the dividend-motivated exercises sample and make it more difficult to find evidence of the use of private information. Thus, any such bias would be conservative and would seem relevant only if we had not found significant differences. In addition, some apparently dividend-motivated exercises could occur prior to periods of poor abnormal performance because the dividend was decreased and provided a negative signal. Because we find no negative abnormal performance in the period following exercises classified as dividend-motivated, it seems likely that any such possibilities are relatively minor and dominated by pure dividend-motivated exercises.

must use the merged sample. This data set contains 82,146 useable early exercises. We find that 5,364 were associated with executive departure.<sup>15</sup> Summary statistics are presented in Panel B of Table I.

Figure 6 shows the BHARs from day -365 to +365 for exercises that are induced by departure and those that are not. It seems intuitive that an executive would consider the decision to leave the company as independent of whether he has vested in-the-money options. If the decision to depart were made, the executive would logically exercise all in-the-money options. Such exercises would not likely be motivated by private information. But the pattern in Figure 6 suggests that executives might well be motivated to leave the firm and exercise their options based on private information. The differences are striking. As expected, BHARs for both groups rise sharply until exercise. Following exercise, BHARs for exercises not motivated by departure continue to rise while those motivated by departure fall sharply. Table V, Panel A reports the statistical details. Exercises not motivated by departure are followed by significant positive BHARs for all three holding periods with *t*'s of 1.98, 3.36, and 2.38, while those motivated by departure are followed by large and significant negative BHARs for all three holding periods with *t*'s of -3.76, -3.29, and -3.22. The differences between the BHARs for these two groups are highly significant for all three holding periods.

Thus, our results are not consistent with H4. Exercises motivated by departure appear to be associated with the use of private information, indeed more so than exercises not motivated by departure. Given this finding, it is worthwhile to investigate further by identifying the reasons for departure. The two reasons identified on ExecuComp for departure are resignation and retirement. Of course, we do not know whether a resignation is a forced resignation, a voluntary resignation, or a voluntary resignation that is de facto forced. Of the 5,364 exercises associated with departure, 824 do not contain a reason on ExecuComp. Of the remaining 4,540 transactions, 2,018 report the reason for departure as resignation, and 2,522 report the reason as retirement. After applying the Carpenter-Remmers criterion of using only the first exercise per company per day, these samples are reduced to 950 and 977 exercises associated with resignations and retirements, respectively.

Figure 7 plots the BHARs for these two groups from day -365 to +365, and Table V, Panel B provides the statistics. While resignations follow a period of stronger positive stock price performance, BHARs for both groups after exercise behave similarly. Consistent with the results for the departure group as a whole, both of these groups show mostly significant negative performance following exercise.

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<sup>15</sup>Executives are likely to begin liquidating their option portfolios well in advance of their actual departure. They also typically have 90 days after departure to exercise before they must forfeit the options. For these reasons we separate exercises within plus or minus 270 days of the reported departure date. For robustness we also separated exercises within plus or minus 90, 180, 300, 330, and 365 days of departure. Results are consistent with those reported.

The differences are not significant for the 365- and 182-day horizons. For the 90-day horizon, however, BHARs for the resignation group are significantly lower than for the retirement group.

Thus, overall we find that H4 is not supported. Departing executives exercising options do appear to be motivated by private information, with a very slight edge to departures motivated by resignation. Several possible explanations exist. The executive could have foreseen poor firm-specific performance and chose to “cash out” and leave. Alternatively, the board could have anticipated difficult times ahead and felt no confidence in the executive’s ability to lead the firm through this period. If that is the case, then the executive’s replacement did no better. A third possible explanation is that the firm performed poorly *because* the executive left. We are unable to distinguish whether there are any differences in the stock’s performance according to whether the exercise follows a retirement or a resignation, as neither group can be clearly distinguished from the other after exercise. These findings suggest a need for further research on why firms appear to perform poorly following the departure of an executive who also exercises options.

We should add that it is common for departing executives to receive large severance packages. Yermack (2006b) estimates that, for CEO’s of Fortune 500 companies in virtually the same period studied here, the average package amounts to \$5.4 million. The avoidance of future losses by exercising options on private information could be viewed as another element of these “golden handshakes.”

#### *E. Results According to Proportion of Vested Options Exercised*

As noted earlier, we are interested in separating exercises that are motivated by private information from those that are motivated by the executive’s need for liquidity. If an executive is in possession of private information that suggests poor upcoming firm-specific performance, the executive would probably exercise a large proportion of exercisable options, if not all of them.

The ExecuComp database contains items that enable us to estimate the proportion of options exercised to those vested that remained unexercised. ExecuComp provides the number of unexercised exercisable options (UEO), which is the number of vested but unexercised options outstanding at fiscal year-end. This figure includes both in- and out-of-the-money options, however, so it overstates the number of options that could be exercised but are not. To address this problem, we estimate the proportion of exercised options to vested unexercised options using the *exercise value* of UEO reported by ExecuComp, which is the exercise value of in-the-money exercisable options. This figure represents the realized value if the executive had exercised all vested options at year-end.<sup>16</sup> Since the exercise value of out-of-the-money options is zero, only the exercise value of in-the-money options is reported. Thus,

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<sup>16</sup>One potential problem is the fact that the options are exercised during the year and must be matched up with figures for holdings at fiscal year-end. Our concern, however, is with relative performance across groups. There does not appear to be any reason why this factor would make one group perform differently from another.

our ratio is the value of options exercised to the exercise value of unexercised vested options at year-end and proxies for the number of options exercised relative to the number of vested options not exercised.<sup>17</sup>

The merged sample of 82,146 early exercises includes 1,472 that do not report UEO and therefore are eliminated. The remaining 80,674 transactions are ranked by the proportion of options exercised relative to those vested but unexercised and placed into two groups. One group contains exercises in which the value of options exercised exceeds the value of vested options not exercised. Thus, the ratio of these exercised to unexercised options is more than 100%. The other group contains the complement, in which the ratio is less than 100%. The groups are almost equally sized with 23,815 in the first group and 23,173 in the second, the small difference occurring because we divide the sample before selecting the first exercise per executive per day and building the benchmark portfolio. Summary statistics for this sample partition are presented in Panel B of Table I. For ease of discussion, we will refer to these two groups as “large exercises” and “small exercises.”

Figure 8 shows the BHARs from day -365 to +365 for both groups, and Table VI, Panel A shows the statistics. As expected, both groups show sharply rising performance prior to expiration and peak at the exercise date. The large exercises group shows falling performance following exercise, while the small exercises group shows performance that continues to rise. For the large exercises group, BHARs are negative for all three periods, but only the 365-day BHAR is significant. For the small exercise group, BHARs are positive and highly significant for each time period. The differences between the groups, however, are highly significant for all periods.<sup>18</sup>

Thus, this evidence is consistent with H5 in that exercises in which the number of options exercised is large relative to those not exercised contain private information. While the negative BHARs are significant for the large exercises group only over the longest holding period, the differences between the large exercises group and the small exercises group are highly significant in the expected direction for all three periods.

#### *F. Results According to the Proportion of Stock Sold*

In this sub-section we conduct tests based on the proportion of stock sold that is acquired upon exercise. Due to data limitations, however, one cannot directly observe whether acquired stock is sold.

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<sup>17</sup>One could make a compelling case that it is indeed the exercise value of the options, not the number of options, that is important. An executive in possession of private information who holds deep in-the-money options would be more inclined to exercise most of those options than if he holds an equivalent number of only slightly in-the-money options, the exercise of which would also discard more time value.

<sup>18</sup>We examined a potential source of mechanical bias that could arise by virtue of the fact that if the stock price falls between the exercise date and year-end, the ratio of exercised to unexercised options would be inflated. Thus, stock price decreases following exercise could set up a condition that drives the ratio upward, thereby defining the group with a high percentage of exercised to unexercised options as the group that had stock price decreases following exercise. We examined for this effect by re-defining the denominator of the ratio based on the average of the high and low prices during the year rather than the year-end price and find that the t-statistics for the differences in buy-hand-hold returns in the two groups remain highly negative and significant for all holding periods.

We can, however, use a procedure similar to that of Ofek and Yermack (2000) to estimate this variable. They propose that if executives retain shares acquired from option exercise and restricted stock grants, then stock ownership should rise one-for-one during years in which executives receive restricted stock or exercise options. Thus, by comparing the change in ownership with the amount of options exercised and restricted stock granted, we obtain a proxy for the stock acquired that was sold.<sup>19</sup>

As noted earlier, the merged sample has a median percentage of stock sold of about 98%, but the distribution is highly skewed with a mean of about 78%. We partition the sample of early exercises into two sub-samples: those that involve the sale of greater than 50% of the stock acquired and those that involve the sale of less than 50% of the stock acquired. Summary statistics are presented in Panel B of Table I. The group selling more than 50% consists of 64,608 exercises and has a mean percentage sold of 92.9% and a median of 99.9%. The group selling less than 50% consists of 13,071 exercises with a mean percentage sold of 13.1% and a median of 0.00%. For ease of exposition we will refer to these two groups as “large stock sales” and “small stock sales.”

Figure 9 shows the BHARs from day -365 to day +365 for the large stock sales and small stock sales groups. As expected, BHARs of both groups peak at the exercise day, but the small stock sales group continues to rise, while the large stock sales group is mostly flat thereafter. Table VI, Panel B reports the statistics. The large stock sales mean BHARs are positive for 365 and 182 days and marginally significant for 182 days but negative and not significant for 90 days. For the small stock sales group, BHARs are positive and highly significant for all three horizons. Because the small stock sales group does indeed hold on to more stock than it sells, it should not be surprising that we find better stock performance somewhat indicative of private information.<sup>20</sup> T-tests for differences between the three groups are highly significant in the expected direction.

These findings are somewhat but not completely supportive of H6. Exercises that involve the sale of a large percentage of acquired stock do not show negative performance after exercise but do appear to be followed by significantly weaker performance than exercises that involve the sale of a small percentage of acquired stock. Exercises that involve the sale of a small percentage of acquired stock are followed by strong positive performance, so they are probably for purposes other than private

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<sup>19</sup>We also examined an alternative method used by Cicero (2009) for estimating the percentage of stock sold. We find that 75% of all stock acquired upon exercise was sold on the same day as exercise. This figure compares closely to Cicero’s figure of 78%. We shall continue to use the Ofek-Yermack method for dividing our sample as this method is more conservative and will simply make it more difficult to identify the use of private information.

<sup>20</sup>Our results are also not surprising in light of the results of Cicero (2009). He finds that 29 (16) percent of executive stock option exercises are not associated with same day disposal of shares before (after) SOX. He interprets this result as evidence of executives exercising and holding acquired shares for more than one year to qualify for long-term capital gains tax treatment. He further shows that disposed exercises are associated with a short-run abnormal return peak around option exercise. For the options that were exercised and held, he finds a trough in short-run returns around exercise, consistent with our large stock sales group. He argues that transactions in which the executive holds on to the shares are probably backdated.

information.<sup>21</sup> Overall, we find that percentage of stock sold is not a strong variable in discriminating exercises based on private information from those not based on private information. This result could be due to the use of the Ofek-Yermack estimator, which is only an approximation of a very difficult variable to measure. But there are other considerations related to this issue, which we will take up in Section IV.

### *G. Moneyness Tests*

We now examine whether exercises of options contain more private information based on the option's moneyness. Recall that for in-the-money options, time value is inversely related to moneyness. Hence, options with low moneyness are more costly to exercise than options with high moneyness and would require more private information to justify exercise. If this premise is supported, options closest to at-the-money should show the strongest negative performance following exercise, while those deepest in-the-money should show the weakest negative or possibly positive performance. After selecting only the first exercise per executive per month, we divide the 145,252 usable early exercises into five moneyness quintiles. Q1 is the group closest to at-the-money, and Q5 is the group deepest in-the-money. Each group contains approximately 29,000 exercises. Mean and median moneyness (stock price to exercise price) figures are 1.41 and 1.42 for Q1, 1.75 and 2.15 for Q2, 2.61 and 3.31 for Q3, 5.83 and 5.64 for Q4, and 238.17 and 15.89 for Q5. Note especially that the Q1 group, which is the closest to at-the-money, is not at all like a group of at-the-money options, because the mean and median moneyness is about 40 percent. Indeed, virtually all exercised options are well in-the-money.

Other descriptive statistics are contained in Table I. Figure 10 shows the BHARs for the five moneyness quintiles. Note the consistency of the results, as no lines intersect. Options that are deepest in-the-money (Q5) naturally exhibit the strongest pre-exercise performance, and pre-exercise performance is monotonically lower with each group that is less in-the-money. Consistent with our priors, the closest to at-the-money group (Q1) shows the poorest performance after exercise and each group with more moneyness shows successively better performance. Q5, the deepest in-the-money, shows strong positive performance after exercise. Table VII provides the statistics. We see that Q1, Q2, and Q3 show significant negative performance following exercise for all holding periods. Q4 shows significant negative performance for the 365-day holding period and negative but insignificant performance for the 182- and 90-day holding periods. Q5, the deepest in-the-money, shows positive and significant performance for all holding periods. A t-test for the difference between BHARs for Q1 and Q5 is highly significant for all three holding periods.

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<sup>21</sup>These results are comparable to results from studies of insider stock purchases and sales in which purchases appear to be informative and sales are not. Sales are probably a mixture of transactions based on private information and other reasons. Purchases are likely to be motivated only by private information. Comparably, our results also show that exercises in which a small percentage of stock is sold are followed by strong positive performance, while exercises in which a large percentage of stock is sold are followed by mostly normal performance.

In conclusion, the moneyness tests support H7 and provide a perspective on the amount of private information used when exercising early. Options only slightly in-the-money are the most costly to exercise, while options deep in-the-money are the least costly. Hence, we should observe considerably poorer firm-specific performance following exercise when the cost of exercising in terms of time value lost is higher. That is indeed what occurs and the results are consistent across moneyness classes.

#### **IV. Further Tests**

In this section we report the results of some additional tests. Although we did not previously present formal hypotheses for these tests, they are suggested by some of the results reported in the previous section and provide diagnostic checks, further scrutiny, and possible explanations for some of the results. These tests are conducted for the 365-day periods.

##### *A. The Impact of SOX*

The Sarbanes-Oxley Act went into effect in August 2002. To determine if the act had any effect on the patterns of early exercise based on private information, we repeat the tests for the period prior to August 2002 and the period after August 2002. We examine the sample of 73,645 early exercises prior to SOX and 75,682 after SOX. The results are largely the same. Significant negative post-exercise performance is observed for both time periods. The 365-day BHAR is -2.44% ( $t = -1.02$ ) before SOX and -2.92% ( $t = -6.87$ ) after SOX. The differences between the BHARs are not significant. Thus, SOX apparently had no effect on exercise based on private information, at least in this univariate test but we will re-examine the effect of SOX in a multivariate framework

As noted earlier, SOX also accelerated the filing deadline. This rule, however, permits a number of exceptions such that late filings are quite possible. We examined late filings in the post-SOX period to determine if executives achieved even greater gains when filing late. In the post-SOX period, we obtain a sample of 6,105 late filings and 70,220 filed on time. The twelve-month BHAR for late filings is -2.99 ( $t = -2.61$ ) and for on-time filings is -2.97 ( $t = -6.98$ ), both of which are significant. The differences, however, are not significant. Thus, late filings do not appear to be more informative.

##### *B. Trends Across Time*

To determine the consistency of these results across time, we repeat our full sample tests for each year over the 1996-2005 period. Naturally the results vary somewhat from year to year. The 365-day BHAR is negative in eight of 10 years and significant in five of those eight years. The 365-day BHAR is positive in two years and significant in one year. The patterns, however, suggest no trend over time.

##### *C. Reloads*

Reload options are those in which the employee exercises the option by tendering stock and upon exercise receives options to replace shares tendered. Because exercise of reload options still leaves the employee holding options, there is the possibility that reload options could be more commonly exercised

without any private information. Indeed Dybvig and Loewenstein (2003) show that an optimal strategy is to exercise a reload option any time it is in-the-money. We isolate the reload options in the merged sample and find only 448, or 1.2%, out the sample of 36,936 are reloads. Both groups show positive returns after exercise and the no-reload group is slightly significant, but the differences are not significant.

#### *D. Executive Rank*

An interesting question is whether the evidence of exploitation of private information is stronger the higher the executive rank. TFI provides four codes that identify the executive's rank.<sup>22</sup> We examine the full sample to determine if there are any differences in the use of private information across these ranks. The number of exercises in each group is 42,388 for Rank 1, 109,301 for Rank 2, 6,715 for Rank 3, and 2,821 for Rank 4. The BHARs are negative and significant for Ranks 1 and 2 with  $t$ 's of -2.31 and -5.55. For Rank 3 the BHAR is positive but not significant, while for Rank 4 the BHAR is negative and not significant. The differences between Ranks 1 and 2 combined versus 3 and 4 combined is significant, confirming that the higher ranked executives do appear to make greater use of private information. Interestingly, however, the best performance is achieved by Rank 2 and not Rank 1, and the difference between Rank 2 and Rank 1 is significant. Given the much greater sample sizes of Rank 1 and 2 executives than Rank 3 and 4 executives, this finding is somewhat more compelling. Thus, Rank 2 executives appear to make greater use of private information. This result could be due to the fact that top level executives are more scrutinized and might be more careful in using private information.

#### *E Implications of Different Sample Sizes*

We also observe another interesting result. For each group comparison that was not constructed by dividing the sample in half or into quintiles, we had notably different sample sizes for the two groups. For every expiration exercise, there are 13 early exercises. For every vest date exercise, there are about 13 exercises not on the vest date. For every dividend-motivated exercise, we have six non dividend-motivated exercises. For every exercise in which less than 50% of stock is sold, we have five exercises in which more than 50% of stock is sold. In each case, we find significantly lower abnormal returns for the larger sample. The only exception was the retired-resigned sample in which the differences were not significant. The combination of lower abnormal returns and considerably larger sample sizes in almost every case suggests that the use of private information may well be extremely common.

#### *F. Backdating*

In recent years, many corporations have been found to have backdated issue and exercise dates of their stock options. Issue dates are not a concern here, but the potential for backdating exercise dates

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<sup>22</sup>Thomson classifies the Chairman, CEO, COO, General Counsel, and President as Rank 1. Ranks 2 through 4 contain numerous classifications, such as CFO and Director. Rank 3 includes Vice President and Controller, and Rank 4 includes Beneficial Owner of more than 10% and Retired. More detailed rank descriptions are available from the authors or Thomson.

could bias these results. For example, if an executive believed the stock price would rise, he might exercise the option, backdate the exercise date, and establish a long-term capital-gain holding period. As previously noted, the general strategy of exercising and holding is sub-optimal, but not if a short-term capital gain can be converted into a long-term capital gain, which can be done through backdating. If backdated options are in our sample, they bias the results against finding evidence of negative private information. That is, our sample of exercises generally followed by negative performance will contain some exercises that are followed by positive performance.<sup>23</sup> Backdating also raises an interesting question in line with our major hypothesis that exercises are often based on private information. A backdated exercise would seem to imply that the executive had private information of a positive nature. Hence, backdating can suggest the use of private information, but a cleaner test would require that potentially backdated exercises be separated from those that are not.

As Cicero (2009) and others have shown, there is considerable evidence to suggest that backdating of exercises is common. Following his approach, we re-examine our sample by eliminating all exercises that are not accompanied by the same day open-market sale of the stock. In doing so, the remaining exercises would be almost impossible to backdate, since the stock sale proves on which day the exercise actually occurred. We find that approximately 20% of the exercises are eliminated using this criterion. Thus, about 80% of our transactions are not contaminated by backdating. Of course, we cannot be certain that all of the other 20% do involve backdating.

We first compare the BHARs for the sample of exercises in which the stock is disposed of on the same day with the sample in which the stock is held, which could contain backdated exercises. We find that those disposed of on the exercise day are followed by significantly negative performance over all three holding periods. Those not disposed of on the exercise day show significant positive performance over the 90-day holding period, positive and insignificant performance over the 182-day holding period, and negative and insignificant performance over the 365-day holding period. Thus, those options in which the stock is held show some tendency, at least over the very short run, to precede strong positive performance, further indication of the use of private, albeit positive, information. Of course, these options might have been backdated but as noted, that does not preclude the use of private information. Notably, the differences in performance of the two groups are highly significant.

For the individual group subsamples, all of the previously reported results are confirmed with one exception, exercises around the vest date. Previously we had found that options exercised not on the vest date had significantly negative returns over all three holding periods, while options exercised on the vest

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<sup>23</sup>Of course, it would make no sense to backdate an exercise that precedes a period of negative performance unless one could somehow backdate to turn negative performance into positive performance. But our point still holds: backdated exercises would simply make it harder to detect negative performance following exercise.

date had returns that were slightly negative but not significant. The differences were significant for 90 and 365 days but not for 182 days. While these results are somewhat consistent with H2, they are, nonetheless, not strong and somewhat inconsistent within themselves in that the short and long holding periods are significant but the intermediate holding period is not.

With the potentially backdated options removed, we find significant negative returns following exercise for options exercised on the vest date as well as for options not exercised on the vest date. Nonetheless, the significance levels are much higher for the exercises not on the vest date, suggesting that there is considerably more noise in the returns following vest date exercises. Indeed the standard errors are about five times as large. Thus, in removing those exercises in which the stock is held, post vest date exercise performance moves from slightly but insignificantly negative to significantly negative. Hence, the removed exercises were for the most part strongly positive. Recall that these exercises were those made around (but obviously slightly after) the vest date and the shares were held by the executives. Since the shares were held, it is not surprising that the stock performed well afterwards. But that leaves a sample of exercises around the vest date in which the stock performed poorly afterwards and in which the stock was immediately sold. That result is also consistent with the use of private information. In other words, executives who exercise on the vest date exercised and disposed of the stock timed it very well. Those that exercised and held also timed it very well. Such a combination is certainly consistent with the use of private information.

Thus, while we find the interesting result that there appears to be little evidence to suggest much exercising on the vest date for diversification purposes, we do find evidence to support our primary question of interest that executives appear to make substantial use of private information.

### *G. Multivariate Tests*

Since many factors can simultaneously influence the decision of an executive to exercise stock options, we attempt to control for these effects in a multivariate framework. We regress the 365-day BHARs on a series of dummy and control variables in the following manner:

$$\begin{aligned}
 BHAR(0,+365) = & b_0 + b_1Informed + b_2Early + b_3NotVest + b_4DivMotiv + b_5Depart \\
 & + b_6Resign + b_7Retire + b_8PropEx + b_9PctSold + b_{10}Moneyiness \\
 & + b_{11}Reload + b_{12}ExecRank + b_{13}PreSOX + b_{14}Backdate + b_{15}LogSize \\
 & + b_{16}BooktoMarket + b_{17}Volatility + b_{18}Momentum + b_{19}PriorFirmPerf \\
 & + b_{20}PriorMktPerf + b_{21}YearDummies + b_{22}IndustryDummies + \varepsilon
 \end{aligned}$$

The first seven variables are dummy variables related to characteristics of the exercises as previously discussed. *Informed* is a composite dummy variable equal to one if the exercise was early, not vest related, not dividend motivated, and the underlying shares were immediately disposed. We use this variable separately in a single regression. In other regressions, we replace this variable with the next nine

informed variables. *Early* equals one if the exercise did not occur within 30 days of expiration. *NotVest* equals one if the exercise did not occur between zero and 30 days after the vest date. *DivMotiv* equals one if the exercise occurred within 15 days prior to an ex-dividend date. *Depart* equals one if the executive left the firm within 270 days of exercise. *Resign* and *Retire* equal one if the reported reason for departure was resignation or retirement respectively. *PropEx* is the proportion of options exercised relative to vested but unexercised options. *PctSold* is the percentage of underlying shares acquired at exercise sold by fiscal year end. *Moneyness* is the stock price divided by the exercise price.

*Reload* is a dummy variable for whether the option is a reload. *ExecRank* is the rank metric as reported in TFI.<sup>24</sup> *PreSOX* is a dummy equal to one if the exercise occurred prior to the Sarbanes-Oxley Act. *Backdate* is a dummy equal to one if the underlying shares were not immediately disposed of in the open market. Obviously this variable does not mean the exercises were backdated but it indicates that backdating was possible.

The remaining variables capture firm and market characteristics. *LogSize* is the log of the firm's market capitalization in the fiscal year end prior to exercise. *BooktoMarket* is the ratio of book value to market value at the fiscal year end prior to exercise. *Volatility* is the standard deviation of the stock computed over the 60 months prior to exercise. *Momentum* is the unadjusted 90-day stock return prior to exercise, and *PriorFirmPerf* is the unadjusted performance of the firm's stock in the one year prior to the beginning of the momentum window. *PriorMktPerf* is the performance of the CRSP equal-weighted index in the one year preceding exercise. *Year* and *Industry* dummies are also included.

The results of three variations of the model are shown in Table VIII. Model (1) explains only 1.9% of the variation but the most informed exercises are highly significant, meaning that those exercises that were early, not vest-related, not dividend-motivated, and which involve immediate disposal of the shares are highly associated with the negative abnormal performance following exercise. In Model (2), we use the option-related as well as firm and market control variables in lieu of *Informed* and obtain an  $R^2$  of 16.6%. Most of the control variables come in strongly significant. For the option-related variables, the most powerful effects are for exercises that are early, exercises that are not motivated by a dividend, those in which the proportion of exercisable options exercised is highest, exercises in which the percentage of shares sold is highest, and exercises in which moneyness is lowest. The firm and market characteristic variable are also highly significant. Interestingly, the departure variables are not significant, meaning that their effects are apparently swamped by the other variables that were not accounted for in the univariate tests. In Model (3) we add the reload, rank, preSOX, and backdate variables and explain approximately 17% of the variation in abnormal returns following exercise. The same variables are significant as in Model (2) but we also find the rank, PreSOX, and backdate variables to be highly positively related. The

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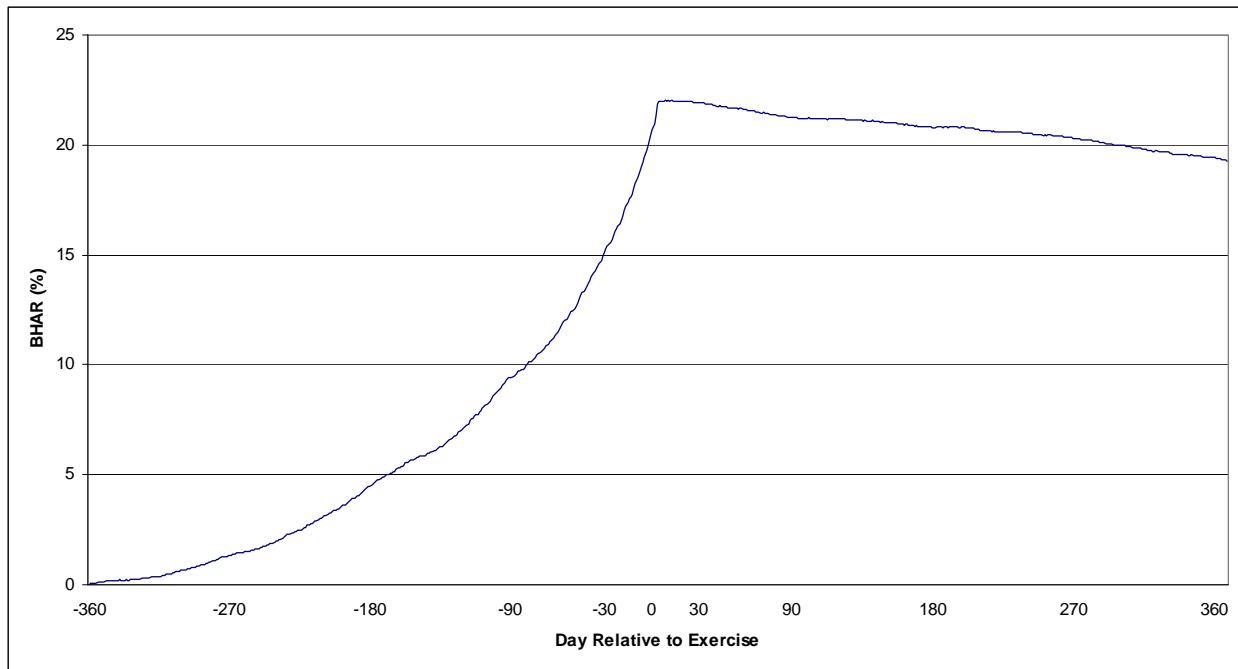
<sup>24</sup>Using rank as a metric, note that a "higher" rank is a lower "ranked" executive.

rank result is consistent with our univariate finding. In the univariate tests we had found a more negative coefficient in the era after SOX, though the difference was not significant. In this multivariate test, the PreSOX variable indicates that the use of private information is more associated with the era after SOX and that result is significant. The backdate variable suggests that potentially backdated exercises are less likely to show negative abnormal performance, which is what we would expect and consistent with our previous findings.

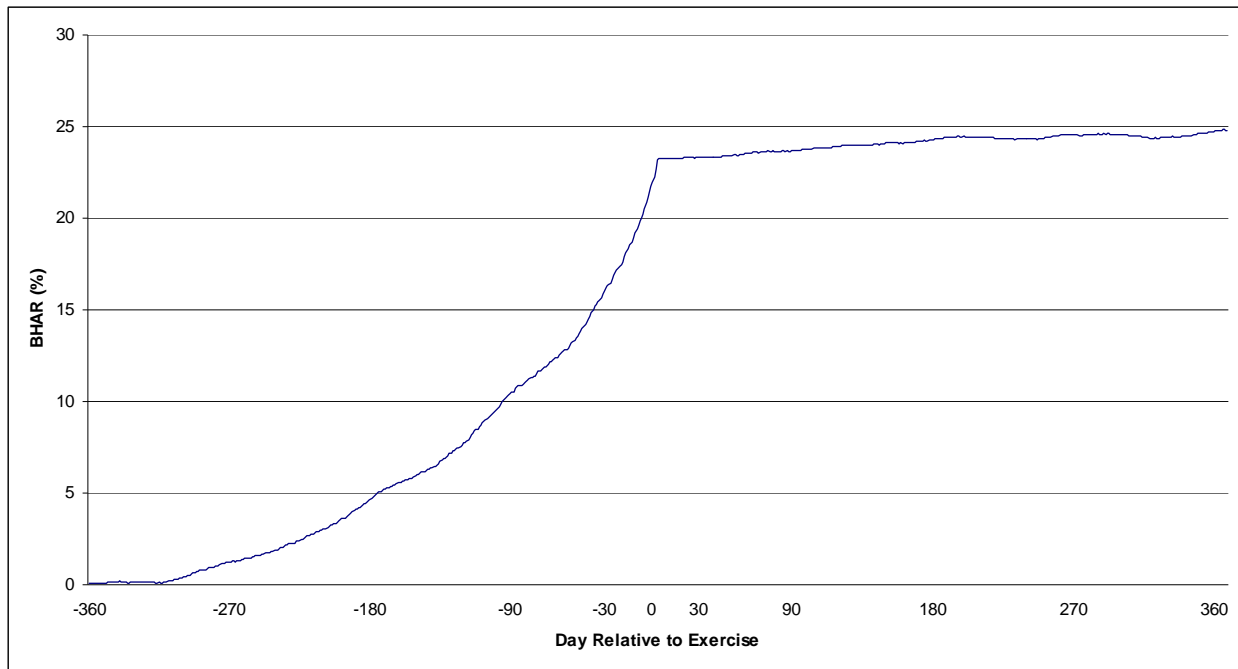
## **V. Conclusions**

In this study we examine whether early exercises of executive stock options that could be motivated by private information are followed by significantly lower buy-and-hold abnormal returns than are those that are motivated for other reasons. Our results confirm that private information appears to be widely used by executives. It would be desirable if one could measure the percentage of exercises that are motivated by private information. We do find that about 93% of all exercises occur early, a similar but slightly higher percentage do not occur on the vest date, and about 64% are not motivated by the capture of dividends, as they occur soon after the ex-dividend dates. Because many of these motivations can interact, however, it is not possible to identify how many exercises are strictly motivated by private information and how many strictly are not. But we do find distinctly lower buy-and-hold abnormal returns following exercise for samples that should be motivated by private information in comparison to samples that should not. In the absence of private information, there appears to be no other logical explanation.

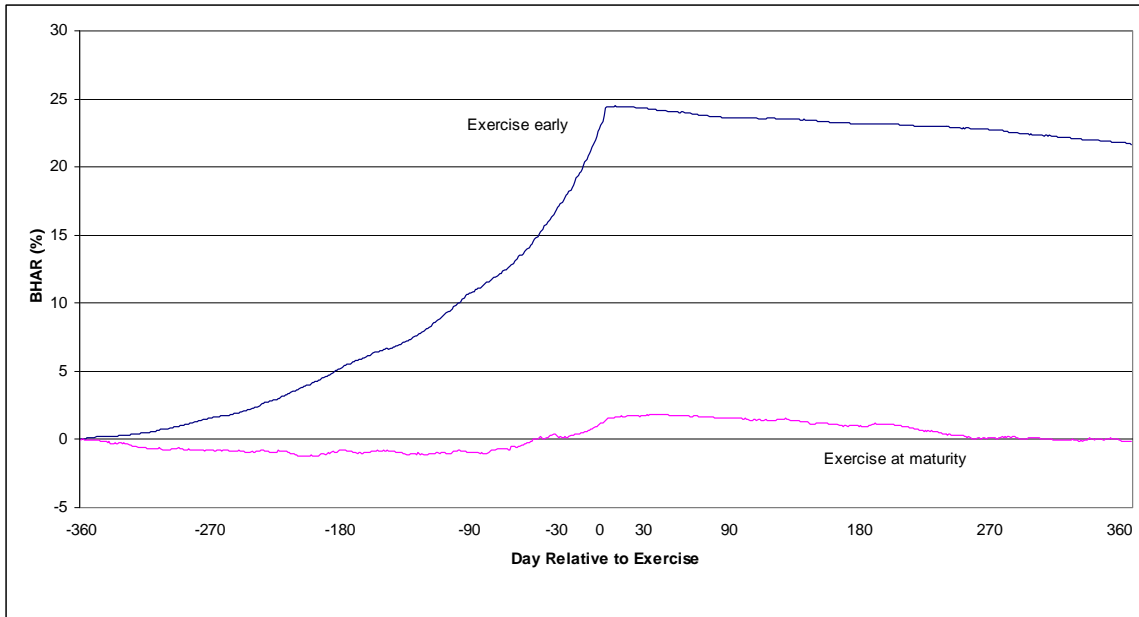
Of course, these findings do not prove that executives are engaged in behavior that would meet the legal definition of insider trading. All executives form opinions about the future performance of the stock and their ability to manage the firm successfully. Illegal inside information is but one of many forms of private and potentially quite accurate information about future company performance. These exercises and the subsequent stock sales are filed with the SEC, so executives and the SEC must generally believe the transactions pass the test of legality. As noted earlier, exercising on inside information might even have some benefits in reducing agency costs. In any case, documenting the use of inside information is an important step toward understanding the costs and benefits.



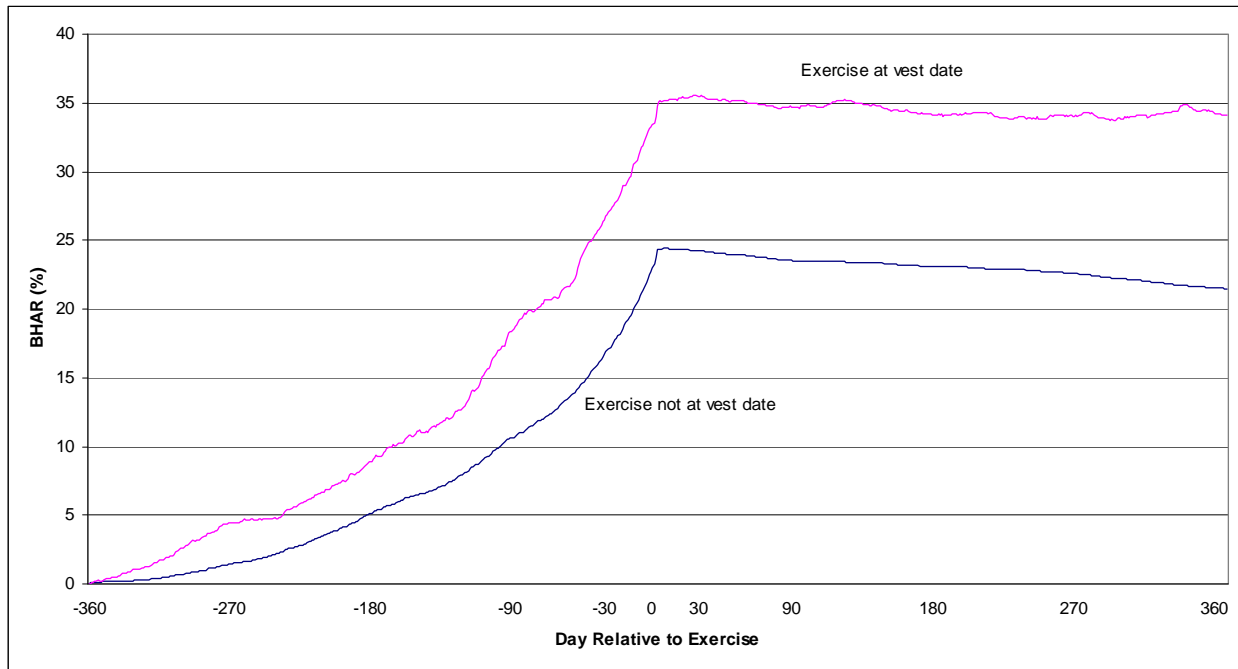
**Figure 1. Buy-and-hold abnormal returns for the full sample around option exercises.** Buy-and-hold abnormal returns for each firm are estimated using a benchmark portfolio constructed by matching on industry, size, book-to-market and with no corresponding exercise event during the relevant time period. The sample of exercises is taken from those reported by corporate insiders to the SEC between 1996 and 2005 and compiled by Thomson Financial Insider filings.



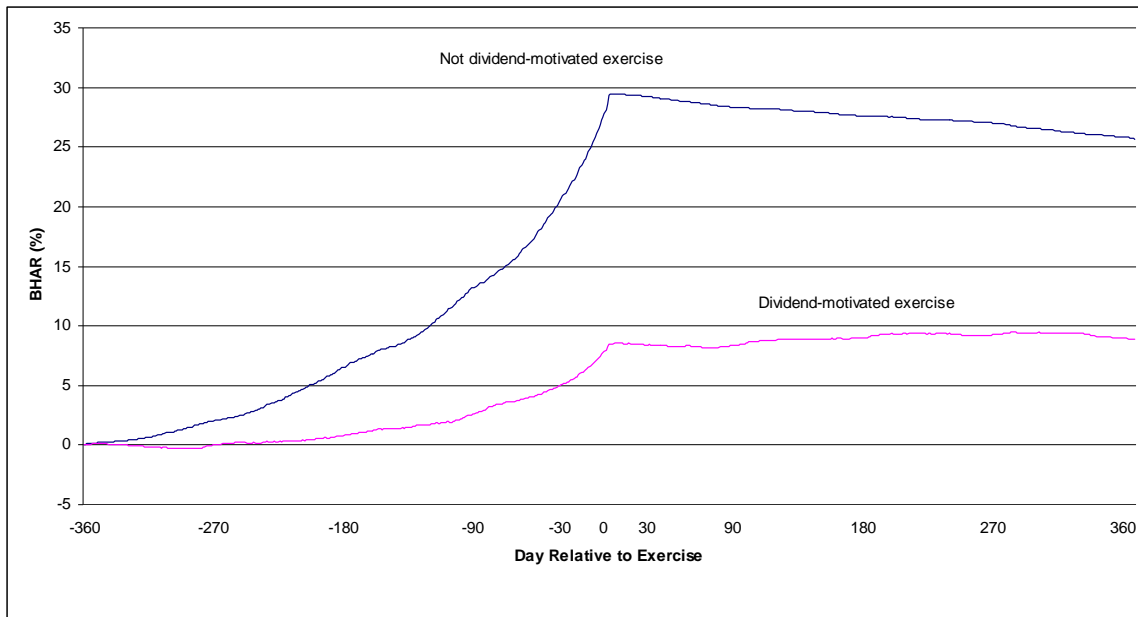
**Figure 2. Buy-and-hold abnormal returns for the merged sample around option exercises.** Buy-and-hold abnormal returns for each firm are estimated using a benchmark portfolio constructed by matching on industry, size, book-to-market and with no corresponding exercise event during the relevant time period. The sample of exercises is taken from those reported by corporate insiders to the SEC between 1996 and 2005 and compiled by Thomson Financial Insider filings. The merged sample is a subset of the full sample in which insider data can be obtained from Standard and Poor's ExecuComp.



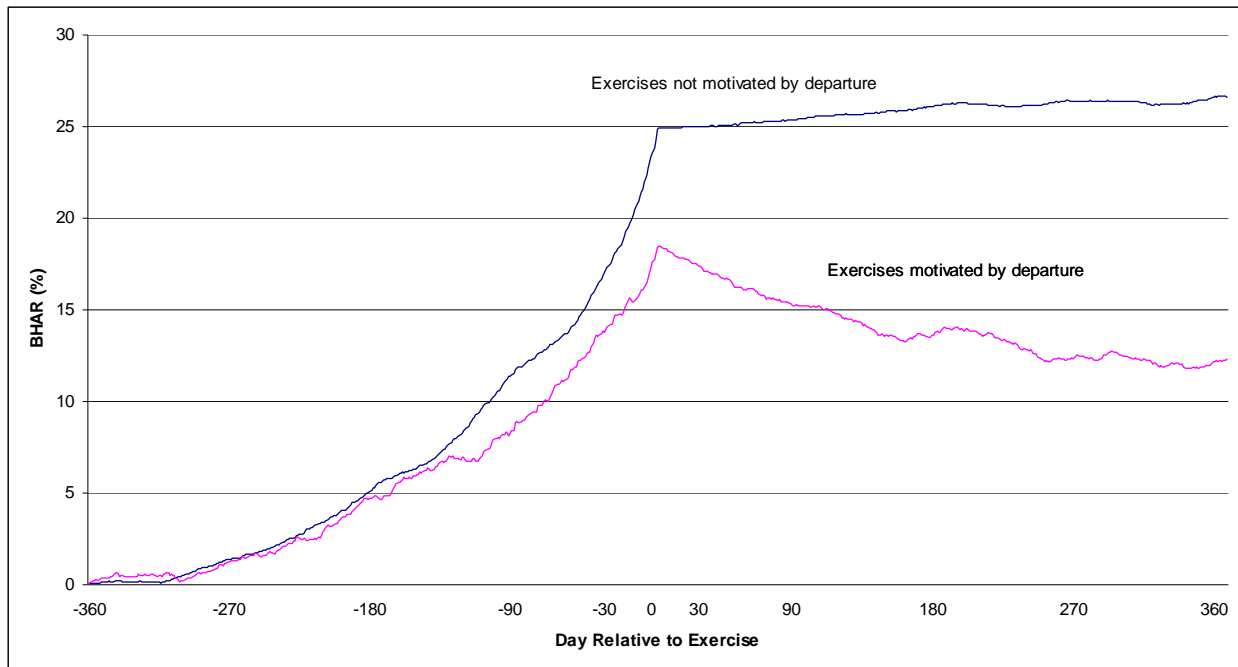
**Figure 3. Buy-and-hold abnormal returns for the full sample of options exercised early and options exercised at expiration.** Buy-and-hold abnormal returns for each firm are estimated using a benchmark portfolio constructed by matching on industry, size, book-to-market and with no corresponding exercise event during the relevant time period. Early exercise is defined as options exercised with more than 30 days remaining to expiration. These results apply to the full sample, which is comprised of all option exercises reported by corporate insiders to the SEC between 1996 and 2005 and compiled by Thomson Financial Insider filings.



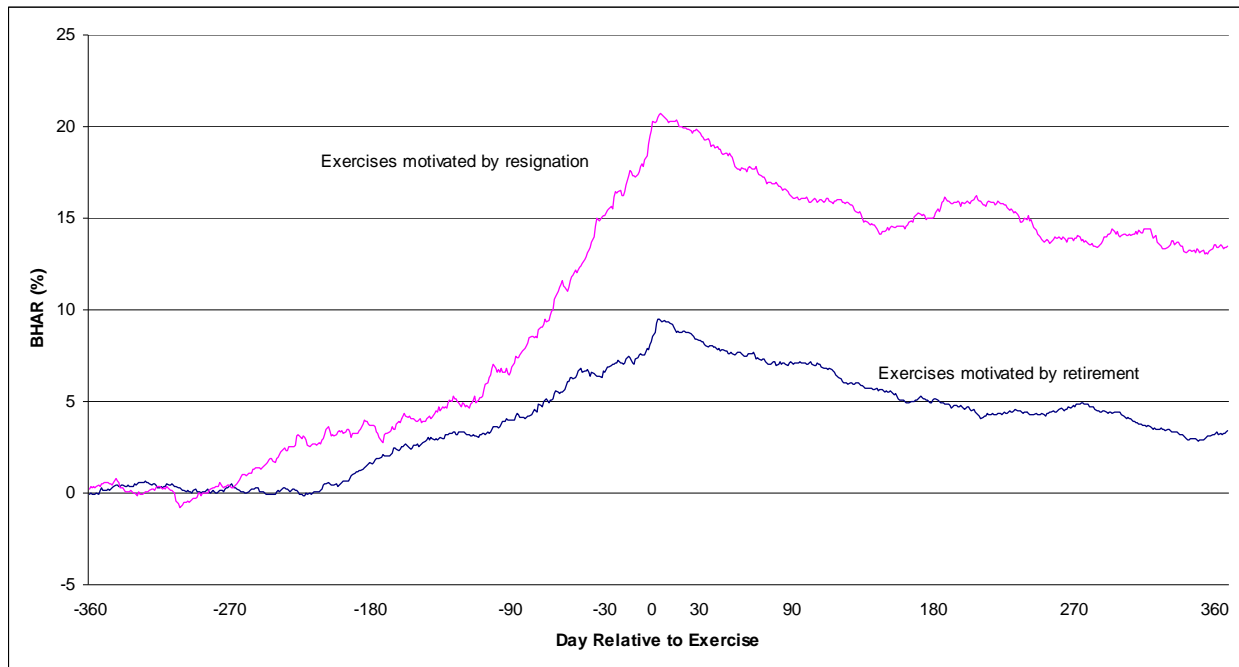
**Figure 4. Buy-and-hold abnormal returns for the full sample of options exercised on the vest date and options exercised after the vest date.** Buy-and-hold abnormal returns for each firm are estimated using a benchmark portfolio constructed by matching on industry, size, book-to-market and with no corresponding exercise event during the relevant time period. Exercises on the vest date are defined as options exercised no more than 30 days after the vest date, with all other options exercised at least 30 days before expiration identified as not exercised on the vest date. These results apply to the full sample, which is comprised of option exercises reported by corporate insiders to the SEC between 1996 and 2005 and compiled by Thomson Financial Insider filings.



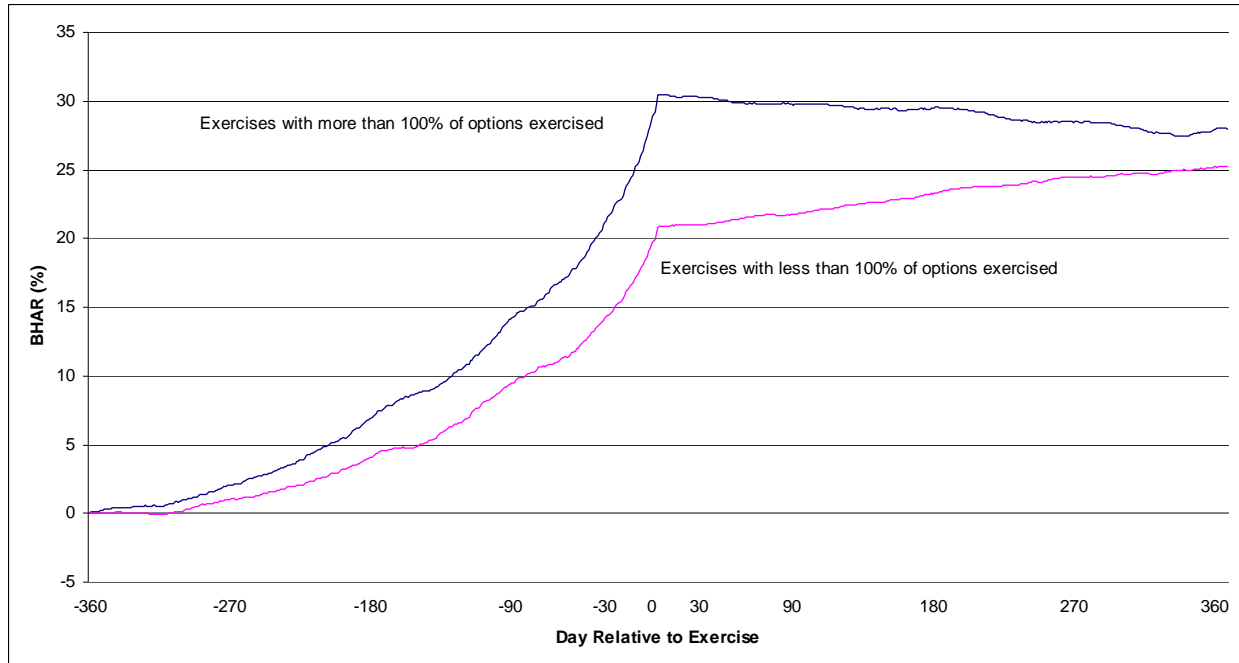
**Figure 5. Buy-and-hold abnormal returns for exercises motivated by dividends and exercises not motivated by dividends.** Buy-and-hold abnormal returns for each firm are estimated using a benchmark portfolio constructed by matching on industry, size, book-to-market and with no corresponding exercise event during the relevant time period. This sample includes only options exercised more than 30 days before expiration. A dividend-motivated exercise is defined as an option exercised early in which the reported exercise date occurs within 15 trading days prior to the ex-dividend date reported in CRSP. Not-dividend-motivated exercises include exercises that occur from seven to ten weeks prior to an ex-dividend dates and exercises of non-dividend paying firms. These results apply to the full sample, which is comprised of option exercises reported by corporate insiders to the SEC between 1996 and 2005 and compiled by Thomson Financial Insider filings.



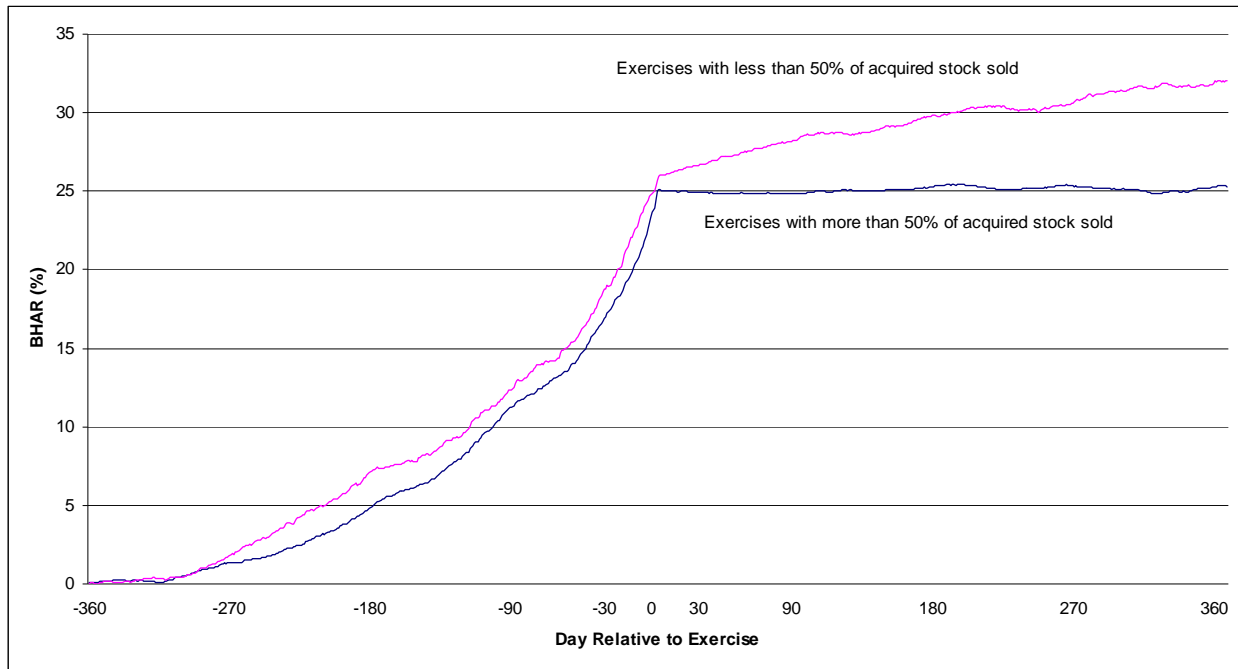
**Figure 6. Buy-and-hold abnormal returns for exercises motivated by executive departure and those not motivated by executive departure.** Buy-and-hold abnormal returns for each firm are estimated using a benchmark portfolio constructed by matching on industry, size, book-to-market and with no corresponding exercise event during the relevant time period. This sample includes only options exercised more than 30 days before expiration. Exercises motivated by executive departure are defined as those that occurred within plus or minus 270 days of the executive leaving the company. Exercises not motivated by executive departure include all other exercises that occur at least 30 days before expiration. These results apply to the merged sample, which is comprised of insider trades reported in the Table II File of Thomson Financial Insider filings for the period 1996 through 2005 in which the transactions can be matched with the insider's data reported in Standard and Poor's ExecuComp.



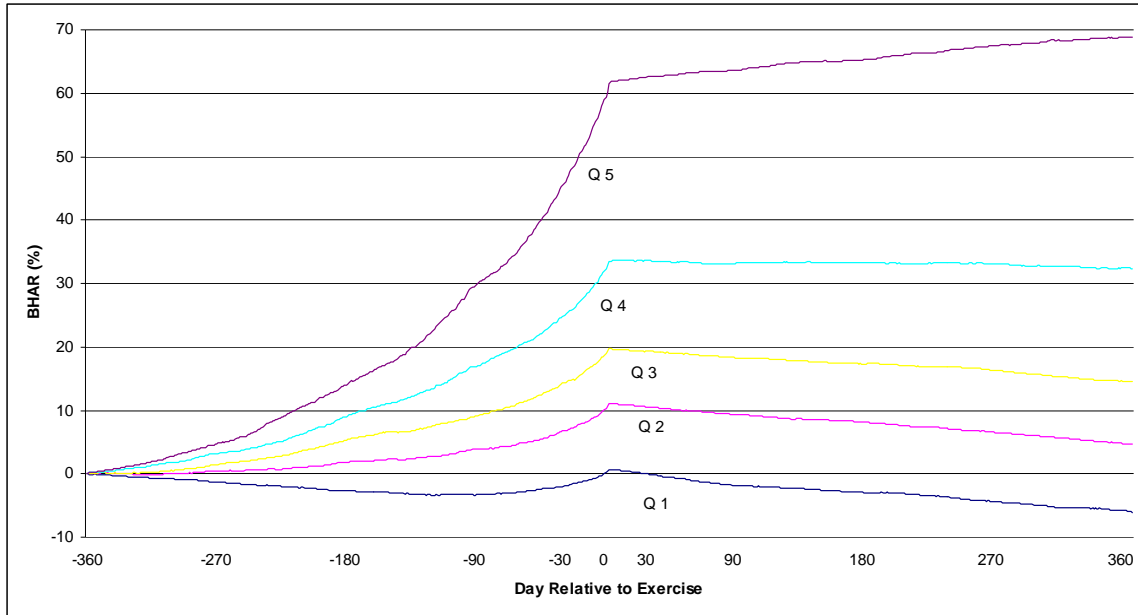
**Figure 7. Buy-and-hold abnormal returns for exercises in which the executive resigned and exercises in which the executive retired.** Buy-and-hold abnormal returns for each firm are estimated using a benchmark portfolio constructed by matching on industry, size, book-to-market and with no corresponding exercise event during the relevant time period. This sample includes only options exercised more than 30 days before expiration. These results apply to the merged sample, which is comprised of insider trades reported in the Table II File of Thomson Financial Insider filings for the period 1996 through 2005 in which the transactions can be matched with the insider's data reported in Standard and Poor's ExecuComp.



**Figure 8. Buy-and-hold abnormal returns for options grouped according to the ratio of exercised options to vested but unexercised options.** Buy-and-hold abnormal returns for each firm are estimated using a benchmark portfolio constructed by matching on industry, size, book-to-market and with no corresponding exercise event during the relevant time period. This sample includes only options exercised more than 30 days before expiration. A proxy is used to estimate the ratio of exercised to unexercised vested options, which is based on the exercise value of exercised options to the exercise value of unexercised vested options. As described in Table I, the group labeled  $> 100\%$  is the group in which the ratio of the value of exercised options to vested but unexercised options is more than 100%, and the group labeled  $< 100\%$  is the complementary group. These results apply to the merged sample, which is comprised of insider trades reported in the Table II File of Thomson Financial Insider filings for the period 1996 through 2005 in which the transactions can be matched with the insider's data reported in Standard and Poor's ExecuComp.



**Figure 9. Buy-and-hold abnormal returns for exercises in which more than 50% of the stock acquired upon exercise is sold and exercises in which less than 50% of the stock acquired up on exercise is sold.** Buy-and-hold abnormal returns for each firm are estimated using a benchmark portfolio constructed by matching on industry, size, book-to-market and with no corresponding exercise event during the relevant time period. This sample includes only options exercised more than 30 days before expiration. These results apply to the merged sample, which is comprised of insider trades reported in the Table II File of Thomson Financial Insider filings for the period 1996 through 2005 in which the transactions can be matched with the insider's data reported in Standard and Poor's ExecuComp.



**Figure 10. Buy-and-hold abnormal return quintiles based on moneyness.** Moneyness is defined as the ratio of the stock price to the exercise price. Q1 is the quintile containing options that are closest to at-the-money, and Q5 is the quintile containing options deepest in-the-money. Buy-and-hold abnormal returns for each firm are estimated using a benchmark portfolio constructed by matching on industry, size, book-to-market and with no corresponding exercise event during the relevant time period. This sample includes only options exercised more than 30 days before expiration. These results apply to the merged sample, which is comprised of insider trades reported in the Table II File of Thomson Financial Insider filings for the period 1996 through 2005 in which the transactions can be matched with the insider's data reported in Standard and Poor's ExecuComp.

**Table I**  
**Descriptive Statistics of the Exercise Data**

Panel A reports statistics for the full sample, which includes option exercises by corporate insiders reported to the SEC between 1996 and 2005 available on Thomson Financial Insider filings. The full sample is partitioned according to whether the exercise occurred early or at expiration, whether the exercise occurred on the vest date, and whether the exercise was motivated by capture of a dividend. Early exercise is defined as exercise with more than 30 days to expiration. Of the 411,366 exercises in the full sample, 33,945 do not report an exercise date. Exercise on the vest date is defined as an exercise between zero and 30 days after the vest date. "Not on vest date" exercise includes all other early exercises. "Dividend-motivated" exercise includes all options exercised within 15 business days prior to the ex-dividend date. "Not dividend-motivated" exercise represents exercises seven to ten weeks before the dividend or all exercises of firms that do not pay dividends. Panel B reports all statistics for the merged sample, which is comprised of insider trades reported in the Table II File of TFI for the period 1996 through 2005 in which the transactions can be matched with the insider's data in Standard and Poor's ExecuComp. The merged sample is partitioned similarly to the full sample, and also according to whether the exercise was induced by executive departure from the firm, the proportion of options exercised to those vested that were not exercised, and the proportion of stock sold at exercise. Of the 92,960 exercises in the merged sample 6,043 do not report an exercise date. Exercises associated with executive departure are those early exercises in which the executive left the company within 270 days of the exercise. Resigned exercises are those in which the reason for departure was resignation, and retired exercises are those in which the reason was retirement. Of the 5,364 departure exercises, 824 do not indicate a reason for departure. Early exercises in the merged sample are ranked by the proportion of options exercised relative to those vested but unexercised and placed into two groups. "> 100%" contains exercises in which the value of options exercised to the value of vested but unexercised options is more than 100% and "< 100%" is the complement. Of the 82,146 early exercises in the merged sample, 1,472 do not report an unexercised exercisable variable. The group labeled "> 50%" are those in which the executive sold more than 50% of the shares acquired from exercise, and the "< 50%" group are the remaining exercises. Of the 82,146 early exercises in the merged sample, 4,467 do not report shares held at fiscal year end. Q1-Q5 moneyness refers to quintiles based on the moneyness of the options at exercise with Q1 being closest to a-the-money and Q5 being deepest in-the-money.

*Panel A: Summary Statistics for Full Sample Option Exercises*

	Number of exercises	Number of executives	Number of firms	Mean years prior to expiration (median)	Mean years after vesting (median)	Mean volatility (median)	Mean moneyness (median)
Full Sample	411,366	59,733	7,569	4.55 (4.89)	2.95 (2.30)	38.15 (37.29)	53.13 (3.14)
Exercised early	350,922	51,159	6,967	5.00 (5.29)	2.87 (2.24)	38.07 (37.12)	52.59 (3.21)
Exercised at expiration	26,499	12,427	3,658	0.02 (0.01)	4.32 (4.06)	37.41 (36.47)	27.36 (2.32)
Exercise not on vest date	325,700	49,395	6,837	4.89 (5.17)	3.26 (2.72)	37.81 (36.82)	44.36 (3.21)
Exercised on vest date	25,222	8,741	3,025	6.83 (7.04)	0.01 (0.00)	41.72 (43.07)	167.19 (3.41)
Not-dividend motivated	263,005	42,915	6,700	5.15 (5.53)	2.72 (2.10)	40.71 (41.60)	68.04 (3.61)
Dividend-motivated	44,951	12,367	2,254	4.58 (4.73)	3.26 (2.74)	30.34 (27.63)	9.40 (2.35)
Q1 moneyness	66,469	18,304	4,440	5.41 (5.90)	2.47 (1.73)	31.35 (28.31)	1.41 (1.42)
Q2 moneyness	66,469	21,275	4,677	5.22 (5.56)	2.89 (2.31)	35.02 (32.92)	2.15 (2.14)
Q3 moneyness	66,469	20,184	4,459	5.02 (5.29)	2.96 (2.32)	37.60 (36.46)	3.34 (3.30)
Q4 moneyness	66,469	17,718	3,769	4.85 (5.07)	3.12 (2.56)	40.20 (40.29)	5.90 (5.72)
Q5 moneyness	66,470	12,825	2,847	4.82 (5.05)	2.88 (2.40)	45.63 (53.25)	255.56 (15.74)

(continued)

*Panel B: Summary Statistics for Merged Sample*

Merged Sample	92,960	9,703	2,105	4.36 (4.65)	3.19 (2.71)	36.87 (35.25)	96.22 (3.57)
Exercised early	82,146	8,699	2,014	4.70 (4.96)	3.14 (2.68)	36.90 (35.20)	91.36 (3.61)
Exercised at expiration	4,771	2,045	1,001	0.04 (0.03)	4.84 (5.01)	34.85 (33.09)	20.22 (2.56)
No executive departure	76,782	8,293	1,989	4.69 (4.93)	3.12 (2.63)	37.03 (35.41)	97.07 (3.68)
Executive departure	5,364	925	663	4.87 (5.13)	3.40 (3.29)	34.97 (31.31)	9.88 (2.79)
Executive resigned	2,018	368	307	5.19 (4.68)	2.72 (2.25)	39.09 (39.76)	16.61 (2.68)
Executive retired	2,522	403	329	4.54 (5.00)	3.91 (3.94)	30.57 (26.48)	5.49 (2.81)
> 100% exercised	39,972	4,535	1,646	5.40 (5.75)	2.39 (1.82)	38.24 (37.20)	89.24 (3.26)
< 100% exercised	40,702	6,132	1,828	4.00 (3.92)	3.87 (5.56)	35.42 (33.35)	95.70 (3.97)
> 50% of stock sold	64,608	7,009	1,866	4.77 (5.03)	3.07 (5.60)	36.59 (34.74)	79.84 (3.45)
< 50% of stock sold	13,071	3,055	1,315	4.16 (4.13)	3.56 (3.06)	37.56 (36.23)	84.26 (4.78)

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**Table II**  
**Buy-and-Hold Abnormal Returns**  
**for Full and Merged Samples**

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The sample is drawn from the full sample described in Table I by selecting only the first exercise for a firm in a given day. The benchmark is the portfolio of five firms matched on industry, size, and book-to-market with no corresponding exercise event in the test period. Calendar-time t-statistics are presented. The sample sizes for the 365-day period are 178,017. The sample sizes for the 182- and 90-day periods are identical to or extremely close to the numbers reported here.

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Period relative to exercise (day 0)	Mean Buy-and-Hold Abnormal Returns			
	Mean (%)	t-statistic	Mean (%)	t-statistic
	Full Sample		Merged Sample	
(0, 365)	-2.61	-5.26	1.61	2.58
(0, 182)	-1.06	-3.20	1.19	3.93
(0, 90)	-0.65	-1.59	0.52	2.69

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**Table III**  
**Buy-and-Hold Abnormal Returns**  
**for Options Exercised Early vs. at Maturity**  
**and Options Exercised not on Vest Date vs. Exercised on Vest Date**

The sample is drawn from the full sample of exercises described in Table I by selecting only the first exercise for a firm in a given day. The benchmark is the portfolio of five firms matched on industry, size, and book-to-market with no corresponding exercise event in the test period. Calendar-time t-statistics are presented. An early exercise is defined as an exercise with more than 30 days remaining to expiration. A vest date exercise is an exercise defined as occurring between 0 and 30 days after the vest date. The sample sizes for the 365-day period are 149,286 early exercises, 15,400 maturity exercises, 10,339 vest date exercises, and 143,212 not vest date exercises. The sample sizes for the 182- and 90-day periods are identical to or extremely close to the numbers reported here.

<i>Panel A: Early exercise vs. exercise at expiration</i>						
Period relative to exercise (day 0)	Options exercised early			Options exercised at expiration		t- or z-statistic for difference
	Mean Buy-and-Hold Abnormal Returns					
	Mean (%)	t-statistic	Mean (%)	t-statistic		
(0,365)	-2.69	-4.01	-1.51	-2.95		-2.23
(0,182)	-1.18	-2.70	-0.42	-1.92		-2.13
(0,90)	-0.77	-1.49	0.15	0.83		-4.16

<i>Panel B: Vest date exercise vs. not-vest date exercise</i>						
Period relative to exercise (day 0)	Options not exercised on vest date			Options exercised on vest date		t- or z-statistic for difference
	Mean Buy-and-Hold Abnormal Returns					
	Mean (%)	t-statistic	Mean (%)	t-statistic		
(0,365)	-2.89	-4.90	-0.69	-0.66		-2.48
(0,182)	-1.22	-3.24	-0.64	-0.13		-1.13
(0,90)	-0.81	-2.15	-0.15	0.46		-1.84

**Table IV**  
**Buy-and-Hold Abnormal Returns**  
**for Exercises Motivated by Dividends vs. Not Motivated by Dividends**

The sample is drawn from the full sample described in Table I by selecting only the first exercise for a firm in a given day. A dividend-motivated exercise is defined as an early exercise in which the reported exercise date occurs within 15 trading days prior to the ex-dividend date. Non-dividend motivated exercises also include exercises of firms that do not pay dividends. The benchmark is the portfolio of five firms matched on industry, size, and book-to-market with no corresponding exercise event in the test period. Calendar-time t-statistics are presented. The sample sizes for the 365-day period are 114,224 not dividend-motivated exercises and 17,622 dividend-motivated exercises for the abnormal returns and 97,555 not dividend-motivated. The sample sizes for the 182- and 90-day periods are identical to or extremely close to the numbers reported here.

Period relative to exercise (day 0)	Not dividend-motivated exercise		Dividend-motivated exercise		t- or z-statistic for difference
	Mean Buy-and-Hold Abnormal Returns				
	Mean (%)	t-statistic	Mean (%)	t-statistic	
(0,365)	-3.62	-4.68	0.43	1.65	-11.25
(0,182)	-1.72	-3.37	0.69	2.18	-10.89
(0,90)	-1.02	-2.24	-0.05	0.56	-6.51

**Table V**  
**Buy-and-Hold Abnormal Returns**  
**for Exercises Around Executive Departure vs. Not Around Executive Departure**  
**and Exercises Around Retirement vs. Not Around Retirement**

The sample is drawn from the merged sample described in Table I by selecting only the first exercise for a firm in a given day. The benchmark is the portfolio of five firms matched on industry, size, and book-to-market with no corresponding exercise event in the test period. Calendar-time t-statistics are presented. Exercises associated with executive departure are those that occur within plus or minus 270 days of the executive leaving the company. The sample sizes for the 365-day period are 34,885 not departure exercises, 2,394 departure exercises, 977 retirement exercises, and 950 resignation exercises for the abnormal returns and 30,285 not departure, 2,142 departure exercises, 1,074 retirement exercises. The sample sizes for the 182- and 90-day periods are identical to or extremely close to the numbers reported here.

<i>Panel A: Departure and Not Departure</i>							
Period relative to exercise (day 0)	Exercises not associated with executive departure			Exercises associated with executed departure		t- or z-statistic for difference	
	Mean Buy-and-Hold Abnormal Returns						
	Mean (%)	t-statistic	Mean (%)	t-statistic			
(0,365)	1.72	1.98	-6.06	-3.76		7.62	
(0,182)	1.31	3.36	-4.45	-3.29		8.34	
(0,90)	0.52	2.38	-3.16	-3.22		7.30	

<i>Panel B: Retirement and Resignation</i>							
Period relative to exercise (day 0)	Exercises in which the executive retired			Exercises in which the executive resigned		t- or z-statistic for difference	
	Mean Buy-and-Hold Abnormal Returns						
	Mean (%)	t-statistic	Mean (%)	t-statistic			
(0,365)	-6.10	-2.70	-7.03	-3.15		0.42	
(0,182)	-4.57	-3.08	-4.62	-2.26		0.03	
(0,90)	-2.37	-1.39	-4.51	-2.59		1.89	

**Table VI**  
**Buy-and-Hold Abnormal Returns**  
**for Exercises with more than 100% of Options Exercised vs. less than 100% of Options Exercised**  
**and Exercises with more than 50% of Stock Sold vs. less than 50% of Stock Sold**

The sample is drawn from the merged sample described in Table I by selecting only the first exercise for a firm in a given day. The benchmark is the portfolio of five firms matched on industry, size, and book-to-market with no corresponding exercise event in the test period. Calendar-time t-statistics are presented. These results apply to the merged sample, which is comprised of insider trades reported in the Table II File of Thomson Financial Insider filings for the period 1996 through 2005 in which the transactions can be matched with the insider's data reported in Standard and Poor's ExecuComp. Early exercises are ranked by the proportion of options exercised relative to those vested but unexercised and placed into two samples. A proxy based on the value, rather than the quantity, of exercised and unexercised vested options is used. The first group contains exercises in which the ratio of exercised to unexercised but vested options is more than 100%, and the second group is the complement. For exercises classified by percentage of stock sold, we use the technique of Ofek and Yermack (2000) who estimate the percentage of stock sold by comparing the change in the executive's stock ownership with the amount of options exercised and restricted stock granted. The sample sizes for the 365-day period are 16,589 greater than 100% exercises, 21,242 less than 100% exercises, 28,871 greater than 50% sold exercises, and 6,678 less than 50% sold exercises for the abnormal returns. The sample sizes for the 182- and 90-day periods are identical to or extremely close to the numbers reported here.

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*Panel A: More than 100% of options exercised to not exercised versus less than 100% of options exercised to not exercised*

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Period relative to exercise (day 0)	> 100% exercised		< 100% exercised		t- or z-statistic for difference
	Mean Buy-and-Hold Abnormal Returns				
	Mean (%)	t-statistic	Mean (%)	t-statistic	
(0,365)	-2.53	-1.70	4.41	4.84	-10.79
(0,180)	-0.96	-0.37	2.62	6.03	-9.52
(0,90)	-0.67	-1.34	1.00	3.91	-6.77

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*Panel B. More than 50% of stock sold versus less than 50% of stock sold*

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Period relative to exercise (day 0)	> 50% of stock sold		< 50% of stock sold		t- or z-statistic for difference
	Mean Buy-and-Hold Abnormal Returns				
	Mean (%)	t-statistic	Mean (%)	t-statistic	
(0,365)	0.21	0.59	6.35	3.97	-6.35
(0,182)	0.30	1.66	4.16	5.30	-7.54
(0,90)	-0.19	0.42	2.64	5.95	-8.59

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**Table VII**  
**Buy-and-Hold Abnormal Returns by Moneyness Quintiles**

Quintile 1 is the 20% of exercises that are closest to at-the-money and Quintile 5 is the 20% of exercises that are deepest in-the-money. The sample is drawn from the full sample described in Table I by selecting only the first exercise for a firm in a given day. The benchmark is the portfolio of five firms matched on industry, size, and book-to-market with no corresponding exercise event in the test period. Calendar-time t-statistics are presented. The sample sizes for the 365-day period are 29,032 for Q1, 29,174 for Q2, 29,177 for Q3, 28,984 for Q4, and 28,885 for Q5. The sample sizes for the 182- and 90-day periods are identical to or extremely close to the numbers reported here.

		Q1		Q2		
		Mean Buy-and-Hold Abnormal Returns				
Period relative to exercise (day 0)	Mean	t-statistic	Mean	t-statistic		
	(%)		(%)			
	(0,365)	-6.60	-11.62	-6.44	-11.66	
	(0,182)	-3.51	-10.14	-3.01	-8.47	
(0,90)	-2.40	-8.48	-1.72	-6.24		

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		Q3		Q4		
		Mean Buy-and-Hold Abnormal Returns				
Period relative to exercise (day 0)	Mean	t-statistic	Mean	t-statistic		
	(%)		(%)			
	(0,365)	-5.07	-7.11	-1.16	-2.11	
	(0,182)	-2.29	-4.88	-0.22	-0.59	
(0,90)	-1.41	-3.63	-0.30	-0.57		

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		Q5			
Period relative to exercise (day 0)	Mean	t-statistic		Q1 vs. Q5 t	
	(%)				
	(0,365)	7.31	6.25		-22.75
	(0,182)	3.84	6.09		-20.77
(0,90)	2.14	5.39		-19.63	

**Table VIII**  
**Multivariate Regression for Buy-and-Hold Long-Term Returns**

This table provides cross-sectional regression models with the BHARs over the period (0, +365) following exercise. *Informed* is a dummy variable equal to one if the exercise was early, not vest related, not dividend motivated, and the underlying shares were immediately sold. *Early* is a dummy equal to one if the exercise did not occur within 30 days of maturity. *NotVest* equals one if the exercise did not occur between zero and 30 days after the vest date. *DivMotiv* equals one if the exercise occurred within 15 days prior to an ex-dividend date. *Depart* equals one if the executive left the firm within 270 days of exercise. *Resign* and *Retire* are both dummies equal to one if the reported reason for departure was resigned or retire. *PropEx* is the proportion of options exercised relative to vested but unexercised options. *PctSold* is the percentage of the underlying shares acquired at exercise sold by fiscal year end. *Moneyiness* is the stock price at exercise divided by the strike price. *Reload* equals one if the exercise was associated with an option reload. *ExecRank* is the executive rank reported in the TFI. *PreSOX* is a dummy variable for whether the exercise occurred prior to the Sarbanes-Oxley Act. *Backdate* equals one if the underlying shares were not immediately disposed in the open market. *LogSize* is the log of the firm's market capitalization in the fiscal year ending before exercise. *BooktoMarket* is ratio of book value to market value at the fiscal year end prior to exercise. *Volatility* is the standard deviation of stock computed 60 months prior to exercise. *Momentum* is the unadjusted 90-day stock return prior to exercise, and *PriorFirmPerf* firm performance in the year prior to the beginning of the momentum window. *PriorMktPerf* is the performance of the CRSP equal-weighted index in the one year preceding exercise. P-values are reported in parentheses. \*significance at the 10%; \*\*significance at the 5%; \*significance at the 1%.

	Model (1)	Model (2)	Model (3)
Constant	0.97 (0.71)	1.48 (0.64)	-4.26 (0.19)
<i>Option-related variables</i>			
Informed	-5.01*** (0.00)	-	-
Early		-6.08*** (0.00)	-5.00*** (0.00)
NotVest		0.32 (0.71)	1.08 (0.21)
DivMotiv		1.37** (0.02)	1.01* (0.08)
Depart		-2.10 (0.29)	-1.83 (0.35)
Resign		-1.51 (0.51)	-1.48 (0.52)
Retire		-1.85 (0.41)	-1.88 (0.40)
PropEx		-0.01*** (0.00)	-0.01*** (0.00)
PctSold		-8.74*** (0.00)	-7.26*** (0.00)
Moneyiness		0.03*** (0.00)	0.01*** (0.00)
<i>Other tests/controls:</i>			
Reload			-1.84 (0.17)
ExecRank			0.99*** (0.01)
PreSOX			18.56*** (0.00)
Backdate			5.04*** (0.00)
<i>Firm characteristics</i>			
LogSize		1.19*** (0.00)	1.26*** (0.00)
BooktoMarket		-10.82*** (0.00)	-10.91*** (0.00)
Volatility		0.43 (0.69)	1.02 (0.35)
Momentum		-0.24*** (0.00)	-0.23*** (0.00)
PriorFirmPerf		0.27*** (0.00)	0.27*** (0.00)
PriorMktPerf		0.07*** (0.00)	0.06*** (0.00)
Year dummies	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Observations	79,888	79,888	79,888
Adjusted R-squared	1.9%	16.6%	16.9%

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