Timing stock trades for personal gain: Private information and sales of shares by CEOs*

Eliezer M. Fich
Drexel University

Robert Parrino
University of Texas at Austin

Anh L. Tran
City University London

July 10, 2015

Abstract

We investigate the determinants of gains to CEOs from large stock sales. Consistent with the literature, we find that some CEOs benefit from inside information by strategically timing sales. We also find that internal accounting information can be used to predict such timing. Furthermore, sales executed under plans that conform to SEC Rule 10b5-1 tend to follow positive abnormal stock returns, but do not, on average, precede abnormal declines. In contrast, sales that do not conform to the requirements of Rule 10b5-1 tend to follow smaller positive abnormal stock returns, but, on average, precede large abnormal declines. Board and CEO characteristics are related to the magnitude of the post-transaction abnormal returns. Overall, the evidence suggests that Rule 10b5-1 plans do not prevent CEOs from timing large sales or the release of discretionary information around them.

* Fich is in the Finance Department, LeBow College of Business, Drexel University, Philadelphia, PA 19104-2875, USA, +1-215-895-2304, eliezer.m.fich@drexel.edu. Parrino is in the Department of Finance, Red McCombs School of Business, University of Texas at Austin, Austin, Texas, 78712-1179, USA, +1-512-471-5788, robert.parrino@mccombs.utexas.edu. Tran is in the Faculty of Finance, Cass Business School, City University London, London, EC1Y 8TZ, UK, +44-207-040-5109, anh.tran@city.ac.uk. We thank Jacelly Cespedes and Elliott Hendrix for excellent research support. All errors are our responsibility.

Timing stock trades for personal gain:
Private information and sales of shares by CEOs

Abstract

We investigate the determinants of gains to CEOs from large stock sales. Consistent with the literature, we find that some CEOs benefit from inside information by strategically timing sales. We also find that internal accounting information can be used to predict such timing. Furthermore, sales executed under plans that conform to SEC Rule 10b5-1 tend to follow positive abnormal stock returns, but do not, on average, precede abnormal declines. In contrast, sales that do not conform to the requirements of Rule 10b5-1 tend to follow smaller positive abnormal stock returns, but, on average, precede large abnormal declines. Board and CEO characteristics are related to the magnitude of the post-transaction abnormal returns. Overall, the evidence suggests that Rule 10b5-1 plans do not prevent CEOs from timing large sales or the release of discretionary information around them.

1. Introduction

Managers generally have better information about the prospects for their firms than outside investors. To protect stockholders from opportunistic trading on the part of managers, Securities and Exchange Commission (SEC) regulations prohibit managers from actively trading their firms' shares during periods in which they are most likely to be in possession of soon-to-be-disclosed material non-public (inside) information, such as financial results or information about an impending acquisition or merger. However, even outside of these periods in which the "trading window" is closed, managers possess private information about the prospects for their businesses that provides them with advantages in trading their personal shares. Consequently, managers can be subject to allegations that they are trading on inside information any time they buy or sell their firms' shares.

In October 2000, the SEC enacted Rule 10b5-1 which enables managers to reduce their exposure to allegations of trading on material non-public information by announcing pre-planned stock sales up to two years in advance. Presumably, since these sales are planned well in advance, managers schedule them without knowledge of the prices at which the shares will be sold and before relevant time-sensitive inside information becomes available to them.

While stock sales which occur under Rule 10b5-1 are less susceptible to opportunistic behavior by CEOs, they are not immune to such behavior. A CEO has the ability to cancel planned sales through the use of limit orders or make decisions which can affect the market price of the firm's shares before a pre-scheduled sale is completed. These latter decisions might involve investment, operating, financing, and reporting choices, or the timing of the release of information. Also, even in the absence of such decisions, a CEO who sells shares within a 10b5-

1 plan can profit if he or she has sufficient foresight regarding the resolution of uncertainty about the value of a firm's shares.

In this study we investigate whether CEOs systematically profit from sales of large blocks of their personal shares which we define as sales involving at least one percent of the firm's market capitalization. We focus on the effectiveness of Rule 10b5-1 in limiting opportunistic sales and in the CEO- and firm- specific characteristics associated with such trades.

Evidence from a sample of 610 large stock sales by CEOs of public U.S. firms during the 2003 through 2009 period indicates that some selling CEOs earn abnormal returns with or without Rule 10b5-1 restrictions. Average cumulative abnormal stock returns (CARs) equal approximately 6 percent over the 40 trading days preceding and −6 percent over the 40 trading days following the sale of a large block of shares by the CEO. Examination of firm financial characteristics reveals substantial declines in key metrics such as sales, capital expenditures, accounting accruals, and earnings from the four quarters before the stock sales to the four quarters after the sales. Furthermore, evidence on the nature of news about the firms at which the selling CEOs are employed suggests that at least some executives are able to time their trades so that they occur prior to the disclosure of negative news by external sources. There is also evidence that managers have the ability to time the release of discretionary news about the firm.

Investigation of the effect that 10b5-1 plans have on the ability of CEOs to strategically time sales indicates that such plans limit the CEOs' ability to trade on negative short-term information. Sales within such plans are preceded by an average 40 day CAR of 10 percent, but, on average, the CAR over the following 40 days is approximately 0 percent. In contrast, trades that take place outside of these plans are preceded by an average 40 day CAR of approximately 4 percent and followed by an average 40 day CAR of −8 percent. Furthermore, the average

monthly alpha of a firm following a sale under a 10b5-1 plan is 2.09 percent over the three years following the sale. This compares with a zero percent monthly alpha for sales outside of such a plan, indicating that sales within plans capture less of the total value of the firm's equity.

While 10b5-1 plans make it more difficult for CEOs to sell their stock before bad news is revealed to the market, we do find evidence that news over which managers have discretion with respect to the timing is more likely to be released immediately following non-routine sales under 10b5-1 plans than following non-routine sales not covered under such plans. Furthermore, accounting accruals are significantly greater in the year prior to plan sales than in the year of the sale, suggesting that accounting numbers may be manipulated in anticipation of these sales. In contrast, accounting accruals increase significantly from the year before to the year of the sale for non-plan sales. Overall, the CEOs in our sample are able to sell stock at an advantageous time even when they sell as part of a 10b5-1 plan. Indeed, in our sample we find that average proceeds from stock sales under 10b5-1 plans are about $1.2 million higher than they would have been if the sales had occurred 40 trading days earlier.

We also find that CARs following large CEO stock sales are more negative at firms with a greater number of independent directors who hold at least three directorships in publicly traded firms (busy directors). However, these CARs are positively related to the number of outside directorships held by the CEO and the level of the CEO's total compensation. These relations suggest that corporate governance in general, along with specific factors such as the monitoring effectiveness of the board and the reputational concerns of the CEO, play an important role in determining the ability and inclination of the CEO to strategically time large stock sales for personal gain.

The contributions of this study are as follows. First, it adds to an extensive body of academic work showing that insiders use private information about the firm to personally benefit from trading their firm's stock.[1] Second, the evidence we present on the potential weaknesses associated with 10b-5 plans advances the literature on the effectiveness of the mechanisms aimed at deterring the ability of managers to profit from trading on private information [e.g.: Jaffe, 1974; Seyhun, 1992; Bettis, Coles, and Lemmon, 2000; Bhattacharya and Daouk, 2002; Roulstone, 2003; Bushman, Piotroski, and Smith, 2005; Jagolinzer, 2008; Jagolinzer, Larcker, and Taylor, 2011; and Henderson, Jagolinzer, and Muller, 2012].

Third, our study provides new evidence showing that managers have the ability to temporarily affect the valuation of their firms. This evidence complements that reported by Gurun and Butler (2012), who find that local media reporting about local firms is more positive than such reporting about non-local firms, by Solomon (2012) and Kim and Meschke (2011), who report that managers can use news coverage in ways that, at least temporarily, affect stock prices, by Tetlock (2007), who reports that media pessimism predicts a temporary downward pressure on stock prices, and by Bergstresser and Philippon (2006), who show that the use of discretionary accruals to manipulate reported earnings is more pronounced when a CEO's compensation is more closely tied to the value of the CEO's stock and option holdings.

[1] Lorie and Niederhoffer (1968) report that corporate insiders often earn abnormal returns when trading their firms' shares. Research on this area shows that insider trades predict both abnormal stock returns (Jaffe, 1974; Finnerty, 1976b; Seyhun, 1986; and Lin and Howe, 1990) and operating performance (Finnerty, 1976a). Other studies report evidence on, or model, insider trading around specific corporate events, including bankruptcy (Gosnell, Keown, and Pinkerton, 1992), takeovers (Agrawal and Nasser, 2012), corporate sell-offs (Hirschey and Zaima, 1989), and capital expenditures (John and Mishra, 1990). Within this literature there is evidence consistent with the views of Maine (1966) and Carlton and Fischel (1983) that stockholders benefit from insider trading because such trading helps improve the accuracy of stock prices. For example, Meulbroek (1992) finds that market participants detect the possibility of informed trading and reflect this information in the prices at which they trade shares, and lower after high stock returns while Rozeff and Zaman (1998) find that insider buying also is greater after low stock returns. In a study of the 1982 Anheuser-Busch acquisition of Campbell Taggart, Cornell and Sirri (1992) find that private information was incorporated into Campbell's stock through insider trading. More recently, Marin and Olivier (2008) show that, while insiders' share sales peak many months before a large drop in the stock price, insiders' share purchases peak only the month before a large increase.

Finally, our results on the governance characteristics associated with large stock sales by CEOs contribute to the literature on whether a firm's governance mechanisms tend to be too weak for efficient monitoring of the CEO (see, for example, Fama, 1980; Jensen and Meckling, 1976; Hermalin and Weisbach, 1998; and Harris and Raviv, 2008) and also on whether managers have incentives to reduce their personal exposure to firm-specific risks by selling their own shares [see, for example, Ofek and Yermack, 2000; and Ross, 2004].

The rest of this paper is organized at follows. Section 2 describes the data and Section 3 presents the empirical evidence. Section 4 concludes.

2. Data

Our experimental design is focused on CEOs who sell a block of their personal stock that is worth at least one percent of their firm's market capitalization. This threshold is selected under the assumption that a trade of such magnitude is unlikely to be casual and more likely to be strategically timed to rip considerable gains for the selling CEOs if such timing is possible.

We obtain information on stock sales by CEOs during the 2003 through 2009 period from the Thompson Financial Insider Filing database (hereafter, TFN).[2] TFN reports transactions that corporate insiders disclose on Forms 3, 4, 5, and 144 filed with the SEC. This database is organized into two distinct sections. Section 1 includes stock transactions and Section 2 contains derivative transactions. Our sample is drawn from Section 1.

We use the following procedure to identify stock sales by CEOs that exceed one percent of their firms' market capitalization. First, in Section 1 of TFN we require "trancode", "acqdisp", and "rolecode" to be "S" (for sales), "D" (for disposition), and "CEO" (for Chief Executive

[2] We exclude transactions that occurred before the SEC adopted rules and amendments to Section 16 of the Exchange Act and implemented the provisions of the Sarbanes-Oxley Act that accelerated the deadline for filing most insider ownership reports. This screen eliminates transactions that took place prior to 2003.

Officers), respectively, to identify all stock sales by CEOs. To ensure data quality, we only retain transactions that have a "cleanse" code of "R" (data verified through the cleansing process) or "H" (cleansed with a very high level of confidence). We then aggregate all sales executed by a CEO on the same day at the same selling price into a single transaction and require that the value of this transaction equals at least one percent of the firm's market capitalization on the transaction date. Finally, we exclude trades in which, at the time of the stock sale transaction, the firm has already received an acquisition bid (covered by Thomson's SDC Platinum Merger and Acquisition database) that is subject to completion. This procedure results in a sample or 610 large stock sales by the CEOs of 378 different firms.

We collect stock price data from the Center for Research in Security Prices (CRSP) and accounting information from the Standard and Poors' Compustat (Compustat) databases. The Appendix provides the definitions for the variables obtained from these sources, as well as for all other variables that we use.

Table 1 reports descriptive statistics for the sample. Panel A presents key firm and transaction characteristics. The firms in our sample have a median (mean) market capitalization of $303.8 million ($846 million), a Tobin's q of 1.91 (2.89), and a ratio of book debt to book debt plus market capitalization of 0.095 (0.181). The median (mean) transaction involves the sale of 292.4 thousand (551.0 thousand shares), which represent 1.6 percent (2.2 percent) of the firm's outstanding shares and have a total value of $3.248 million ($11.527 million). Examination of the distribution of transactions by industry (not tabulated in the interest of brevity) reveals that large CEO stock sales occur across a wide range of industries. Furthermore, the annual number of sales drops dramatically during the financial crisis, from an average of 121

per year during the 2003 to 2006 period to an average of 42 per year during the 2007 to 2009 period.

For the firms in our sample, we obtain information on corporate governance characteristics from RiskMetrics. Data on CEO compensation is drawn from Execucomp. Since RiskMetrics and Execucomp do not cover all of the firms in our sample, we supplement the information from these sources with hand-collected data from proxy statements filed by the sample firms with the SEC.

Panel B of Table 1 shows that the typical board of directors in our sample has 7 members and that the directors in 47.2 percent of the firms serve staggered (classified) terms. Furthermore, over 71.4 of the directors at the typical firm are independent in that they are not current or former employees (or consultants) of the company, or relatives of a firm's manager. More than 25 percent of the independent directors at the typical firm are classified as busy because they hold a total of at least three independent directorships in publicly traded companies.

Panel B also reports that the median (mean) age of the CEOs in our sample 56 years (54.6 years) and the median (mean) tenure in office is 10 years (11.3 years). The CEOs in our sample tend to be younger and have a longer tenure than the typical CEO at large public firms (see, for example, Huson, Malatesta, and Parrino; 2004). Over 77 percent of the CEOs in our sample also chair their firm's board of directors and fewer than half hold an outside directorship at another publicly traded firm.

The CEOs in our sample own a median (mean) of 11.5 percent (17.6 percent) of their firm's common shares immediately before the stock sale. The mean value substantially exceeds the average CEO ownership levels of 2.8 percent and 3.3 percent reported by Kim and Lu (2011) and Coles, Lemmon, and Meschke (2012), respectively. With such large holdings, it is not

surprising that the CEOs are selling large blocks of shares. The median transaction value of $3.24 million (Panel A) is about six times the median compensation of $0.54 million received by the selling CEOs (Panel B). Nevertheless, these CEOs tend to retain significant ownership of their firms' shares afterwards. As shown in Panel A, the median (mean) stock sale involves only 14.3 percent (23.6 percent) of the CEOs stock holdings.

Following Jagolinzer (2008), we obtain information on whether the CEO participates in a 10b5-1 trading plan from Form 4, Form 8-K, and Factiva searches. 18.4 percent of the firms in our sample disclose that their executive trades are executed under a 10b5-1 plan. Because Jagolinzer focuses exclusively on firms with 10b5-1 trading plans, he does not report a corresponding percentage (incidence) of firms with such plans. However, the 18.4 percent figure is similar to that reported by Cognetti (2013). Approximately 15.4 percent of the firms in her sample had a 10b5-1 plan during a given year during the 2004 to 2009 period.

3. Evidence

3.1 Firm performance around insider sale transactions

Figure 1 illustrates the average cumulative abnormal return (CAR) for the sample firms' shares during the 40 trading days before and 40 trading days after the CEO stock sale. The CARs are estimated using a market model with a one year estimation period that ends 41 trading days before the reported stock sale date.

The plot for all sales in Figure 1 shows that there is an average abnormal stock price run-up of approximately 6 percent over the 40 days prior to the sale and an equally large decline over the 40 days after the sale. Figure 1 suggests that, on average, the selling CEOs are strategically timing their sales or the release of information in an effort to maximize the proceeds they receive.

In addition to illustrating the overall average CAR for the sample, we report the average CARs for subsamples based on whether or not the sale is classified as routine using the method proposed by Cohen, Malloy, and Pomorski (2012). Specifically, each sale is classified based on the trading history for each selling CEO. We begin by obtaining all sales, regardless of size, that are listed for each CEO in the Thomson Insider database. We code a sale on our sample as routine if it is dated within 14 days of the one-year anniversary of a previous sale by the same CEO. Sales are denoted as non-routine otherwise. Since this classification is made at the trade level, an insider can have both routine and non-routine stock sales. The plots in Figure 1 suggest that stock sales (particularly those classified as routine sales) tend to take place after a larger run-up in the firm's shares. This graphical evidence is consistent with the idea that CEOs that sell shares on a routine basis tend to benefit more from the timing of their sales. In fact, the inverted V-shapes in Figure 1 are similar to the patterns described by the CARs centered on CEO stock gift donations in Yermack (2009). He argues that many of these gifts are timed in order to maximize the CEOs' personal tax deductions, which is consistent with our interpretation that, on average, CEOs are timing their stock sales for personal gain.

It is important to provide some perspective of the market valuations around the returns plotted in Figure 1. Across our entire sample, the average unadjusted market capitalization for the selling CEO's firm increases from approximately $880 million on day -40 to just over $920 million on day -10, relative to the stock sale. It then declines sharply over the following 20 days, to about $840 million. According to our data, CEOs that sell their shares personally benefit from the changes in market capitalization in the form of either increased gains after upswings or loss avoidance before downturns. Specifically, for the mean stock sale we find that net proceeds are more than $600 thousand ($700 thousand) higher than they would have been if the sale had

occurred 40 trading days earlier (later).

Table 2 reports numerical evidence on the magnitudes and statistical significance of the changes in the average CARs and in the net-of-market returns over the 40 days before and the 40 days after the date of the stock sale. The results indicate that the typical sample firm outperforms the market by about 3.5 percent during the 40 days prior to the sale. In contrast, the typical sample firm underperforms by about 4.3 percent during the 40 days after the sale. The median and mean CAR values are qualitatively similar to those in Table 2 when we compute them using the Fama-French four factor model, matched book/market and size decile portfolios, or the net-of-market approach.

Notably, the median and mean abnormal stock price declines in our sample substantially exceed the mean declines, of 0.2 percent to 0.3 percent, reported in Brochet's (2010) study of managerial stock sales. However, whereas the median (mean) stock sale in our sample accounts for about 1.6 percent (2.2 percent) of the firm's market capitalization those in Brochet's (2010, p.428) represent a mean of 0.20 percent of the firm's market capitalization before 2002 and of 0.09 percent after 2002. This suggests that our experimental design which focuses on personal stock sales by CEOs involving at least one percent of their firm's market capitalization is better suited to detect whether the trades are strategically timed.

Table 2 also shows that the 40-day CAR is positive before the sale approximately 57 percent of the time and negative after the sale approximately 60 percent of the time. If none of the sales are timed, we would expect that the number of positive and negative CARs both equal approximately 50 percent of the total number of observations before and after the trades. The roughly 17 percent difference in the percentages of positive CARs, before and after the sales (57 percent versus 40 percent), suggests that as many as one in five of the sales in our sample might

be strategically timed to take place before post-sale stock price declines, after pre-sale stock price run-ups, or both. A *z*-test of the difference in proportions (significant at the 1 percent level) strengthens the perception that many of the stock sales we study are indeed deliberately timed.

3.2 Growth rates surrounding stock sales

We cannot observe the information that CEOs consider before deciding when to sell their own shares. However, we can observe some of the financial characteristics that they are aware of and are likely to forecast when assessing firm prospects and the values of their shares. Figure 2 illustrates average year-to-year quarterly growth rates for eight financial characteristics, from four quarters before the quarter in which the sale takes place through the fourth quarter after the quarter in which the sale occurs. On the x-axis of each plot, the number 0 indicates the quarter in which the sale occurs, -1 indicates the quarter prior to quarter in which the sale occurs, and +1 indicates the quarter following the quarter in which the sale occurs. The shading of the bars indicates whether the growth rates in each quarter, from quarter +1 through quarter +4, are significantly different from the growth rates in quarters -4 through -1.

Figure 2 indicates that the average growth rate declines significantly in the quarter immediately following the stock sale for all characteristics except dividends. Furthermore, the declines in the average growth rates of sales, accruals, earnings, and ROA persist through at least the fourth quarter following the stock sale. This evidence is consistent with the theory that some of the CEOs in our sample time the sale of their shares to take place before significant deterioration in financial performance is reported in their firms' financial statements.

Table 3 reports evidence from multivariate analyses of the change in the growth rate for each financial characteristic illustrated in Figure 2. Our tests, which are similar to those in Murphy and Zimmerman (1993), include eight firm-quarter ordinary least squares (OLS)

regressions using the eight financial characteristics in Figure 2 as the dependent variables. The key independent variable in each of these regressions is an indicator which equals one for quarters +1 through +4 and equals zero otherwise. We name this variable *post-CEO-sales quarter (0,1)*. All of the models in Table 3 control for market adjusted returns (in the year of the trade and in the year prior to the trade) and include industry and year fixed effects.

The evidence in Table 3 is generally consistent with that in Figure 2. The performance of all financial variables, with the exception of CAPX, is significantly lower during the four quarters following a large stock sale by the CEO. This suggests that some of these CEOs might simply be reacting to changes in the prospects of their firms while others, having decided that they want to sell shares, might be taking actions to change the perceptions of market participants so that they can sell at a higher price. In other words, the latter CEOs might be pumping their shares and then dumping them.

Murphy and Zimmerman (1993) document increases in accounting accruals and earnings prior to CEO departures and suggest that CEOs might make decisions that have a short-term impact on the levels of these variables. Doing so can increase their performance-based compensation as they near retirement and it can help them avoid losing their jobs sooner than they want. To the extent that CEOs take actions to temporarily inflate firm financial characteristics, and, in doing so, increase the prices they receive for their shares, we would expect decreases in accounting accruals and earnings from before to after quarter 0. This is exactly what we observe in Figure 2.

Despite its statistical significance, it is possible that the evidence we present to this point is purely coincidental. CEOs might not be strategically timing the sales of their shares. The patterns that we document in financial characteristics might reflect something as benign as

seasonality. We note, however, that the tests presented in Table 3 already account for seasonality by using the change in the level of the variables between the current quarter and the same quarter the year before, not the level in the current quarter. Notwithstanding this, next, we conduct a series of tests to evaluate the robustness of our findings.

3.3. Are stock sales timed around earnings or dividend announcements?

If CEOs are more likely to sell their shares before negative information is revealed, we might expect such sales to occur more frequently immediately before negative earnings and dividend announcements. However, as Bettis, Coles, and Lemmon (2000) note, executives do not have complete discretion with regards to the timing of such sales. Internal policies of many public companies forbid trading by corporate officers during the period leading up to earnings announcements. In fact, firm policies commonly disallow trading by insiders at all times except for the period 3 to 12 trading days after the quarterly earnings announcement. Such policies would seem to limit the ability of CEOs to strategically time their sales.

Table 4 presents evidence which indicates that such limits are not universal and which suggests that some CEOs do engage in strategic timing of large stock sales. Panel A reports statistics for 2-day CARs around earnings announcements that take place during the 40 trading days before the CEO stock sale and that take place during the 40 trading days after the CEO stock sale. We note that the CARs around the majority of earning announcements that take place before a sale are positive (56 percent versus 44 percent), while the majority of the CARs around announcements that take place after a sale are negative (54 percent versus 46 percent). The difference in proportions of positive versus negative CARs during the pre- and post-sale periods is statistically significant at the 1 percent level, as is the difference in earnings announcement returns (-1.76 percent, *t*-statistic = 3.38). The analysis in Panel B of Table 4 also shows a larger

and significant proportion of positive (negative) dividend announcement returns before (after) the stock sale (albeit using a considerably smaller sample).

Without strategic scheduling of stock sales, one should not expect to observe any difference in the earnings or dividend announcements that occur before or after a large CEO stock sale. However, the estimates in Table 4 suggest that 7 percent to 16 percent of the trades in our sample are timed to occur immediately before unfavorable earnings or dividend announcements and that 11 percent to 20 percent are timed to occur just after favorable announcements. This evidence suggests that some CEOs use their insider knowledge about earnings and dividend releases to conveniently time their stock sales.

Overall, the evidence to this point is consistent with the idea that some CEOs take advantage of their positions to inflate firm financial characteristics prior to selling shares or that, at a minimum, they use inside information about their firms' prospects to strategically time personal stock sales. In other words, they consciously make an effort to drive stock prices higher before they sell shares or they might trade on inside information in order to limit losses associated with anticipated price declines.

3.4 Falsification tests

Figure 2 and Table 3 show that growth rates of certain financial characteristics tend to be higher before and lower after large CEO sales. While the evidence in Table 3 suggests that these differences in growth rates do not reflect random events, we investigate this possibility further through falsification tests. We perform these tests by moving the sale date for each observation in our sample to the date which is exactly two years before the actual sale date and to the date which is exactly two years after the actual sale date. If the timing of the trades in our sample is

random and the trends in stock prices and financial characteristics that we observe are seasonal, then we should observe similar patterns around the "falsified" trade dates.

Figure 3 plots the CARs during the 40 trading days before and the 40 trading days after falsified dates that are two years before (solid line) and two years after (dotted line) the true sale date. In contrast to the patterns we observe in Figure 1, neither plot in Figure 3 illustrates an inverted V-shape, further suggesting that the timing of CEO large stock sales is not entirely random.

In unreported analyses we examine changes in the financial characteristics illustrated in Figure 2, but where two sets of alternative (falsified) CEO stock sale dates are used instead of the actual sale dates. One set of alternative dates includes those dates that are two years before the actual sale dates and the other set includes those dates that are two years after the actual sale dates. Overall, the changes in growth rates of financial characteristics that are illustrated in Figure 2 are not observed around either of the alternative sets of dates, which also suggests that some CEOs are strategically timing their trades.

3.5. Internal versus external news

CEOs have more control over the content and timing of some information disclosures. For example, the content and timing of news disclosed through a news release are easier to control than the content and timing of news disclosed by another party. If CEOs are manipulating the content of information disclosures and their timing, we would expect to observe differences in the nature of the disclosures around sales for news announced by the firm and for news announced by another party.

To investigate whether such differences exist, for each firm in our sample we conduct a free text search in Factiva to identify the most recent news about the firm within 40 days before

the sale of shares by the CEO and the first news about the firm within 40 days after the sale. We then classify the news as either positive or negative from the perspective of the firm's stockholders and as either internal or external, depending on whether it is announced by the firm (internal news) or not (external news).

Table 5 shows the frequencies of positive and negative announcements immediately before and immediately after the sale of stock by the CEO. We report this information for sub-samples based on whether the percentage of the CEOs shares that are sold is greater than or less than the median (Panel A) and also based on whether the news is generated internally (Panel B) or externally (Panel C).

Consistent with the idea that some CEOs are timing their sales, Panel A shows that, for all news, the frequency of negative news is greater after the sales. Some CEOs appear to be selling ahead of negative news announcements. Furthermore, Panels B and C indicate that this evidence is particularly strong for external news when the CEO is selling a relatively small proportion of his or her holdings. To the extent that they are timing their sales, CEOs largely avoid doing so around internally released news and when they are selling a larger portion of their holdings. This pattern suggests a conscious effort to avoid timing where it is easier to identify and where it is likely to attract the greatest attention.[3]

3.6. Discretionary versus non-discretionary news

Aside from the differences between internal and external news, we might also expect the

[3] To further explore the effect of ownership, in untabulated analyses we compare CEO ownership at firms in which the share price increases during the 40 trading days before the sale and decreases during the following 40 trading days (those potentially pumping and then dumping their shares) with the CEO ownership at firms with no increase in share price before the sale, but a decrease afterwards. We find that the former group of CEOs tend to have smaller ownership positions. The pump-and-dump group of CEOs (N=196) owns a mean (median) of 14.9 percent (10.4 percent) of their firm's shares while the corresponding mean (median) ownership of the other group of CEOs (N=175) is 20.0 percent (13.2 percent). The stock price movements at firms where the CEOs are selling a larger fraction of their shares are more consistent with pump-and-dump activities.

timing of CEO sales to differ between discretionary and non-discretionary news. To the extent that a firm exercises greater discretion over how and when information is disclosed, the CEO can do more than simply choose the timing of the sale−he or she can also determine the timing of the disclosure.

To evaluate the impact of discretion, we classify each of the news announcements as either discretionary or non-discretionary following the taxonomy suggested by Edmans, Goncalves-Pinto, Wang and Xu (2013). The results of this classification are reported in Table 6. The evidence in Table 6 is generally consistent with that in Table 5: CEOs make a conscious effort to avoid timing where it is easier to identify and where it is likely to attract the greatest attention (i.e., during discretionary disclosures). However, the evidence in Table 6 also suggests that some CEOs are timing sales around internal non-discretionary news. Specifically, some executives appear to sell their shares ahead of bad news announcements by the firm.

3.7. The effect of Rule 10b5-1 plans and corporate governance

Rule 10b5-1 can help managers reduce their exposure to allegations of trading on material non-public information. This is because sales under Rule 10b5-1 are presumably scheduled before managers are likely to have superior knowledge about the potential price at which the shares will be sold. As a result, stock sales under 10b5-1 plans are unlikely to be favorably timed by insiders.

Despite the limits imposed by the 10b5-1 rule, there is anecdotal evidence suggesting that some managers might still be able to trade on inside information even under this rule. For example, in a *Wall Street Journal* article, Kapner (2013) describes how the Chairman of Lululemon, Dennis Wilson, sold shares under a 10b5-1 plan shortly before a significant decline in the market price of those shares. Kapner notes that Mr. Wilson sold 607,545 Lululemon shares

at a price of $81.50 per share on the day that the company's CEO informed the board of her intention to step down. Four days later, when the CEO's departure was publically announced, the company's stock price dropped 17 percent, to $67.85 per shares.

We expect the legal protections provided by 10b5-1 plans to be especially valuable to CEOs who are selling large blocks of shares, given the visibility of these transactions. However, it is not obvious whether, as suggested by Jagolinzer (2008), the protections provided by such plans are used as a cover for strategic timing of the sales or whether large sales under 10b5-1 plans are not strategically timed. We provide evidence on these alternatives next.

Company proxy statements issued immediately prior to the sales in our sample indicate that 18.4 percent of the CEOs are subject to a 10b5-1 plan. Figure 4 illustrates the CARs from 40 days before to 40 days after the sales, for sample partitions based on whether the shares are sold under a 10b5-1 plan. The solid line shows that, on average, stock prices decline substantially following CEO stock sales at firms where the trades are not made as part of a 10b5-1 plan. In these cases, the average CEO avoids a loss of almost $900 thousand by selling shares prior to the stock price decline. At the same time, there is no suggestion in Figure 4 that stock sales are timed to take place before price declines when a 10b5-1 plan exists. Indeed, the average CAR is relatively flat following the sale date in cases where the firm reports the existence of such a plan. Notably, the absence of a meaningful share price decline following trades executed under 10b5-1 plans challenges the notion that the large stock sales we study mechanically trigger a drop in the stock price.

In Figure 4, trades in both subsamples tend to take place following positive CARs. Importantly, the positive average CAR prior to 10b5-1 plan sales suggests that there might be strategic timing in the sense that some of the CEOs in this group defer the sale until they think

that good information is fully reflected in their firms' share prices. As Sen (2008) notes, there can be no securities fraud under Rule 10b5-1 without an actual trade. A CEO can cancel a planned trade without legal exposure through the use of limit orders if the firm's stock price is likely to increase after the planned sale date due to the contemporaneous release of material non-public information. The observed pre-sale pattern in the average CAR for sales under 10b5-1 plans could result if CEOs systematically do this.

The evidence from our sample is consistent with the possibility that some CEOs time plan sales. The mean proceeds corresponding to stock sales under 10b5-1 plans are $1.2 million greater than they would have been if the sale had been executed 40 trading days earlier. The $1.2 million increase in the proceeds for trades under 10b5-1 plans appears to be economically important when benchmarked against the $0.54 million median compensation for the selling CEOs.

Table 7 provides a longer term perspective on the post-sale performance for the shares of the sample firms. On average, the abnormal stock price performance for firms with a 10b5-1 plan is positive, economically meaningful, and continues for at least three years. Indeed, the average monthly adjusted alpha over the three years following the sale is 2.09 percent. In contrast, on average, there is no post-sale positive abnormal performance without a 10b5-1 plan. This evidence suggests that the presence of a 10b5-1 plan indicates that the CEO intends to be less aggressive in timing sales, that a 10b5-1 plan makes it more difficult for the CEO to time sales, or both.

To obtain greater insight on the impact that 10b5-1 plans have on the abilities of the CEOs in our sample to time stock sales, we examine the differences between non-routine sales that occur in the presence of a 10b5-1 plan and those that do not. We do this because, while a

10b5-1 plan can make it more difficult to time sales, it is still possible that managers having sufficiently long foresight can still time trades within a plan. Non-routine trades are those where the timing of sales is most likely to have been opportunistic.

Figure 5 shows average CARs around non-routine trades that occur within 10b5-1 plans and those that that occur outside of such plans. In both cases, the sale date is near the peak in the plot, indicating that some sales are being timed in both sub-samples. In fact, both the run-up before the sale and the subsequent decline afterwards are greater around sales under 10b5-1 plans. This further suggests that 10b5-1 plans are not eliminating the ability of managers to behave opportunistically with regards to their stock trades and that the impact of such behavior is especially apparent with non-routine sales.

In Table 8 we split our sample by whether the trade occurs under a 10b5-1 plan (Panel A), and also by whether the absence (Panel B) or presence (Panel C) of this plan coincides with a routine stock sale or with a non-routine sale. The evidence indicates that timing of sales within a plan is much more likely around non-routine transactions, which are perhaps easier to camouflage.

Table 9 reports subsamples based on whether the stock sale by the CEO occurs under a 10b5-1 plan (Panel A), and also subsamples of trades without 10b5-1 plans (Panel B) and with these plans (Panel C) around news classified as discretionary and non-discretionary. The evidence here reveals that timing of sales within a plan is much more likely around non-discretionary news, which is possibly easier to disguise. However, while there appears to be some opportunistic timing under 10b5-1 plans, opportunism seems more pronounced in the absence of such plans.

We also find evidence that opportunistic trading under 10b5-1 plans is generally a larger problem with respect to external news than with internal news. This suggests that, like the CEOs in the sample as a whole, CEOs who sell under 10b5-1 plans are more likely to avoid opportunistic selling around news that they might be viewed as having greater control over. Panel A of Table 10 shows that the first news following the sale of the CEO's stock is more likely to be internal and negative for sales that *do not* take place under a plan than for sales that *do* take place under a plan.

Interestingly, when we focus on the subsample of non-routine stock sales, while the relation for internal negative news remains the same, the first news following sales under 10b5-1 plans is more likely to be discretionary. Since, discretionary news is news over which management can exercise discretion with regards to how and when the news is disclosed, this evidence suggests that there is some manipulation of the timing of this particular type of internal news by CEOs who sell shares under 10b5-1 plans.

Panel B in Table 10 suggests that opportunistic behavior on the part of selling CEOs goes beyond manipulation of the timing of sales or news immediately around the sales. This panel shows that accounting accruals are particularly large in the fiscal year immediately prior to the year in which the sale takes place and then drop in the year of the sale and remain lower in the subsequent year. This evidence is consistent with managers dressing up the books in anticipation of large stock sales under 10b5-1 plans. The statistics in Panel B for sales that do not take place pursuant to a 10b5-1 plan show a very different pattern. For these sales, mean accounting accruals are relatively low in the year before the sale, but then increase significantly during the year of the sale. This is consistent with CEOs selling shares as the accounting performance of their firms is beginning to deteriorate.

We next estimate four multivariate OLS regressions to further investigate the above evidence on 10b5-1 plans and to also examine the importance of other potential determinants of post-sale CARs on selling firm shares. The estimates are presented in Table 11. The dependent variable in all models in Table 11 is the CAR accruing from day +1 to day +40, relative to the date of the stock sale. Our regressions include varying controls for firm performance, transaction characteristics, firm governance attributes, and CEO compensation characteristics, as well as year and industry fixed effects.

The coefficient estimates in Table 11 for the 10b5-1 variable support the evidence in Figure 4 that post-transaction CARs at firms where no 10b5-1 plan is reported are lower than those at firms that report a 10b5-1 plan. In all tests, the coefficient estimates indicate that post-transaction CARs are about 8 percentage points lower, on average, at firms without a 10b5-1 plan.

The negative and significant coefficient estimates for the busy director variable in Table 11 are also noteworthy. Core, Holthausen, and Larcker (1999) document a positive correlation between excessive CEO compensation and busy directors, while Fich and Shivdasani (2006) show that board monitoring is ineffective when the majority of outside directors are busy. The evidence in Table 11 adds to that from those studies in that it suggests that busy directors might be less effective at representing outside stockholder interests when monitoring insider sales. The parameter estimate in Model 3 indicates that a single standard deviation increase in the percentage of busy directors reduces the post-sale CAR by 2.6 percent.

The results in Table 11 also reveal that post-stock-sales CARs increase with the number of outside directorships held by the CEO and with the total compensation that the CEO receives in the previous year. These results suggest that CEOs with more outside directorships and higher

recent compensation are, on average, less opportunistic in the timing of their stock sales. The reason for this is unclear. On one hand, it is possible that CEOs with more outside directorships and higher compensation value their labor market reputation more highly and, given the potential reputational costs, are less likely to find strategic timing of stock sales attractive (Fama, 1980). On the other hand, as suggested by Roulstone (2003), CEOs with lower compensation might be allowed by their boards to augment their compensation through beneficial timing of stock sales. In other words, the gains they earn through trading on superior information might be viewed as part of their overall compensation package.

Overall, the evidence in Table 11 suggests that 10b5-1 plans, governance structures, and compensation characteristics affect the extent to which the large stock sales executed by CEOs in our sample are informed trades. These results provide important evidence related to the potential catalysts and deterrents of insider trading activity by some CEOs.

4. Conclusions and discussion

We find evidence that CEOs time large stock sales regardless of whether they face Rule 105b-1 restrictions. Sales within such plans are preceded by an average 40 day CAR of 10 percent, but, on average, the CAR over the following 40 days is approximately 0 percent. These findings indicate that, with respect to the large stock sales that we examine, such plans limit the ability of some CEOs to trade on negative short-term information. In contrast, similar trades that take place outside of these plans are preceded by an average 40 day CAR of approximately 4 percent and followed by an average 40 day CAR of -8 percent. This evidence suggests that 10b5-1 plans make it more difficult for some CEOs to time their sales so that they take place before bad news is revealed to the market. However, the evidence also suggests that many CEOs in our sample are able to sell a considerable amount of stock at an advantageous time even when they

sell it as part of a 10b5-1 plan. Specifically, we find that the timing of sales under 10b5-1 plans augments the proceeds of the trade by about $1.2 million. Importantly, firms in which some CEOs sell their personal shares under 10b5-1 plans, exhibit earnings management and news release timing patterns that beneficially affect their stock prices when the planned sales are executed.

Our results also indicate that CARs following large CEO stock sales are more negative at firms with a greater number of independent board members classified as busy directors. However, these CARs are positively related to the number of outside directorships held by the CEO and to the compensation the executive receives. These relations indicate that corporate governance factors (such as the monitoring of the board, the level of managerial incentives, and the reputation of the CEOs) affect the ability and willingness of these executives to strategically time large stock sales for their personal gain.

References

Agrawal, A., and Nasser, T., 2012. Insider trading and takeover targets. Journal of Corporate Finance 18, 598-625.

Bergstresser, D., and Philippon, T., 2006. CEO incentives and earnings management. Journal of Financial Economics 80, 511-529.

Bettis, J. C., Coles, J. L., Lemmon, M. L., 2000. Corporate policies restricting trading by insiders. Journal of Financial Economics 57, 191-220.

Bhattacharya, U., and Daouk, H., 2002. The world price of insider trading. Journal of Finance 57, 75-108.

Brochet, F., 2010. Information content of insider trades before and after the Sarbanes-Oxley Act. Accounting Review 85, 419-446.

Bushman, R. M., Piotroski, J. D., and Smith, A. J., 2005. Insider trading restrictions and analysts' incentives to follow firms. Journal of Finance 60, 35-66.

Carlton, D., and Fischel, D., 1983. The regulation of insider trading, Stanford Law Review 35, 857-895.

Cognetti, C., 2013. Rule 10b5-1 trading plans: Update and best practices (Morgan Stanley).

Cohen, L., Malloy, C., and Pomorski, L., 2012. Decoding inside information. Journal of Finance 67, 1009-1043.

Coles, J., Lemmon, M., and Meschke, F. 2012. Structural models and endogeneity in corporate finance: The link between managerial ownership and corporate performance. Journal of Financial Economics 103, 149-168.

Core, J., Holthausen, R., Larcker, D. 1999. Corporate governance, chief executive officer compensation, and firm performance. Journal of Financial Economics 51, 371-406.

Cornell, B., and Sirri, E. R., 1992. The reaction of investors and stock prices to insider trading. Journal of Finance 47, 1031-1059.

Dechow, P., Sloan, R., Sweeney, A., 1995. Detecting earnings management. Accounting Review 70, 193-225.

Dechow, P., Dichev, I., 2002. The quality of accruals and earnings: The role of accrual estimation errors. Accounting Review 77, 35-59.

Edmans, A., Goncalves-Pinto, L., Wang, Y., and Xu, M., 2013. Corporate news release and equity vesting. NBER Working Paper No. w20476.

Fama, E., 1980. Agency problems and the theory of the firm. Journal of Political Economy 88, 288-307.

Fich, E. M., and Shivdasani, A., 2006. Are busy boards effective monitors? Journal of Finance 61, 689-724.

Finnerty, J. E., 1976a. Insiders' activity and inside information: A multivariate analysis. Journal of Financial and Quantitative Analysis 11, 205-215.

Finnerty, J. E., 1976b. Insiders and market efficiency. Journal of Finance 31, 1141-1148.

Gosnell, T., Keown, A. J., and Pinkerton, J. M., 1992. Bankruptcy and insider trading: Differences between exchange-listed and OTC firms. Journal of Finance 47, 349-362.

Gurun, U. G., and Butler, A. W., 2012. Don't believe the hype: Local media slant, local advertising, and firm value. Journal of Finance 67, 561-597.

Harris, M., and Raviv, A., 2008. A theory of board control and size. Review of Financial Studies 21, 1797-1832.

Hermalin, B., and Weisbach, M., 1998. Endogenously chosen boards of directors and their monitoring of the CEO. American Economic Review 88, 96–118.

Henderson, M. T., Jagolinzer, A. D., and Muller, K. A. III, 2012. Hiding in plain sight: Can disclosure enhance Insiders' trade returns. Unpublished working paper, The University of Chicago Law School.

Hirschey, M., and Zaima, J. K., 1989. Insider trading, ownership structure, and the market assessment of corporate sell-offs. Journal of Finance 44, 971-980.

Huson, M. R., Malatesta, P. H., and Parrino, R., 2004. Managerial succession and firm performance. Journal of Financial Economics 74, 237-75.

Jaffe, J. F., 1974. The effect of regulation changes on insider trading. The Bell Journal of Economics and Management Science 5, 93-121.

Jagolinzer, A. D., 2008. SEC Rule 10b5-1 and insiders' strategic trade. Unpublished working paper, Graduate School of Business, Stanford University.

Jagolinzer, A. D., Larcker, D. F., and Taylor, D. J., 2011. Corporate governance and the information content of insider trades. Unpublished working paper, Leeds School of Business, University of Colorado.

John, K., and Mishra, B., 1990. Information content of insider trading around corporate announcements: The case of capital expenditures. Journal of Finance 45, 835-855.

Jones, J., 1991. Earnings management during import relief investigations. Journal of Accounting Research 29, 193-228.

Kapner, S., 2013. Timing Aids Lululemon Insider. The Wall Street Journal, page B1, June 13.

Kim, E., and Lu., Y. 2011. CEO ownership, external governance, and risk-taking. Journal of Financial Economics 102, 272-292.

Kim, Y. H., and Meschke, F., 2011. CEO interviews on CNBC. Unpublished working paper, Nanyang Business School.

Lin, J., and Howe, J. S., 1990. Insider trading in the OTC Market. Journal of Finance 45, 1273-1284.

Lorie, J. H., and Niederhoffer, V., 1968. Predictive and statistical properties of insider trading. Journal of Law and Economics 11, 35-53.

Marin, J. M., and Olivier, J. P., 2008. The dog that did not bark: Insider trading and crashes. Journal of Finance 58, 2429-2476.

Meulbroek, L. K., 1992. An empirical analysis of illegal insider trading. Journal of Finance 47, 1661-1699.

Murphy, K. J., and Zimmerman, J. L., 1993. Financial performance surrounding CEO turnover, Journal of Accounting and Economics 16, 273-315.

Ofek, E., and Yermack, D., 2000. Taking stock: Equity-based compensation and the evolution of managerial ownership. Journal of Finance 55, 1367–1384.

Rozeff, M. S., and Zaman, M. A., 1998. Overreaction and insider trading: Evidence from growth and value portfolios. Journal of Finance 53, 701-716.

Ross, S. A., 2004. Compensation, incentives, and the duality of risk aversion and riskiness. Journal of Finance 59, 207-225.

Roulstone, D., 2003. The relation between insider-trading restrictions and executive compensation. Journal of Accounting Research 41, 525-551.

Sen, R., 2008. Are insider sales under 10b5-1 plans strategically timed? Unpublished working paper, Stern School of Business, New York University.

Seyhun, H. N., 1986. Insiders' profits, costs of trading, and market efficiency. Journal of Financial Economics 16, 189-212.

Seyhun, H. N., 1988. The January effect and aggregate insider trading. Journal of Finance 43, 129-141.

Seyhun, H. N., 1992. The effectiveness of the insider-trading sanctions, Journal of Law and Economics 35, 149-182.

Solomon, D. H., 2012. Selective publicity and stock prices. Journal of Finance 67, 599-637.

Tetlock, P. C., 2007. Giving content to investor sentiment: The role of media in the stock market. Journal of Finance 62, 1139-1168.

Table 1: Sample statistics

Sample statistics for 610 stock sales by CEOs involving shares an aggregate value of at least one percent of firm market capitalization. The sales took place at 378 firms over the 2003 to 2009 period. The financial characteristics are as of the end of the quarter in which the sale took place. The CEO and governance characteristics are from the most recent annual proxy statement dated prior to the date on which the firm reported the sales in an SEC filing. All variables are reported at the transaction level.

Panel A: Firm and transaction characteristics

	Mean	Median	Q1	Q3	σ
Financial characteristics:					
Market value of equity (millions of US$)	846.3	303.8	92.4	793.6	1,906.1
Tobin's q	2.89	1.91	1.29	3.12	2.83
Leverage	0.181	0.095	0.001	0.260	0.255
Transaction characteristics:					
Number of shares (millions)	551.0	282.4	120.0	520.0	1,3440
Proportion of total shares outstanding	0.022	0.016	0.011	0.025	0.021
Proportion of CEO holdings	0.236	0.143	0.070	0.297	0.242
Transaction value (millions of US$)	11.527	3.248	1.244	10.491	38.987

Panel B: CEO and governance characteristics

Governance characteristics	Mean	Median
Board size	7.25	7.00
Classified board (0,1)	0.472	
Fraction of independent directors	0.695	0.714
Fraction of busy independent directors	0.311	0.250

CEO characteristics	Mean	Median
Age	54.6	56.0
Tenure	11.3	10.0
Chairman (0,1)	0.772	
Outside directorships	0.58	0.00
Fractional CEO ownership	0.176	0.115
CEO compensation (US$ mil)	1.198	0.544
Pay slice	0.383	0.364
Golden parachute (0,1)	0.507	
10b5-1 plan (0,1)	0.184	

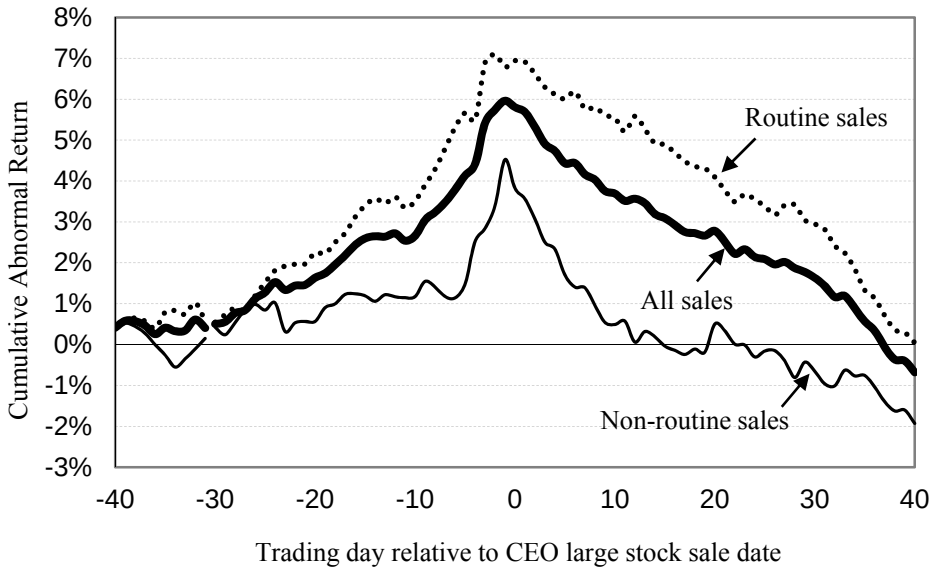

Figure 1: Abnormal returns around large CEO stock sales

These plots illustrate cumulative abnormal returns (CARs) from 40 trading days before to 40 trading days after 610 stock sales by CEOs which involve one percent or more of the firm's market capitalization. Routine sales are those that occur within 14 days of the one year anniversary of a previous sale by the same CEO. Non-routine sales are those that do not occur within 14 days of such an anniversary.

Table 2: Cumulative abnormal returns around dates of large CEO stock sales

This table reports cumulative abnormal returns (CARs) and net-of-market returns around 610 large CEO stock sales. The subscript denotes the number of trading days relative to the stock sales date, *t*. We report the mean and median CAR values, *t* test statistics for the null hypothesis that the CAR values equal zero, signed rank test statistics, and the percentage of CAR observations that have positive or negative values. The market model is estimated using a one year estimation period that ends 41 trading days before the reported stock sale date. The symbols *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Benchmark Portfolio Weighting:	Equal	Value
CAR[t_{-40},t_{-1}]		
Mean	5.83%	5.96%
Median	3.44%	3.50%
t-statistic	3.79***	3.88***
Signed rank	18,358***	18,672***
Percent positive	56.7%	57.4%
CAR[t_{+1},t_{+40}]		
Mean	-6.22%	-6.48%
Median	-4.28%	-4.37%
t-statistic	-5.50***	-5.63***
Signed rank	-27,394***	-29,672***
Percent negative	60.2%	60.8%

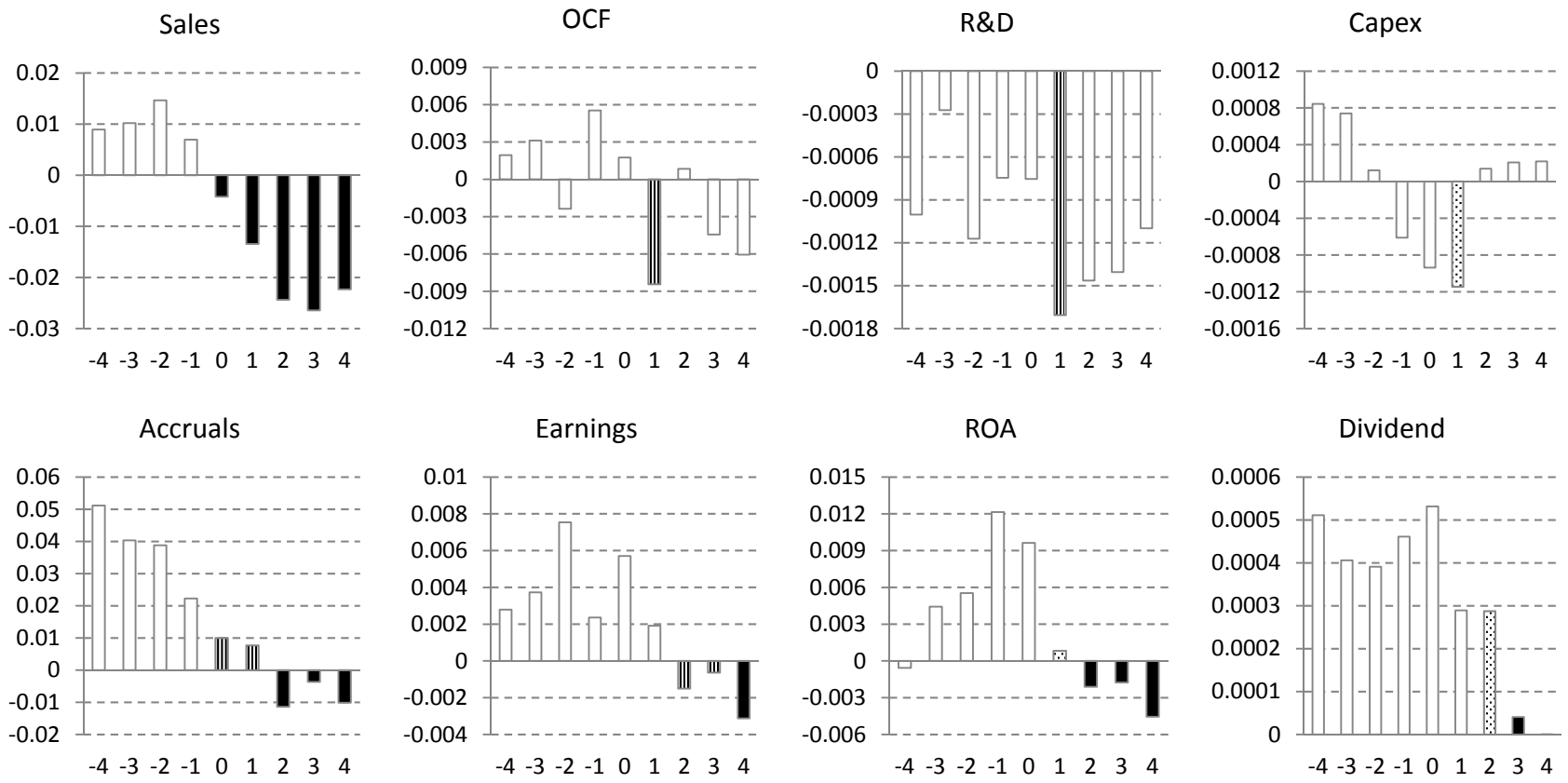

Figure 2: Average growth rate for financial variables surrounding CEO large stock sales.

Growth is the change in value between quarter *t* and quarter *t*-4. All variables (except for ROA) are scaled by total assets. The X-axis represents the quarter relative to the CEO stock sales event. The shading indicates whether the growth in each of the quarters from 0 to 4 is significantly different from the growth in quarters -4 through -1. The significance levels are determined by estimating the following pooled cross-sectional time-series regression: Financial variable $_{it} = a + b_0$ Quarter 0 $_{it} + b_1$ Quarter 1 $_{it} + b_2$ Quarter 2 $_{it} + b_3$ Quarter 3 $_{it} + b_4$ Quarter 4 $_{it}$. The solid, striped, and dotted shades denote statistical significance at the 1%, 5%, and 10% level, respectively.

Table 3: The relation between financial variables and the timing of large CEO stock sales

The sample include 9 quarters of financial data from quarter -4 through +4 with quarter 0 being the timing of 610 large CEO stock sales. Post-CEO-sales quarter (0,1) equals one if quarter *t* is after large CEO stock sales (*t* = +1 to +4). All financial variables at quarter *t* are the change in value between quarter *t* and quarter *t*-4. All variables (except for ROA) are scaled by total assets. We report *p*-values in parentheses. The symbols *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable =	Model 1 Sales $_t$	Model 2 OCF $_t$	Model 3 R&D $_t$	Model 4 CAPX $_t$	Model 5 Accruals $_t$	Model 6 Earnings $_t$	Model 7 ROA $_t$	Model 8 Dividend $_t$
Intercept	-0.0082	-0.0072	0.0016*	-0.0026*	0.0414	-0.0135***	-0.0089*	0.0000
	(0.4357)	(0.4629)	(0.0573)	(0.0825)	(0.1032)	(0.0025)	(0.0510)	(0.8173)
Post-CEO-sales quarter (0,1)	-0.0252***	-0.0059*	-0.0007***	-0.0003	-0.0389***	-0.0033**	-0.0051***	-0.0003***
	(0.0001)	(0.0531)	(0.0052)	(0.4915)	(0.0001)	(0.0153)	(0.0003)	(0.0001)
Market adjusted stock return $_t$	0.0330***	0.0032	-0.0005	-0.0004	-0.0101	0.0121***	0.0203***	0.0002**
	(0.0001)	(0.4432)	(0.1580)	(0.5078)	(0.3504)	(0.0001)	(0.0001)	(0.0431)
Market adjusted stock return $_{t-1}$	0.0063	-0.0004	-0.0011***	-0.0006	0.0114	0.0139***	0.0164***	0.0002**
	(0.1008)	(0.9154)	(0.0006)	(0.2978)	(0.2164)	(0.0001)	(0.0001)	(0.0321)
Year 2003	0.0320***	0.0166*	-0.0006	0.0044***	-0.0166	0.0164***	0.0139***	0.0002
	(0.0012)	(0.0722)	(0.4572)	(0.0014)	(0.4855)	(0.0001)	(0.0011)	(0.3208)
Year 2004	0.0272***	0.0105	-0.0015*	0.0050***	-0.0108	0.0143***	0.0111**	0.0005**
	(0.0064)	(0.2612)	(0.0652)	(0.0004)	(0.6518)	(0.0007)	(0.0100)	(0.0139)
Year 2005	0.0216**	0.0166*	-0.0019**	0.0039***	-0.0140	0.0154***	0.0135***	0.0002
	(0.0304)	(0.0749)	(0.0179)	(0.0053)	(0.5597)	(0.0003)	(0.0017)	(0.3062)
Year 2006	0.0223**	0.0159*	-0.0014*	0.0047***	-0.0614**	0.0132***	0.0068	0.0003
	(0.0281)	(0.0948)	(0.0940)	(0.0011)	(0.0122)	(0.0021)	(0.1215)	(0.1340)
Year 2007	0.0175	0.0312***	-0.0015*	0.0042***	-0.0491*	0.0105**	0.0101**	0.0006***
	(0.1032)	(0.0019)	(0.0936)	(0.0055)	(0.0583)	(0.0213)	(0.0289)	(0.0066)
Year 2008	0.0075	-0.0014	-0.0022**	-0.0010	0.0034	0.0087*	0.0038	0.0004**
	(0.5001)	(0.8916)	(0.0154)	(0.5327)	(0.8971)	(0.0613)	(0.4207)	(0.0363)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	5,490	5,490	5,490	5,490	5,490	5,490	5,490	5,490
Adjusted R^2	0.039	0.014	0.049	0.016	0.039	0.046	0.078	0.031
Regression's *p*-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Table 4: Earnings and dividend announcement returns surrounding large CEO stock sales

Two-day CARs around quarterly earnings and dividend announcements for sub-samples of such announcements that occur within 40 trading days before and 40 trading days after large CEO stock sales.

Panel A: Earnings announcements				
Timing of announcement relative to stock sales date	$[t_{-40},t_{-1}]$ N = 474	$[t_{+1},t_{+40}]$ N= 205	z-statistic for difference in proportions	
Positive	55.91%	46.34%	4.11	
Negative	44.09%	53.66%		
Announcement return	1.54%	-0.21%	Difference (t-stat)	-1.76% (-3.38)
Panel B: Dividend announcements				
Timing of announcement relative to stock sales date	$[t_{-40},t_{-1}]$ N = 10	$[t_{+1},t_{+40}]$ N= 7	z-statistic for difference in proportions	
Positive	60.00%	42.86%	7.37	
Negative	40.00%	57.14%		
Announcement return	1.47%	-1.15%	Difference (t-stat)	-2.62% (-2.52)

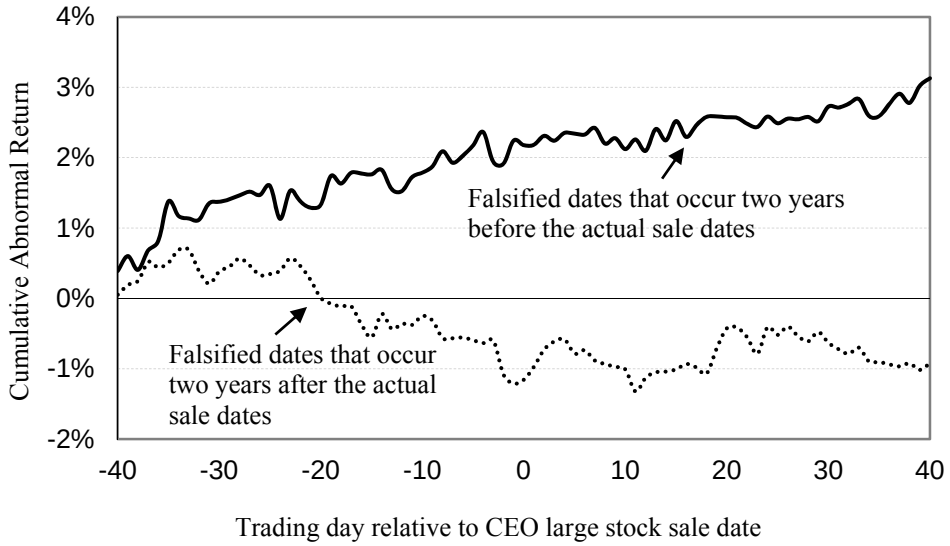

Figure 3: Stockholder returns surrounding falsified dates for large CEO stock sales.

Cumulative abnormal returns (CARs) from 40 trading days before to 40 trading days after large CEO stock sales dates. CARs are estimated using a market model with a one year estimation period that ends 41 trading days before the stock sales date. The solid line shows the CARs around "falsified" dates that are 2 years before the actual sale dates. The dotted line shows the CARs around "falsified" dates that are 2 years after the actual sale dates.

Table 5: Stock sales around the release of internal and external news

Percentages of positive and negative announcements before and after the sale by the CEO of stock with an aggregate value greater than one percent of the firm's market capitalization. Data are for 610 sales over the 2003 through 2009 period. Panel A presents percentages and tests of differences in those percentages between sudsamples based upon whether the percentage of the CEO's total holdings that were sold were above or below the median value of this percentage across the 1,081 news. Panel B reports statistics like those in Panel A, but for internal news only. Panel C reports statistics like those in Panel A, but for external news only. Internal news is defined as news that is announced by firm representatives. External news is news that is reported by a source outside the firm. The statistics in all panels are for the last news announcement prior to the sale and for the first news announcement immediately after the sale.

	Timing of Press Release Relative to Date Stock Was Sold		z-Statistic for Difference in Proportions
	$[t_{-40},t_{-1}]$	$[t_{+1},t_{+40}]$	
Panel A: All news			
Sales where the percentage of the CEO's shares sold is above the median			
Number of observations	284	220	
Percent positive announcements	73.59	63.18	2.51
Percent negative announcements	26.41	36.82	
Sales where the percentage of the CEO's shares sold is below the median			
Number of observations	302	275	
Percent positive announcements	77.82	63.64	3.75
Percent negative announcements	22.19	36.36	
z-statistic for difference in proportions	-1.19	-0.10	
Panel B: Internal news			
Sales where the percentage of the CEO's shares sold is above the median			
Number of observations	221	138	
Percent positive announcements	81.90	77.54	1.01
Percent negative announcements	18.10	22.46	
Sales where the percentage of the CEO's shares sold is below the median			
Number of observations	232	185	
Percent positive announcements	82.76	79.46	0.86
Percent negative announcements	17.24	20.54	
z-statistic for difference in proportions	-0.24	-0.42	
Panel C: External news			
Sales where the percentage of the CEO's shares sold is above the median			
Number of observations	63	82	
Percent positive announcements	44.44	39.02	0.66
Percent negative announcements	55.56	60.98	
Sales where the percentage of the CEO's shares sold is below the median			
Number of observations	70	90	
Percent positive announcements	61.43	31.11	3.83
Percent negative announcements	38.57	68.89	
z-statistic for difference in proportions	-1.96	1.09	

Table 6: Stock sales around the release of discretionary and non-discretionary news

Percentages of positive and negative announcements before and after sales by CEOs of more than one percent of their firm's shares. Data are for 610 sales over the 2003 through 2009 period. Panel A presents percentages and tests of differences in those percentages between sudsamples based upon whether the news is discretionary or non-discretionary. Panel B reports statistics like those in Panel A, but for internal news only. Panel C reports statistics like those in Panel A, but for external news only. Discretionary news is news over which management can exercise discretion with regards to how and when the news is disclosed. Non-discretionary news is that where the disclosure is not under control of management. Internal news is defined as news that is announced by firm representatives. External news is news that is reported by a source outside the firm. The statistics in all panels are for the last news announcement prior to the sale and for the first news announcement immediately after the sale.

	Timing of Press Release Relative to Date Stock Was Sold		z-Statistic for Difference in Proportions
	$[t_{-40},t_{-1}]$	$[t_{+1},t_{+40}]$	
Panel A: All news			
Discretionary news			
Number of observations	183	195	
Percent positive announcements	85.79	88.21	-0.70
Percent negative announcements	14.21	11.80	
Non-discretionary news			
Number of observations	451	337	
Percent positive announcements	71.62	49.85	6.24
Percent negative announcements	28.38	50.15	
z-statistic for difference in proportions	3.77	8.88	
Panel B: Internal news			
Discretionary news			
Number of observations	174	189	
Percent positive announcements	87.36	91.01	-1.12
Percent negative announcements	12.64	9.00	
Non-discretionary news			
Number of observations	321	160	
Percent positive announcements	79.13	64.38	3.49
Percent negative announcements	20.87	35.63	
z-statistic for difference in proportions	2.28	6.06	
Panel C: External news			
Discretionary news			
Number of observations	9	6	
Percent positive announcements	55.56	0.00	2.24
Percent negative announcements	44.44	100.00	
Non-discretionary news			
Number of observations	130	177	
Percent positive announcements	53.08	36.72	2.85
Percent negative announcements	46.92	63.28	
z-statistic for difference in proportions	0.14	-1.85	

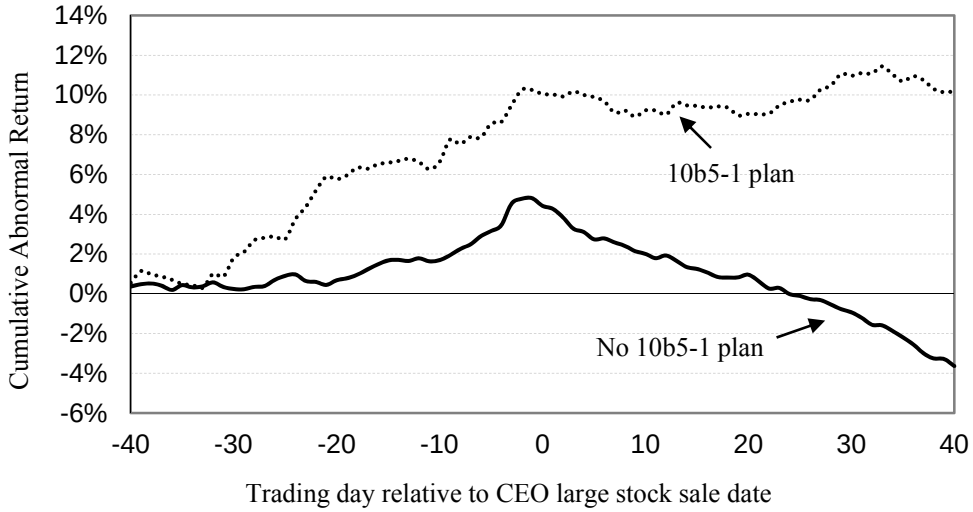

Figure 4: 10b5-1 plan and returns surrounding large CEO stock sale dates.

The plots show cumulative abnormal returns (CARs) from 40 trading days before to 40 trading days after large CEO stock sales dates. CARs are estimated using a market model with a one year estimation period that ends 41 trading days before the reported stock sales date. The dotted line shows the CARs of transactions executed under a 10b5-1 plan while the solid line shows the CARs of transactions in which the sale is not part of a 10b5-1 plan.

Table 7: Average monthly alphas following large CEO stock sales

This table reports the average monthly alpha relative to equally-weighted CRSP market return for one year and three years following the sale of a one percent or greater ownership interest by the CEO. Data are for 610 sales over the 2003 through 2009 period. Abnormal stock returns are estimated using calendar time portfolio regressions. In each month, all firms that have experienced a large sale with (without) a 10b5-1 plan within the previous 12 or 36 months are included in that month's portfolio of Plan 10b-5 (No Plan 10b-5). Equally weighted portfolio returns are calculated for each month and benchmarked against the Fama-French three factor model. The factors are obtained from Professor French's website. The intercept α measures the monthly abnormal return conditioned on the model. The adjusted intercept, Adj.α, equals the difference between the estimated intercept and the average intercept from 1,000 calendar-time portfolio regressions for portfolios formed from randomly selected firms from the same size and book-to-market quintiles (using CRSP data) as the firms used to construct the sample portfolios. *T-statistics* are reported in parentheses.

No Plan 10b5-1		Plan 10b5-1		Difference	
α	Adj. α	α	Adj. α	α	Adj. α
One year following sale:					
0.33%	-0.30%	3.55%	2.45%	3.22%	2.75%
(0.61)	(-0.56)	(3.76)	(2.60)	(3.05)	(2.60)
Three years following sale:					
0.28%	-0.01%	2.58%	2.09%	2.30%	2.10%
(0.75)	(-0.02)	(2.62)	(2.12)	(2.26)	(2.06)

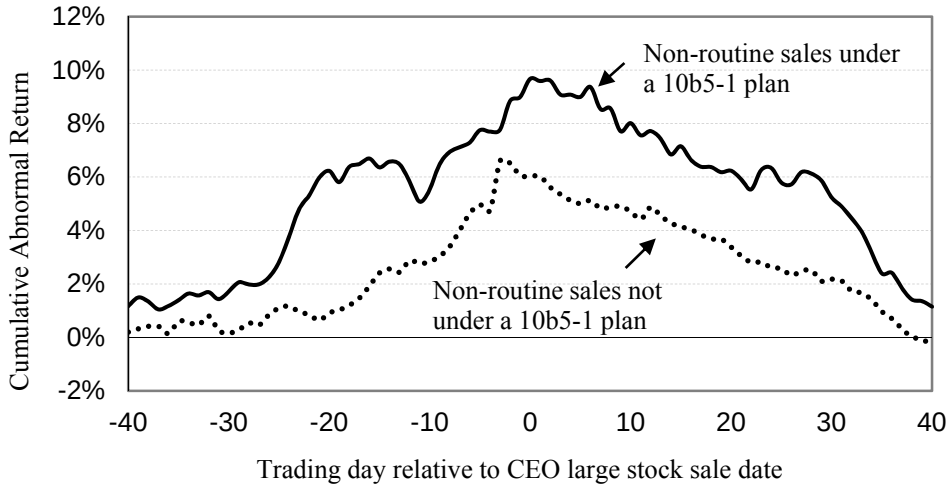

Figure 5: Abnormal returns around routine and non-routine sales

These plots illustrate cumulative abnormal returns (CARs) from 40 trading days before to 40 trading days after 610 stock sales by CEOs which involve one percent or more of the firm's market capitalization. Plots are presented for non-routine sales that occur pursuant to a 10b5-1 plan and those that do not.

Table 8: Routine vs. non-routine stock sales

Percentages of positive and negative returns before and after sales by CEOs of more than one percent of their firm's shares. Data are for 610 sales over the 2003 through 2009 period. Panel A presents percentages and tests of differences in those percentages between subsamples based upon whether the sales are routine or non-routine. Panel B reports statistics like those in Panel A, but for sales without a 10b5-1 plan only. Panel C reports statistics like those in Panel A, but for sales with a 10b5-1 plan only. Each sale is classified based on the trading history for each selling CEO. We begin by obtaining all sales, regardless of size, that are listed for each CEO in the Thomson Insider database. We classify a sale on our sample as routine if it is dated within 14 days of the one-year anniversary of a previous sale by the same CEO. Sales are classified as non-routine otherwise.

	Returns window relative to the sales		z-Statistic for Difference in Proportions
	$[t_{-40},t_{-1}]$	$[t_{+1},t_{+40}]$	
Panel A: Complete sample			
Routine sales			
Number of observations	223	223	
Percent positive returns	56.95	47.09	2.08
Percent negative returns	43.05	52.91	
Non-routine sales			
Number of observations	387	387	
Percent positive returns	56.59	35.66	5.84
Percent negative returns	43.41	64.34	
z-statistic for difference in proportions	0.09	2.78	
Panel B: No 10b5-1 plan			
Routine sales			
Number of observations	171	171	
Percent positive returns	55.56	42.69	2.38
Percent negative returns	44.44	57.31	
Non-routine sales			
Number of observations	327	327	
Percent positive returns	53.21	33.03	5.21
Percent negative returns	46.79	66.97	
z-statistic for difference in proportions	0.50	2.13	
Panel C: 10b5-1 plan			
Routine sales			
Number of observations	52	52	
Percent positive returns	61.54	61.54	0.00
Percent negative returns	38.46	38.46	
Non-routine sales			
Number of observations	60	60	
Percent positive returns	75.00	50.00	2.83
Percent negative returns	25.00	50.00	
z-statistic for difference in proportions	-1.53	1.23	

Table 9: Stock sales sorted by 10b5-1 plan coverage

Percentages of positive and negative announcements before and after sales by CEOs of more than one percent of their firm's shares. Data are for 610 sales over the 2003 through 2009 period. Panel A presents percentages and tests of differences in those percentages between subsamples based upon whether the news is discretionary or non-discretionary. Panel B reports statistics like those in Panel A, but for sales without a 10b5-1 plan only. Panel C reports statistics like those in Panel A, but for sales with a 10b5-1 plan only. Discretionary news is news over which management can exercise discretion with regards to how and when the news is disclosed. Non-discretionary news is that where the disclosure is not under control of management. Internal news is defined as news that is announced by firm representatives. External news is news that is reported by a source outside the firm. The statistics in all panels are for the last news announcement prior to the sale and for the first news announcement immediately after the sale.

	Timing of Press Release Relative to Date Stock Was Sold		z-Statistic for Difference in Proportions
	$[t_{-40},t_{-1}]$	$[t_{+1},t_{+40}]$	
Panel A: Complete sample			
Discretionary news			
Number of observations	183	195	
Percent positive announcements	85.79	88.21	-0.70
Percent negative announcements	14.21	11.80	
Non-discretionary news			
Number of observations	451	337	
Percent positive announcements	71.62	49.85	6.24
Percent negative announcements	28.38	50.15	
z-statistic for difference in proportions	3.77	8.88	
Panel B: No 10b5-1 plan			
Discretionary news			
Number of observations	142	159	
Percent positive announcements	82.39	86.16	-0.90
Percent negative announcements	17.61	13.84	
Non-discretionary news			
Number of observations	376	275	
Percent positive announcements	72.07	48.00	6.25
Percent negative announcements	27.93	52.00	
z-statistic for difference in proportions	2.42	7.89	
Panel C: 10b5-1 plan			
Discretionary news			
Number of observations	41	36	
Percent positive announcements	97.56	97.22	0.09
Percent negative announcements	2.44	2.78	
Non-discretionary news			
Number of observations	75	62	
Percent positive announcements	69.33	58.06	1.37
Percent negative announcements	30.67	41.94	
z-statistic for difference in proportions	3.59	4.18	

Table 10: Release of news after and accounting accruals around CEO stock sales

News releases following and accounting accruals around large CEO stock sales. Data are for 610 sales over the 2003 through 2009 period. Panel A presents statistics on the release of news immediately following large CEO stock sales for sales not under a 10b5-1 plan and sales under a 10b5-1 plan. Panel B presents statistics on accounting accruals during the fiscal year before, during, and after the CEO sells shares. Accruals are computed using the modification of the Jones method (Jones, 1991) that was proposed by Dechow, Sloan, and Sweeney (1995) and the method proposed by Dechow and Dichev (2001).

Panel A: Type of first news after CEO stock sales as a percentage of all first news

		No 10b5-1 Plan	10b5-1 Plan	z-Statistic for Difference
	(1)	(2)	(3)	(2) - (3)
All stock sales				
Percent discretionary news	25.57	24.70	29.46	-1.04
Percent negative internal news	8.20	9.24	3.57	1.98**
Number of observations	610	498	112	
Non-routine stock sales				
Percent discretionary news	23.51	21.41	35.00	-2.28**
Negative internal news	8.79	9.48	5.00	1.13
Number of observations	387	327	60	

Panel B: Accounting accruals during fiscal years before, during, and after year CEO sells shares

	Year Before the Stock Sale	Year Of the Stock Sale	Year After the Stock Sale	t-Statistic for Difference in Indicated Columns	
	(1)	(2)	(3)	(1) - (2)	(1) - (3)
10b5-1 plan					
Modified Jones	0.1808	-0.1355	0.0191	1.73*	0.85
Dechow-Dichev	0.2406	-0.0846	-0.0339	2.46**	2.20**
No 10b5-1 plan					
Modified Jones	-0.1565	0.0734	-0.0131	-2.53**	-1.64
Dechow-Dichev	-0.1109	0.0050	-0.0176	-1.81*	-1.53

Table 11: Regression model of cumulative abnormal returns following large CEO stock sales

The table reports ordinary least squares estimates for models of cumulative abnormal returns (CARs) over the 40 days following large CEO stock sales. CARs are estimated from a market model described in previous tables. All variables are defined in the Appendix. We report *p*-values in parentheses. The symbols *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

The effects of 10b5-1 plan				
Dependent variable = CAR[t_{+1},t_{+40}]	Model 1	Model 2	Model 3	Model 4
Benchmark portfolio weighting:	Equal	Value	Equal	Value
No 10b5-1 plan (0,1)	-0.0794***	-0.0835***	-0.0729**	-0.0768**
	(0.0056)	(0.0041)	(0.0227)	(0.0171)
ln(Stock sale proceeds)	-0.0073	-0.0124	-0.0101	-0.0145
	(0.6220)	(0.4084)	(0.5376)	(0.3792)
Reporting lag	0.0044	0.1445	0.0967	0.3395
	(0.9975)	(0.9170)	(0.9459)	(0.8126)
Firm size	0.0229	0.0238	0.0243	0.0249
	(0.1160)	(0.1067)	(0.1556)	(0.1486)
Tobin's *q*	-0.0210***	-0.0206***	-0.0246***	-0.0243***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Leverage	-0.0017	0.0125	-0.0018	0.0178
	(0.9708)	(0.7963)	(0.9715)	(0.7285)
CAR[t_{-40},t_{-1}]	0.2350***	0.2166***	0.2956***	0.2792***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Classified board (0,1)			-0.0228	-0.0219
			(0.3820)	(0.4042)
Golden parachute (0,1)			0.0006	-0.0002
			(0.9828)	(0.9955)
Board size			0.0344	0.0483
			(0.5893)	(0.4519)
Percentage of independent directors			0.0646	0.0449
			(0.5231)	(0.6592)
Percentage of busy independent directors			-0.0922**	-0.0819*
			(0.0468)	(0.0793)
Number of CEO's outside directorships			0.0230**	0.0211*
			(0.0348)	(0.0542)
CEO's ownership (as % of firm's outstanding)			0.0735	0.0999
			(0.4216)	(0.2776)
CEO-Chairman (0,1)			-0.0243	-0.0375
			(0.4486)	(0.2441)
CEO's age			-0.0383	-0.0385
			(0.6411)	(0.6413)
CEO's tenure			0.0009	0.0015
			(0.6268)	(0.4154)
CEO's total compensation			0.0176**	0.0153*
			(0.0254)	(0.0527)
CEO's pay slice			-0.0369	-0.0035
			(0.6978)	(0.9704)
Intercept	-0.0531	0.0346	-0.1992	-0.1211
	(0.7790)	(0.8570)	(0.6499)	(0.7840)
Year and industry fixed effects	Yes	Yes	Yes	Yes
N	610	610	477	477
Adjusted R^2	0.2498	0.2563	0.2557	0.2635
Regression's *p*-value	0.0001	0.0001	0.0001	0.0001

Appendix: Variable definitions

Transaction variables	*Sources: Thomson Reuters and CRSP*
Transaction date	the date of the stock sale
Filing date	the date when the stock sale transaction is filed with the SEC
Number of shares	number of shares in the stock sale transaction
Stock sale proceeds	the value of the stock sale transaction, which equals the selling price times the number of shares
Pre-sale CAR(-40,-1)	the cumulative abnormal return over the window (-40,-1) relative to the transaction date, where the return is estimated from a market model that uses a one year estimation period that stops 41 trading days before the transaction date.
Post-sale CAR(+1,+40)	the cumulative abnormal return over the window (+1,+40) relative to the transaction date, where the return is estimated from a market model described above
Transaction CAR(-1,+1)	the cumulative abnormal return over the window (-1,-+1) around the transaction date, where the return is estimated from a market model described above
Earnings and dividend announcements	*Sources: Factiva, Compustat and CRSP*
News announcement return	the 2 day stock return following the news announcement date
Financial characteristics	*Sources: Compustat*
Size $_{t-1}$ (Size $_{t+1}$)	the natural logarithm of the market value of assets at the quarter before (after) the transaction date
Leverage $_{t-1}$ (Leverage $_{t+1}$)	the book value of debt divided by the sum of book value of debt and market value of equity at the quarter before (after) the transaction date
Tobin's q $_{t-1}$ (Tobin's q $_{t+1}$)	the market value of assets divided by the book value of assets at the quarter before (after) the transaction date
Sales $_{t-1}$ (Sales $_{t+1}$)	the sales divided by the book value of assets at the quarter before (after) the transaction date
OCF $_{t-1}$ (OCF $_{t+1}$)	the cash flow from operations scaled by the value of assets at the quarter before (after) the transaction date
R&D $_{t-1}$ (R&D$_{t+1}$)	the research and development expenses scaled by the value of assets at the quarter before (after) the transaction date
Capex $_{t-1}$ (Capex $_{t+1}$)	the capital expenditures scaled by the value of assets at the quarter before (after) the transaction date
Accruals $_{t-1}$ (Accruals $_{t+1}$)	the accruals scaled by the value of assets at the quarter before (after) the transaction date
Earnings $_{t-1}$ (Earnings $_{t+1}$)	the earnings scaled by the value of assets at the quarter before (after) the transaction date
ROA $_{t-1}$ (ROA $_{t+1}$)	the operating income divided by the book value of assets at the quarter before (after) the transaction date
Dividend $_{t-1}$ (Dividend $_{t+1}$)	the dividend scaled by the value of assets at the quarter before (after) the transaction date
Accounting accruals variables	*Sources: Compustat*
Modified Jones accruals	discretionary current accruals calculated according to the modified Jones (1991) model proposed by Dechow, Sloan, and Sweeney (1995)
Dechow-Dichev accruals	discretionary current accruals calculated according to the method proposed by Dechow and Dichev (2001)

Insider trading policy variables	*Sources: Form 4, 8-K, Web search*
10b5-1 plan (0,1)	one if the transaction is executed under the 10b5-1 plan
Insider trading policy (0,1)	one if the firm has an insider trading policy
General counsel approval (0,1)	one if the firm requires trading approval (pre-clearance) from the general counsel for all trades made by insiders
CEO characteristics	*Sources: Execucomp and SEC filings*
CEO-chairman (0,1)	one if the CEO is the chairman of the board
CEO age	the age of the CEO
Tenure	the number of years the CEO has been in the position (computed using BECAMECEO)
Fractional CEO ownership	the number of shares owned by the CEO as a proportion of the firm's shares outstanding
CEO compensation	the total compensation of the CEO the year before the transaction date
Pay slice	the proportion of the CEO's total pay among the top five executives as in Bebchuk, Cremers, and Peyer (2011)
Outside board seats	the number of outside directorships held by the CEO
Golden parachute (0,1)	one if the CEO has a golden parachute in the employment contract
Governance characteristics	*Sources: RiskMetrics and SEC filings*
Classified board (0,1)	one if not all directors of the firm are up for election at the same time
Board size	the number of directors on the board
Number of independent directors	the number of directors who are not current or former employees of the firm or a subsidiary, and is not affiliated with the company as defined by RiskMetrics.
Fraction of independent directors	the number of independent directors divided by the board size
Number of busy independent directors	the number of directors who hold at least three independent directorships in publicly traded firms
Fraction of busy independent directors	the number of busy independent directors divided by the number of independent directors