Information Content of Insider Trades before and after the Sarbanes-Oxley Act

Francois Brochet
Harvard University

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Abstract:

This study examines the information content of Form 4 filings under the more timely disclosure regime introduced by Section 403 of the Sarbanes-Oxley Act of 2002 (SOX). Abnormal returns and trading volumes around filings of insider stock purchases are significantly greater after SOX than before. Abnormal trading volumes around filings of insider sales are also greater post-SOX, on average, but stock returns are not more negative. However, once controlling for pre-planned transactions, reporting lag, litigation risk, and news following insider trades, I find a negative association between returns around filings of insider sales and SOX. Overall, the evidence suggests that the prompt public disclosures about insider transactions mandated by the new rule are relevant to the pricing of securities. The results are also consistent with SOX and regulatory actions reducing the incentives to sell ahead of privately known negative news.

Keywords: insider trading; Sarbanes-Oxley Act; information content.

Data Availability: Data are available from sources identified in the article.

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I. INTRODUCTION

The Sarbanes-Oxley Act of 2002 (SOX) is a far-reaching federal law aimed at improving the reliability of both corporate governance and the financial reporting process. SOX addresses the issue of insider trading disclosure in Section 403, which amends Section 16(b) of the Exchange Act of 1934 by requiring insiders[1] to report their trades to the Securities and Exchange Commission (SEC) on a Form 4 within two business days. Until August 2002, the requirement had only been to file Form 4 with the SEC within ten days after the close of the calendar month in which the transaction had occurred. My study examines whether Section 403 of SOX has resulted in the provision of more timely and relevant information to market participants in the United States.

Prior research suggests that more timely dissemination of SEC filings positively affects their information content (e.g., Carter and Soo 1999; Asthana and Balsam 2001). However, the evidence of the information content of Form 4 filings in the U.S. before SOX is mixed (Lakonishok and Lee 2001; Aboody and Lev 2000), despite (a) empirical evidence that corporate insider trades are associated with subsequent stock returns (e.g., Lakonishok and Lee 2001) and with earnings news (Ke et al. 2003; Piotroski and Roulstone 2005), and (b) anecdotal evidence that market participants use information about insider trades in their own investment decisions.[2]

Since Section 403 of SOX requires insider trades to be filed on a much more timely basis (as of August 29, 2002) and mandates electronic filing (as of June 30, 2003),

[1] In most empirical studies, the term "insiders" designates directors, officers, and beneficial owners of more than 10 percent, who were subject to the filing requirements of Section 16 of the Exchange Act of 1934 prior to August 29, 2002 and who are now subject to Section 403 of SOX. I further restrict my analysis to top-management team members, whose trades are most likely to be informed (Seyhun 1998).

[2] The SEC acknowledges this belief as a motivation for changing the disclosure rule: "Many investors believe that reports of directors' and executive officers' transactions in company equity securities provide useful information as to management's views of the performance or prospects of the company and that more timely and transparent access to reports will be even more useful."

I expect Form 4 filings of insider trades to exhibit significantly greater information content in the post-SOX period, *ceteris paribus*. However, the change in institutional environment and market conditions around the passage of SOX may have reduced the incidence of insider trades driven by private information.

Using stock returns adjusted for book-to-market and size and abnormal trading volumes as proxies for information content, I find evidence that filings of insider purchases are significantly more informative after SOX. Over a three-day window beginning with the receipt of the form by the SEC, the pre- and post-SOX mean cumulative abnormal returns are 0.59 percent and 1.89 percent, respectively, while the pre- and post-SOX average daily trading volumes are 1.03 percent and 12.03 percent higher than normal, respectively. These differences are all statistically significant. In the case of insider sales, mean daily trading volumes around post-SOX filings are significantly higher than normal (1.15 percent over a three-day window) and greater than they were pre-SOX. In contrast, mean abnormal returns are more negative around pre-SOX filings than around post-SOX filings (-0.28 percent and -0.11 percent, respectively, over a three-day window). All results except for stock returns around filings of insider sales suggest that SOX has increased the information content of Form 4's. However, additional findings indicate that, after controlling for confounding factors such as pre-planned trades and litigation risk, stock returns around filings of sales are also significantly more negative after SOX.

I also find that, after SOX, insiders are less likely to sell shares immediately prior to negative stock returns and ahead of earnings news that falls short of analyst forecasts. This finding suggests that there is a decrease in informed insider selling around SOX.[3]

Using a variety of supplemental tests, I attempt to rule out alternative explanations for the change in information content of insider trades around August 29, 2002 other than Section 403 of SOX. First, I compare the information content of insider trading disclosures in the United Kingdom before and after August 29, 2002. This setting enables me to benchmark the U.S.-based results against a market in which insider trades are subject to the same timely-disclosure regime in both periods (Fidrmuc et al. 2006). I find that pre- and post-SOX returns and volumes around disclosures of insider trades in firms that constitute the FTSE 350 Index and which are not listed in the U.S. are not significantly different, just as one would expect in the absence of a change in regulation. In firms that are also listed in the U.S., I find that disclosures of insider sales are associated with less negative returns after August 29, 2002. This suggests that U.K. insiders of cross-listed firms are also responding to increased scrutiny of suspicious managerial dealings by reducing sale transactions that could induce negative market reactions.

In the U.S. sample, I find no evidence that the information content of Form 4 filings increased around Enron's bankruptcy filing (December 2, 2001), which suggests that the main results are not driven by a change in market sentiment vis-à-vis insider trading around the events that led to SOX. Also, the change in the information content of

[3] Besides litigation risk, liquidity needs are a primary driver of the difference between the informativeness of insider sales and purchases. However, excluding insider sales from the sample according to attributes commonly thought to be associated with liquidity needs such as trade size, option exercises, and corporate restrictions on the timing of insider trades does not yield any stronger results with respect to the impact of SOX on stock returns around Form 4 filings of sales.

Form 4's around SOX does not appear to be limited to firms affected by Reg FD. Altogether, these additional tests provide further support to my causal attribution of the increase in information content of Form 4 filings to Section 403 of SOX.

Collectively, the evidence in this study contributes to the literature on the information content of disclosures mandated by the SEC. This is the first study to show that the timely disclosure of corporate insider purchases triggers economically significant market reactions in the U.S. The larger market reactions to insider purchases under the new disclosure regime, given a similar amount of informed trading in both periods, suggests that Section 403 of SOX has brought about more timeliness and transparency in the communication of managers' purchase transactions to the market. If one subscribes to the view that insider trading is a partial substitute for accounting information and firms' voluntary disclosure (Carlton and Fischer, 1983), my findings have implications for studies on financial disclosure. Indeed, I show insider trade disclosures to be a significant component of market participants' information set. More timely Form 4 filings are very likely to affect market reactions to contemporaneous disclosures such as earnings announcements or Form 10-K/10-Q filings.

Simultaneously, this study adds to the literature on insider trading behavior under different economy-wide regulatory environments in the United States (e.g., Seyhun 1992; Garfinkel 1997) and complements SOX-related research that documents changes in disclosure (Koh et al. 2008), financial reporting (Cohen et al. 2008), and managerial compensation practices (Heron and Lie 2007; Carter et al. 2008)—factors that were shown to be associated with managers' opportunistic behavior in the pre-SOX era.

Section II develops the study's expectations based on the institutional features of insider-trading disclosure regulation and on the theoretical and empirical literature. Section III delineates the research design. Section IV describes the sample and presents the results. Section V concludes.

II. INSTITUTIONAL BACKGROUND AND EMPIRICAL PREDICTIONS

The SEC regulates insider trading in the U.S. Directors, officers, and principal stockholders (with a stake of 10 percent or more) have to report most changes in their beneficial ownership to the SEC. Until August 2002, the reporting requirements were defined under Section 16 of the Securities Exchange Act of 1934 and consisted of filing a Form 4 with the SEC within 10 days of the close of the calendar month of the transaction. Section 403 of SOX amends this provision as of August 29, 2002 by requiring insiders to file their Form 4's with the SEC within two business days of the transaction. Furthermore, effective June 30, 2003, Form 4's must be filed electronically and companies with websites must post information online about the trades the day after they are filed with the SEC.[4]

Information content is measured in terms of stock returns and trading volumes, in conjunction with the information environment around the disclosure, as demonstrated theoretically by Karpoff (1986), Kim and Verrechia (1991), and Dontoh and Ronen (1993). Trading volumes can result from differential interpretations of a disclosure among traders and/or convergence of their previously dispersed beliefs, while stock

[4] Another aspect of the accelerated filing requirements of Section 403 is that stock-option grants are subject to the same regime, whereas they were previously reported on Form 5, which was not due until 45 days after the end of the fiscal year. Heron and Lie (2007) use this institutional change to test the backdating hypothesis for option-grant date choice. Their work extends pre-SOX studies on patterns of stock returns around option grants (negative before, positive after) (Yermack 1997; Aboody and Kasznik 2000).

returns capture changes in consensus beliefs. The announcement of an insider trade is expected to generate both abnormal stock returns (positive for purchases, negative for sales) and abnormal trading volumes.

Analytically, Huddart et al. (2001) show that public disclosure of insider trades accelerates price discovery, as compared to the no-disclosure benchmark model of Kyle (1985). Hypothetically, if exactly the same insider trade were subject to a more timely disclosure requirement, I would expect its disclosure to trigger a larger price reaction because some of the private information that insiders trade upon can be revealed before an untimely Form 4 filing. Indeed, before SOX, several studies, such as Givoly and Palmon (1985) and Aboody and Lev (2000), document positive (negative) abnormal returns in the days following insider purchases (sales) but before their public filings. Also, Fidrmuc et al. (2006) find that disclosures of insider trades in the U.K., which must be filed within five business days, elicit average returns greater than those documented by Lakonishok and Lee (2001) in the U.S. from 1975 to 1995. Assuming that insiders trade on their private information to the same extent in both the U.K. and the U.S., the difference between the results in the two aforementioned studies suggests that disclosure timeliness affects the information content of insider-trade filings.

Under heterogeneous beliefs, accelerated filing and prompt online public dissemination of Form 4's by firms and by the SEC are also expected to affect trading volumes positively because (1) more market participants will trade on the insider signal at the same time, and (2) participants are more likely to interpret the signal differently than they would be if they could observe the subsequent price movement. Consequently, I expect the shorter delay between insider trades and their disclosures that came about as

a result of Section 403 of SOX to endow Form 4 filings with greater information content because the shorter delay allows the market to react to the filings rather than to other sources of news that reveal insiders' private information.

However, this reasoning assumes that insiders trade on their private information to the same extent before and after SOX, which may not be the case. In the wake of corporate scandals contemporaneous to the enactment of SOX, I expect insiders to be less prone to opportunistic trading because of increased scrutiny from investors, media, and regulators. Since insider sales are more exposed to litigation and prosecution than purchases, I expect sales to be more affected by this change.[5] As the major scandals that led to SOX involved insider sales transactions, I expect SOX to have a significant effect on insiders' trading behavior.[6] Hence, the average insider trade (especially if it is a sale) may be driven by private information to a lesser extent after SOX. In that case, the increase in information content that would have been induced by the more timely disclosure of insider sales might be mitigated by the concurrent decrease in opportunistic selling after SOX.

I also expect the new disclosure rule to result in the provision of information about insider trades in a more disaggregated fashion. Insiders, concerned with the

[5] This is assumed to be the byproduct of an asymmetry in expected legal costs associated with good and bad news. In the case of good news, one suffers an opportunity loss rather than an out-of-pocket cost and it is more difficult to prevail before juries with the former (see Skinner 1994). The connection with insider trading comes from the fact that insider selling is recognized by courts as a mechanism to establish that the defendants acted with scienter in allegations of securities fraud, which plaintiffs need to prove for their lawsuit to prevail under Rule 10b-5.

[6] Recent research provides evidence suggesting that managers' incentives and opportunities to engage in opportunistic behavior have decreased after SOX. For example, stock return patterns around option grants are less favorable to managers after SOX (Heron and Lie 2007). Li and Zhang (2007) find a post-SOX decrease in opportunistic insider selling ahead of accounting restatement announcements. Cohen et al. (2008) find a decrease in accrual-based earnings management after SOX; they document that pre-SOX earnings management was associated with the proportion of option holdings in top executives' total compensation. This suggests that SOX left insiders with fewer opportunities to "pump and dump" their stock (Bartov and Mohanram 2004; Cheng and Warfield 2005; Huddart and Louis 2006).

influence of large trades on stock price, tend to trade several times over a period of several days, as predicted by Kyle's (1985) strategic model of trading. Under the old reporting regime, an insider could wait until the deadline to file a single Form 4, whereas under Section 403 of SOX, that same insider must now report several Form 4's within days to meet the two-business-day deadline.[7] In addition, assuming that waiting for the deadline was the norm, pre-SOX trades could be reported around the same date for all insiders across all firms. All told, the same amount of insider trading is likely to result in more Form 4's being filed after SOX. As a result, individual post-SOX Form 4's are expected, all else equal, to have less information content.

Overall, the change in the information content of Form 4 filings around the passage of SOX is likely to be driven by the tension between increased timeliness on one hand and the decrease in informed trading and greater disaggregation of filings on the other. While this tension is likely to be more severe for sales than for purchases, I formulate no directional hypothesis and leave the net change in information content of Form 4 filings around the passage of SOX as an empirical question.

III. RESEARCH DESIGN

Variable Definitions: Trade Size, Abnormal Returns, and Abnormal Trading Volumes

[7] The SEC, in the cost and benefit analysis of Section 403, singles out this issue as the main potential source of increased costs: "We recognize that implementation of the Act will likely create costs and benefits to the economy. Costs may arise because reporting persons will be required to file Form 4 significantly more quickly after a transaction, and potentially more frequently because Form 4 no longer will be a monthly form. The increased speed of filing also may increase preparation costs. In addition, to the extent that amended Section 16(a) results in an increase in the number of Form 4's filed—although the total number of reportable transactions has not been changed by Section 403 of the Act or this release—the aggregate cost of providing this information may increase."

I measure the size of insider trades as the number of shares traded, deflated by the number of shares outstanding[8] on the same day. I label the ratio *Trade Size*. Several transactions may be reported on the same Form 4 and several forms may be reported on the same date. In such cases, *Trade Size* is the sum of all transactions reported on the same filing date, but is calculated separately for purchases and sales.

To measure abnormal returns, I assign stocks to one of 25 Fama-French portfolios resulting from the intersection of five portfolios based on market value of equity (size) and five portfolios based on book-to-market value of equity ratio.[9] I subtract portfolio returns from individual stock returns to obtain daily abnormal returns CAR_t. If the window of interest exceeds one day, daily abnormal returns are compounded.

I calculate abnormal trading volumes using a log market model based on Ajinkya and Jain (1989), extended by Meulbroek (1992) in the context of illegal insider trading and by Yermack (1997) and Heron and Lie (2007) for stock-option awards. The regression is the following:

$$\begin{aligned}\log(V_{it}) = {} & \alpha_i + \beta_i \log(V_{i,mt}) + \lambda_1 \log(V_{it-1}) + \lambda_2 \log(V_{it-2}) + \eta_1 Mon + \eta_2 Tue \\ & + \eta_3 Wed + \eta_4 Thu + \varphi_1 Holiday_{it} + \varphi_2 Holiday_{it-1} + \rho_i Earnings_{it} \\ & + \delta_i Dividend_{it} + \gamma_i Filing_{it} + \varepsilon_{it} \end{aligned} \quad (1)$$

[8] Theoretically, deflating trades by insiders' equity holdings is more appealing than using shares outstanding because it better reflects the impact of trades on insiders' portfolios. However, when selling "conventional" stock, insiders report their holdings exclusive of options. By contrast, when selling options, they report only option holdings for a specific series, so total (option) holdings are generally not observable in Thomson Financial.

[9] The expected returns are obtained from Professor Kenneth French's website (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html). Returns based on size and momentum portfolios as well as market- and industry-adjusted returns yield similar results.

V_{it} is trading volume as a percentage of total shares outstanding for firm *i* on day *t* net of *Trade Size*. $V_{i,mt}$ is equal to total trading volume as a percentage of total shares outstanding for all firms listed on the same exchange as firm *i* on day *t*. Lagged values of V_{it} are included to reduce serial correlation of the residuals. *Mon, Tue, Wed,* and *Thu* are day-of-the-week indicator variables. *Holiday* is an indicator variable set to 1 for days preceding three-day holiday weekends and the Friday following Thanksgiving, and 0 otherwise. *Earnings* (*Dividend*) is an indicator variable equal to 1 for all days in the [-3,+3] window around earnings (dividend) announcements, and 0 otherwise.

The variable of interest is *Filing,* an indicator variable equal to 1 on insider trade filing dates and/or the following one to four trading days, depending on the window of interest, and 0 otherwise. I estimate separate coefficients for each firm-SEC filing date, using a time-series regression based on 50 days before and after the event day. Hence, Model (1) is run 53,503 times. Each regression produces a γ_i specific to a Form 4 filing, which I use as a measure of abnormal trading volume (subsequently labeled *Volume*). This measure can be interpreted as the daily percentage deviation around Form 4 filings from normal trading volumes as modeled in Eq. (1).

My first test of the change in information content of Form 4 filings around SOX consists of comparing mean and median *CAR* and *Volume* around filings of insider purchases and sales before August 29, 2002 with those around filings on and after that date. The subsequent multivariate analyses investigate potential determinants of the information content of Form 4 filings.

Information Content of Insider Trade Filings: Multivariate Analysis

Trading Volumes

To test the association between volume reactions to Form 4 filings and potential determinants of the information content of Form 4 filings, I run the following regression, for which individual observations are filing dates of Form 4's:

$$\begin{aligned} Volume_{0,2} = {} & \alpha_0 + \alpha_1 PostSOX + \beta_1 Reporting\ Lag + \alpha_2 10b5_1 \\ & + \beta_2 Recent\ Trades + \beta_3 Trade\ Size + \beta_4 Trade\ Size \times PostSOX \\ & + \beta_5 Book\ To\ Market + \beta_6 Size + \beta_7 R\&D + \beta_8 Loss + \beta_9 Restrict + \varepsilon \end{aligned} \quad (2)$$

PostSOX is an indicator variable equal to 1 for post-SOX filings, and 0 otherwise. *Reporting Lag* is the natural logarithm of one plus the number of trading days between an insider transaction and its filing. If several trades are filed on the same day, the reporting lag of the earliest trade prevails. *10b5_1* is an indicator variable equal to 1 if the trades reported on the Form 4 are identified as pre-planned transactions pursuant to Rule 10b5-1, and 0 otherwise. *Trade Size* is the total number of shares purchased or sold as reported on all Form 4's filed on day 0, deflated by shares outstanding. *Recent Trades* is the aggregate of *Trade Size* for all Form 4's filed in the same firm between days -10 and -1. *Book-to-Market* is the ratio of book value to market value of equity, calculated as of the beginning of the fiscal quarter. *Size* is the natural logarithm of market capitalization as of the beginning of the fiscal quarter. *R&D* is an indicator variable equal to 1 for firms that report a non-zero R&D expense in the previous fiscal year, and 0 otherwise. *Loss* is an indicator variable equal to 1 for firms that report negative net income in the previous fiscal year, and 0 otherwise. *Restrict* is an indicator variable aimed at capturing the existence of a firm-level policy restricting the timing of insider trades (Bettis et al. 2000).

Following Roulstone (2003), I infer the presence of such a policy from the degree of clustering of insider transactions after earnings announcements. *Restrict* is equal to 1 for all quarters in a firm-fiscal year if 75 percent or more of insider trades executed during that year occur in a 30-day window following an earnings announcement, and 0 otherwise.[10]

Because of the fundamental differences between purchases and sales, Model (2) is run separately for each. I choose to measure the dependent variable over a three-day window (0,+2) to capture timely market reactions to Form 4 filings. The primary variables of interest are *PostSOX* and *Reporting Lag*. If leakage[11] reduces the information content of Form 4 filings and increases with filing delays, then the coefficient on *Reporting Lag* should be negative. This alone could capture the effect of Section 403 of SOX on the information content of Form 4's. However, there may also be an intercept effect—i.e., a significantly positive coefficient on *PostSOX*.

Pre-planned trades could have less information content if they were pre-announced; they could also trigger larger volume reactions if there is disagreement as to whether or not they are informed. Therefore, the sign of the coefficient on *10b5_1* is an empirical question. I also include *Trade Size* to test whether larger insider trades trigger more trading volume upon filing. I control for the immediately preceding filings of Form 4's using *Recent Trades.* Recent trades could preempt the information content of a Form 4 filing, thereby reducing the volume reaction around the filing. Alternatively, the market

[10] I use trades from all directors and officers to construct this variable. I address the sensitivity of this proxy by changing the parameters such as the 75% and 30-day cutoffs, but report results based on the aforementioned definition.

[11] I use the term "leakage" to describe the incorporation of insiders' private information into stock price in the period between an insider trade and its public filing. Such leakage can occur through informed traders' activity or public announcements, but is not necessarily driven by knowledge about the insider trade per se.

may react more strongly to a Form 4 which provides a signal reinforcing the information content of recent trades.[12] Finally, the other variables have been shown to be determinants of stock returns following insider transactions. I include them to test whether they are associated with the trading-volume component of the information content of Form 4 filings, but leave the sign of their coefficients as an empirical question.

Stock Returns

I test the association between returns around filing dates of insider trades and potential determinants of the information content of Form 4 filings using the following cross-sectional regression:

$$\begin{aligned} CAR_{0,2} = {} & \alpha_0 + \alpha_1 PostSOX + \beta_1 Reporting\ Lag + \beta_2 CAR_{6m} + \beta_3 CAR_{6m} \times PostSOX \\ & + \alpha_2 10b5_1 + \beta_4 Recent\ Trades + \beta_5 Trade\ Size + \beta_6 Trade\ Size \times PostSOX \\ & + \beta_6 Book\ To\ Market + \beta_7 Size + \beta_8 R\&D + \beta_9 Loss + \beta_{10} Restrict + \varepsilon \end{aligned} \quad (3)$$

$CAR_{0,2}$ is the three-day size- and book-to-market-adjusted stock return starting on the filing date of a Form 4. CAR_{6m} is the six-month abnormal return following the first transaction reported on a Form 4. *10b5_1*, *Reporting Lag, Recent Trades, Trade Size, Book-to-Market, Size, R&D*, *Loss,* and *Restrict* are the same as in Eq. (2).

As in Model (2), I run the model separately for purchases and sales. If there is an average increase in the information content of Form 4 filings after SOX, the coefficient on *PostSOX* should be positive for purchases and negative for sales. The coefficient on

[12] For example, a stock sale by a CFO preceded by a stock sale by the CEO of the same company may have (a) *less* information content than if it were not preceded by the CEO transaction because the market has already reacted to the CEO sale and the incremental information content of the CFO transaction is small or (b) *more* information content because the combined signal of the CEO and CFO transactions is greater than that of the CFO's trade in isolation.

the six-month return CAR_{6m} is included to measure the extent to which short-window returns around Form 4 filings are associated with the private information upon which insiders trade. If the more timely filings under Section 403 of SOX accentuate this association, then the coefficient on the interaction term between CAR_{6m} and *PostSOX* should be positive. *Reporting Lag* is included to capture the potential effect of leakage on the information content of Form 4 filings as a function of the delay between the transaction and its public disclosure. If leakage increases with the reporting lag, then the association will be negative (positive) for purchase (sale) filings.[13] Overall, the effect of Section 403 of SOX on returns around Form 4 filings can manifest itself through α_1, β_1, β_3, or a combination thereof.

If pre-planned trades are perceived as less likely to be informed, the coefficient on *10b5_1* will be negative (positive) for purchases (sales). However, Jagolinzer (2009) finds that insider sales executed under Rule 10b5-1 plans actually precede returns which are more negative than those preceded by other trades in the same firms, thereby suggesting that their filings could be informative. I include *Trade Size* to assess if the market reacts more strongly to filings of larger insider trades. *Recent Trades* is included for the same reasons for which it was included in the *Volume* regression. The other independent variables are also expected to be determinants of returns around insider trade filings, as they proxy for other dimensions of information asymmetry, risk, and past performance. Prior research shows that insiders tend to buy (sell) shares in value (growth) stocks (Rozeff and Zaman 1998; Lakonishok and Lee 2001; Piotroski and Roulstone 2005). If insider purchases (sales) in high (low) book-to-market firms signal

[13] Carter, Mansi, and Reeb (2003) document a positive association between reporting lag and pre-Form 4 filing returns, using a sample of pre-SOX purchases.

under(over)valuation, the coefficient on *Book-to-Market* should be positive in Model (4). Net insider purchases predict more positive abnormal returns in smaller firms (Lakonishok and Lee 2001), such that the coefficient on *Size* should be negative (positive) for purchases (sales). Following Aboody and Lev (2000), I expect *R&D* to exhibit a positive (negative) association with *CAR* for purchases (sales). I also test whether poor financial performance, captured by the *Loss* indicator, is associated with more positive (negative) reactions to filings of purchases (sales). Roulstone (2003) finds that the variable I label as *Restrict* is negatively associated with insider-trading profitability, so I expect Form 4 filings of purchases (sales) to be associated with less positive (negative) returns when *Restrict* equals 1.

IV. RESULTS

Sample and Descriptive Statistics

The data for the main tests in this study are gathered from the following sources: (1) CRSP for stock-price and trading-volume variables, (2) Compustat for financial information, (3) Thomson Financial insider trading database, (4) I/B/E/S for analyst forecasts, and (5) Stanford Securities Class Action Clearinghouse for litigation data. In addition, I obtain information about pre-planned trades by searching for the keyword "10b5-1" in press releases, Form 4 filings, and 8-K filings through Lexis-Nexis. Sample size varies with the data requirement for each test.

Thomson Financial Insiders Data Feed contains trade information from directors, officers, and principal stockholders with holdings greater than 10 percent of a firm's stock, all subject to disclosure requirements as defined in Section 16 of the Exchange Act of 1934 until August 2002 and in Section 403 of the Sarbanes-Oxley Act subsequently. I

select all purchases and sales (including those of shares acquired through option exercises) by CEOs, CFOs, COOs, board chairs, and presidents between 1997 and 2006.

[Insert Table 1 about here]

Table 1 reports descriptive statistics. The sample consists of 13,840 reporting dates of insider purchases (5,423 after SOX) and 39,663 reporting dates of sales (29,846 after SOX) for which data on shares outstanding are available.[14] Using reported transaction prices, the mean (median) dollar value of insider purchases reported in my sample is $217,010 ($29,060) before SOX and $216,095 ($26,304) after SOX, while for sales it is $2,803,864 ($476,738) before SOX and $1,566,942 ($285,700) after SOX. The increased number of insider-sales reporting dates and the decrease in average trade value (almost 50 percent) after SOX illustrate a mechanical effect of Section 403 of SOX, which results in a multiplicity of Form 4's, which would have been clustered under the prior rule, now being filed on different dates. These summary results suggest that the potential impact of Section 403 of SOX on the dispersion of Form 4 filings is meaningful, especially for sale transactions. In terms of Rule 10b5-1 trades, very few pre-planned transactions occur before SOX. By contrast, about 10 percent of post-SOX trades are categorized as pre-planned, most of them being sales.[15]

[Insert Figure 1 about here]

Figure 1 plots the daily distribution of pre- and post-SOX filing dates for a given calendar month. It clearly shows that there is a flat distribution of filing dates after SOX,

[14] This is after a cleansing process that eliminates (a) transactions with reported prices outside the interval between the lowest bid and highest ask available on CRSP, (b) transactions in which the number of shares either is less than 100 or exceeds the total common shares outstanding, and (c) transactions with a transaction price lower than $2 per share. Also, trades with a reporting lag of more than 50 business days are excluded from the analysis.

[15] This statistic could greatly understate the actual number of pre-planned transactions, since insiders are not required to disclose that trades are pursuant to a Rule 10b5-1 plan, but it should reflect all publicly available information about pre-planned trades.

whereas, before SOX, filings are clustered around the 10th day of the month. This provides additional support for the interpretation of the results in Table 1 in terms of the greater dispersion of post-SOX filings.

Information Content of Form 4 Filings

Filings of Insider Purchases before versus after SOX

Table 2 reports mean and median abnormal returns *CAR* (Panel A) and trading volumes *Volume* (Panel B) around Form 4 filing dates of insider purchases.

[Insert Table 2 about here]

Mean and median daily abnormal returns over the five days starting on the filing dates of Form 4's of insider purchases are significantly positive post-SOX. They are also significantly greater than pre-SOX returns on the filing date and the following day. Mean (median) three-day *CAR* is 1.89 percent (0.99 percent) after SOX versus 0.59 percent (-0.06 percent) before SOX, a significant difference ($p<0.01$). In terms of returns, then, post-SOX filings of Form 4's for insider purchases have more information content, on average, than pre-SOX filings. Also, the patterns of daily returns suggest that, following the receipt of a Form 4 filing by the SEC, the information becomes available more promptly after SOX.

The results for abnormal trading volumes are similar. Daily *Volume* averages 12.03 percent over the three-day window starting on the filing date after SOX versus 1.03 percent before SOX.[16] Post-SOX abnormal trading volumes are also, on average,

[16] To provide a benchmark for the magnitude of this trading activity, the mean daily abnormal trading volume over a seven-day window around earnings announcement according to Model (1) (using all earnings announcements that fall within 50 days of a Form 4 filing) is about 25 percent, which shows that post-SOX filings of top managers' open-market purchases generate a large amount of trading volume.

significantly positive the day before the receipt of Form 4's by the SEC, despite the fact that I deduct the shares traded by insiders from my measure of daily turnover. This could be due to abnormal trading activity associated with the trades themselves rather than with their disclosure. Overall, the evidence in Table 2 leads to the conclusion that the market reacts more quickly and strongly to insider purchase filings after SOX.

Filings of Insider Sales before versus after SOX

Table 3 reports mean and median *CAR* and *Volume* around Form 4 filing dates of insider sales.

[Insert Table 3 about here]

Panel A indicates that abnormal returns are less negative around post-SOX filings than around pre-SOX filings. Mean (median) three-day returns starting on filing dates are -0.28 percent (-0.32 percent) before SOX and -0.11 percent (-0.19 percent) after. If one looks at stock returns only, this result contradicts the contention that filings of insider sales have greater information content under Section 403 of SOX than they did under Section 16 of the Exchange Act. But as Panel B shows, this is not the case in terms of trading volumes. Indeed, mean *Volume* is significantly positive around post-SOX filings, but not pre-SOX. For example, on the filing date, the difference between post- and pre-SOX is significant at the 0.05 level. Mean three-day daily *Volume* is 1.15 percent post-SOX and -0.70 percent pre-SOX, which is also significantly different ($p<0.01$). On average, then, post-SOX filings of insider sales, unlike pre-SOX filings, generate positive excess trading volumes.

Abnormal Returns as of Transaction Dates

The analysis to this point ignores stock-price patterns between insider transactions and their filings. Figure 2 plots mean cumulative abnormal returns starting from the day after insider transactions, separately for pre-SOX purchases, pre-SOX sales, post-SOX purchases, and post-SOX sales. Since pre-SOX trades could be filed 10 to 40 calendar days after their execution, I only plot returns over the first five days following pre-SOX trades and then the last five days before their filings. Pre-transaction returns are not plotted, so the returns before day 0 for post-SOX trades are based only on trades filed with a delay of two-business days.

[Insert Figure 2 about here]

Figure 2 shows that within days of the filing date, the mean return following post-SOX purchases is as high as the pre-SOX mean, even though the pre-SOX mean as of the filing date is about 1 percent. Untabulated results show that the difference between mean (as well as median) pre- and post-SOX returns following purchases becomes insignificant within two days of the filing date. Hence, stock-return patterns following insider purchases suggest that the incremental returns that follow post-SOX filings are comparable to the amount of news that used to be reflected, under the previous reporting regime, in stock price before the filings. By contrast, returns following post-SOX sales are less negative than they were pre-SOX, irrespective of the end of the measurement window (the difference being statistically significant at the mean and median level).

Determinants of Form 4 Filing Information Content

Trading Volumes

Table 4 reports OLS results for the analysis of abnormal trading volumes around Form 4 filings. *Trade Size* is multiplied by ten, so the order of magnitude is more in line with *Volume* and the tabulated coefficients are not too large. The first (second) set of coefficients is estimated from Model (2) for insider purchases (sales).

[Insert Table 4 about here]

For purchases, the significantly positive coefficient on *PostSOX* suggests that, once I control for other factors that potentially explain the information content of Form 4's, the univariate results from Table 2 translate into an intercept effect. By contrast, the coefficient on *PostSOX* for sales is not significantly different from zero. Rather, the significantly positive association between *Volume* and *Trade Size* × *PostSOX* suggests that the univariate results in terms of trading volumes around filings of insider sales are driven by a slope effect with respect to trade size. Judging from the significantly positive coefficients on *Trade Size* and *Trade Size* × *PostSOX* for purchase filings, larger insider purchases also tend to trigger larger volume reactions from the market when filed, both before and after SOX, but with a stronger effect after SOX. In terms of leakage, there is a significantly negative association between *Volume* and *Reporting Lag* around filings of purchases and sales; the longer the delay between an insider trade and its disclosure, the lower is the volume reaction to the disclosure. Other results show that *Volume* decreases with firm size—significantly so for filings of insider sales. The coefficient on *Restrict* is positive, indicating that insider trades in firms that appear to impose a restriction on their timing trigger, on average, larger trading volumes around their filing. This result may be due to the greater degree of clustering of Form 4 filings in such firms.

Abnormal Returns

Table 5 reports regression results on three-day *CAR* starting on Form 4 filing dates. Coefficients are estimated separately for purchases and sales.

[Insert Table 5 about here]

The significantly positive coefficient on *PostSOX* for filings of insider purchases is consistent with the univariate findings in Table 2. The significantly positive coefficients on CAR_{6m} and $CAR_{6m} \times PostSOX$ show that the returns around Form 4 filings are positively associated with six-month returns following insider purchases. The incremental post-SOX effect is consistent with the interpretation that a greater proportion of the insiders' private information is impounded into stock price around the more timely disclosure of their purchases. The significantly negative coefficient on *Reporting Lag* for purchase filings, together with the results of the volume regressions, shows that the information content of those filings increases with their timeliness. The significantly negative coefficient on *10b5_1* shows that Form 4's of pre-planned purchases have less information content in terms of stock return. This result could be explained by a market reaction to a prior announcement about the purchase plan or by the perception that a pre-planned transaction is less likely to be informed. The significantly positive coefficient on *Recent Trades* indicates that purchase filings immediately preceded by other purchase filings tend to elicit greater stock returns, suggesting a reinforcing effect among Form 4's filed within days of each other. Purchase filings trigger, on average, three-day returns that are 0.67 percent greater in R&D firms than in other firms. The coefficient on *Loss* is significantly positive for purchases, suggesting that disclosures of insider purchases in financially distressed firms signal good news.

With respect to insider sales, the coefficient on *PostSOX* is significantly negative. In contrast to purchases, the more promptly sales are reported, the less negative the returns following their disclosure, as shown by the negative coefficient on *Reporting Lag*. This suggests that the greater the delay between an insider sale and its public disclosure, the more bad news the disclosure signals.[17] Because of the lack of variation in reporting delay permitted by Section 403 of SOX, the market can no longer differentiate diligently reported trades from those reported less diligently, which can negatively impact the information content of Form 4's of sales. As with purchases, the coefficient on CAR_{6m} is significantly positive. However, there is no incremental effect after SOX. Hence, there appears to be an average "discount" in terms of stock returns around Form 4 filings of sales after SOX as captured by the negative coefficient on *PostSOX*, but no evidence that market participants infer a greater proportion of insiders' private information around the disclosure of their sale transactions. Among the control variables, *Restrict* is the only one with a significant coefficient in the sales regression.

Abnormal Returns around Form 4 Filings of Sales: High and Low Litigation Risk

To complement previous tests, I partition the sample based on an estimate of the firm-level *ex ante* litigation risk and look at determinants of stock returns around Form 4 filings of insider sales. This filters out firms for which I expect to observe a significant decrease in opportunistic insider selling around the passage of SOX. Indeed, I expect managers in firms with high *ex ante* litigation risk to be more cautious in timing their stock sales after SOX, which could have a confounding effect on the information content

[17] The asymmetric association between returns around Form 4 filings and the reporting lag of the trades can be reconciled with findings from Cheng et al. (2007), who document a significantly negative reaction to Form 5's of insider sales on average, but no reaction to purchase filings. Since Form 5's are filed on an annual basis, this is consistent with good news being impounded more quickly after insider purchases, whereas the longer it takes for insider sales to be publicly revealed, the more bad news they signal.

of their Form 4's. To calculate *ex ante* litigation risk, I use an approach similar to Rogers and Stocken (2005).[18] Observations across all sample firms are then ranked within each calendar year, based on estimated *ex ante* litigation risk; those in the top quartile of a given year are considered to be high-litigation-risk firms.

[Insert Table 6 about here]

Table 6 presents the results of this analysis. As expected, the coefficient on *PostSOX* is significantly negative for the subsample of sales in firms with low *ex ante* litigation risk, but not for sales in firms with high *ex ante* litigation risk. This suggests that, after SOX, insiders are more cautious in timing their stock sales when *ex ante* litigation risk is high, which reduces the information content of their Form 4's. This result lends additional support to the argument that there is less opportunistic insider selling after SOX.

Insider Trades and Subsequent News

To shed light on the nature of the news events upon which insiders are likely trading, I complement return-based tests with another measure of news to assess informed insider trading. I regress aggregated insider trading activity at the firm-quarter level (quarter q) on three indicator variables which are equal to 1 if reported EPS at the end of quarters q, q+1, and q+2, respectively, is at least as high as the consensus analyst forecast measured at the beginning of quarter q and which are 0 otherwise. Each of the three variables is interacted with a *PostSOX* indicator. If insiders trade on foreknowledge

[18] Rogers and Stocken (2005) run a probit regression in which the dependent variable is 1 if a Rule 10b-5 lawsuit is filed against a firm in a given quarter, and 0 otherwise. The independent variables include firm size, beta, daily turnover, cumulative quarterly return, standard deviation of daily returns, minimum of daily returns, and skewness of daily returns, as well as indicator variables for high-risk industries. I run the same model using firm-year observations and add indicator variables for calendar years. A table with coefficient estimates is available upon request.

of future earnings not reflected in current analyst forecasts, there should be a positive (negative) association between insider purchases (sales) and subsequent occurrences of positive earnings surprises.[19] Table 7 presents the results.

[Insert Table 7 about here]

In the first column, the dependent variable is quarterly insider purchases, measured by the number of transactions. The marginally significant and positive coefficients on $MBE_q \times PostSOX$ and $MBE_{q+2} \times PostSOX$ suggest that, after SOX, insiders are more likely to increase their stock purchases when earnings surprises for the current quarter and two quarters ahead are positive. The significantly negative coefficient on $Return_{q-1}$ suggests that insiders purchase stock more often after poor stock price performance. There is no evidence of an incrementally positive association between quarterly insider purchases and subsequent stock returns after SOX, since the coefficients on $Return_q \times PostSOX$ and $Return_{q+1,q+2} \times PostSOX$ are not significant.

The second column reports results for insider sales. The significantly positive (negative) coefficient on MBE_q (MBE_{q+2}) suggests that insiders sell more (less) stock immediately (two quarters) ahead of positive earnings news. This set of results is consistent with evidence in Ke et al. (2003) that insiders sell larger amounts of shares three to nine quarters ahead of a break in a string of earnings increases. While insiders trade upon future earnings, they avoid doing so too close to the news announcement to avoid litigation consequences. However, the negative coefficient on the interaction term $MBE_{q+2} \times PostSOX$ indicates that, after SOX, insider selling is no longer associated with

[19] I choose to measure the association between insider trades and subsequent earnings surprises as far as two quarters ahead because prior research finds that insiders tend not to trade on information revealed by the earnings announcement at the end of the same quarter (Ke et al. 2003; McVay et al. 2006; Huddart et al. 2007).

MBE_{q+2}. The positive coefficients on $Return_{q-1}$ and $Return_{q-1} \times PostSOX$ indicate that insiders tend to engage more heavily in stock sales following price run-ups and are more likely to do so after SOX. This is consistent with an increase in passive informed selling, as defined in Seyhun (1998) and Huddart et al. (2007), after SOX. The significantly positive coefficients on $Return_q$ and $Return_{q+1,q+2}$ suggest that, before SOX, insiders timed their sales immediately prior to negative stock returns and that those returns persisted over the next two quarters. However, the significantly positive coefficient on $Return_q \times PostSOX$ shows that, after SOX, insiders refrain from timing their sales during quarters of poor performance. Overall, the evidence suggests that, after SOX, there is less informed selling with respect to forthcoming earnings surprises and contemporaneous stock returns.

Supplemental Tests

I perform further tests to support the claim that increased information content of Form 4's after August 29, 2002 is significantly attributable to Section 403 of SOX.

Comparison with the U.K.

I replicate the main analysis using U.K. insider transactions over the same period. Since U.K. reporting deadlines for insider trades remained unchanged during that period, my U.K. sample can be considered to some extent as a control group.[20] I expect no significant difference between the information content of insider-trade disclosures before and after August 29, 2002 in the U.K., with the possible exception of insider sales from firms cross-listed in the U.S. Indeed, the overall increase in scrutiny around the passage of SOX may have affected the propensity of U.K. executives to engage into opportunistic

[20] See Fidrmuc et al. (2006) for detailed institutional background on insider trading regulation in the U.K.

selling after SOX if their stock is also listed on a U.S. stock exchange. In that case, the returns around disclosures of insider sales in those firms could also be less negative after August 29, 2002.

[Insert Table 8 about here]

The results in Panel A of Table 8 indicate that there is no significant difference, at the mean and median levels, between pre- and post-August 29, 2002 abnormal returns and trading volumes around announcements of insider trades for firms listed only in the U.K.[21] This result applies to both purchase and sale transactions. In Panel B, pre- and post-August 29, 2002 insider purchases from cross-listed firms do not differ significantly in their information content at the mean and median levels. In contrast, mean and median returns around announcement dates of cross-listed firms' insider sales are significantly higher after August 29, 2002 than they were before. For instance, the mean three-day return is significantly negative (-0.69 percent) before August 29, 2002 but not after (0.14 percent). Hence, there is some evidence that sales transactions from executives in those firms are less likely to induce negative market reactions after SOX.

Overall, the U.K.-based results provide incremental evidence supporting the claim that the increase in information content of Form 4's of insider purchases around the passage of SOX can be attributed to Section 403 of SOX. The observed post-SOX increase in returns around disclosures of insider sales in the U.S. as well as in U.K. firms listed in the U.S. is consistent with a lower propensity of executives exposed to greater scrutiny in the U.S. markets to sell their shares ahead of bad news.

[21] I select all director purchases and sales involving more than 0.0005% of ordinary shares outstanding from 1997 to 2006 in firms from the FTSE 350 Index. I compute daily market-adjusted returns (using the FTSE 350 value-weighted average), starting on the date the London Stock Exchange notifies data vendors of the trade and ending up to four trading days after the notification. Director dealings are obtained from Hemscott, while stock returns and trading volumes come from Datastream.

Additional Cutoff Dates: Enron Bankruptcy Filing and Mandated Electronic Filing

I test whether abnormal returns and trading volumes around Form 4 filings increased at all prior to August 29, 2002 by separating the pre-SOX period into subperiods before and after December 2, 2001, when Enron filed for bankruptcy in the U.S. It is possible that market participants increased their focus on insider trade disclosures in the months following Enron's collapse but preceding SOX. I also test whether stock return and trading volume patterns around Form 4 filings changed once electronic filing became mandatory. Only 38 percent of Form 4's in March 2003 were filed electronically, which suggests that the dissemination of Form 4's became most timely after June 2003.[22]

The results (not tabulated) indicate that there is no significant difference between the information content of Form 4 filings before and after December 2, 2001 within the pre-SOX era. Hence, there is no evidence that the average increase in information content of (volume reactions to) Form 4 filings of insider purchases (sales) around SOX is attributable to the events that led to the enactment of SOX.

Regarding the effect of the electronic-filing requirement on the information content of post-SOX filings, the results suggest that the average reaction to Form 4 filings of purchases is more timely (as captured by significantly greater returns and volumes on days 0 and +1) after June 30, 2003. Once the measurement window is extended to day +4, the information content is insignificantly different in the two periods. There is no such pattern for insider sales.

Robustness Checks

[22] SEC, Final Rule: Mandated Electronic Filing and Website Posting for Forms 3, 4 and 5 (http://www.sec.gov/rules/final/33-8230.htm#P65_7954).

In this section, I briefly discuss additional robustness checks. First, I check whether the main results hold if I require the same insiders to be in the sample before and after SOX. When I keep post-SOX observations only for individuals who trade at least once before SOX—resulting in about 30 percent fewer post-SOX purchases and sales—and rerun the tests from Tables 2 to 9, the results (not tabulated) are virtually the same as with the main sample.

I also attempt to control for the possibility that Regulation Fair Disclosure (Reg FD), which became effective in October 2000, may account for the increase in information content of Form 4's around SOX. Indeed, since Reg FD prohibits the dissemination of information by managers to a select group of investors, those who had such privileged access to information prior to Reg FD may have turned to Form 4's as an alternative source. I compare the information content of Form 4's before and after SOX, separately for three subgroups: firms that did not hold conference calls in the pre-Reg FD era and, consistent with Bushee et al. (2004) and Ke et al. (2008), firms that held open conference calls and those that held closed conference calls. In untabulated tests, I find a significant increase in mean and median stock returns and trading volumes around Form 4 filings of purchases in the post-SOX period across all three subgroups. I also find greater trading volumes around sales filings. A similar test isolates firms which did not have analyst coverage in the pre-Reg FD period, since prior studies show that Reg FD has affected private communication between managers and sell-side analysts (Francis et al. 2006). I also find that, around SOX, the information content of Form 4's changed comparably across firms with and without analyst following, although the trading volume results are weaker for sale filings in the no-analyst-following sample (not tabulated).

Overall, the increase in the information content of (volume reactions to) Form 4 filings of insider purchases (sales) around SOX manifests itself irrespective of the impact of Reg FD on firms' information environment. While there remains the possibility that Reg FD had some impact on the information content of Form 4's, this evidence mitigates concerns that Reg FD is the driving force behind the change in information content of Form 4's which is documented in this study.

To address the issue that other changes in the economic environment around SOX rather than Section 403 may have impacted the information content of Form 4's, I test whether the information content of Form 4's varies with their reporting lag using only pre-SOX data. I partition the sample into quartiles based on the distribution of trade reporting lag, then compare the information content of the most timely filings to the rest. The average (maximum) reporting lag in the first quartile is five (eight) business days. The results (not tabulated) indicate that purchase filings in the first reporting-lag quartile are significantly more informative in terms of returns and volumes than the rest of the sample. For insider sales, median returns around timely pre-SOX filings are significantly less negative. This result lends support to the contention that promptly reported insider sales signal less negative news, irrespective of SOX. Overall, the analysis within the pre-SOX sample corroborates the main results and shows that they can be attributed primarily to the mandated change in reporting requirements.

V. CONCLUSION

This study analyzes the information content of Form 4 filings in the years around the passage of the Sarbanes-Oxley Act of 2002 (SOX). Effective August 29, 2002, SOX

amends Section 16 of the Securities Exchange Act of 1934 by requiring corporate insiders to file their stock transactions with the SEC within two business days; under the prior regime, they could wait until the tenth day of the following calendar month. I argue that, *ceteris paribus*, the greater timeliness of Section 403 filing requirements should increase and accelerate the information content of Form 4's. However, the changes in both the institutional environment and the market conditions around the passage of SOX are likely to increase the expected penalties associated with corporate wrongdoing, including illegal insider trading. A concurrent decrease in informed trading could have decreased the information content of Form 4's. Using all purchases and sales by top managers from 1997 to 2006, I find that mean and median size-adjusted and book-to-market-adjusted stock returns and abnormal trading volumes around filing dates of insider purchases are significantly greater post-SOX than pre-SOX. When returns are accumulated as of the transaction date, the results suggest that the increase in returns around post-SOX filings of purchases corresponds to the amount of good news that used to be incorporated into stock prices prior to pre-SOX filings.

In the case of sales, mean abnormal trading volumes around Form 4 filings are significantly positive after SOX and greater than they were pre-SOX, but stock returns are not more negative around post-SOX filings. However, after controlling for trade-reporting lag, firm-level *ex ante* securities-litigation risk, disclosures of pre-planned trades pursuant to Rule 10b5-1, and the amount of news following insider sales, I find a negative association between returns around Form 4 filings of sales and a post-SOX indicator variable. I also find managers less prone to opportunistic insider sales with

respect to contemporaneous stock returns and forthcoming earnings news under the heightened scrutiny of managerial behavior around the passage of SOX.

Overall, while I attempt to control for the impact of changes in market conditions around the passage of SOX, I am aware that the enactment of SOX was brought about endogenously along with the unraveling of the stock market bubble and the revelation of large-scale corporate fraud. At the very least, the analysis strongly suggests that these results are attributable to the combination of fraud scandals and the consequent SOX regulation. Moreover, Section 403 of SOX, by itself, is shown to affect the timeliness of the information content of insider trades. Hence, this study highlights the potential benefits of this specific change in regulation to provide investors with more timely information about managers' equity transactions. Indeed, the new rule potentially reduces information asymmetry between corporate insiders and investors. The costs of compliance appear to be lower than the costs of other provisions of SOX, and the benefits are most likely to accrue to small firms, for which insider transactions are most informative. Future research could investigate how more timely Form 4's influence the information content of contemporaneous financial disclosure. For instance, since many insider trades occur shortly after earnings announcements, investors have access to more information about insider trades prior to the release of the corresponding Form 10-Q or 10-K.

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TABLE 1
Descriptive Statistics

	Mean		*p-value for*	Median		*p-value for*	N	
Variable	Pre-SOX	Post-SOX	*difference*	Pre-SOX	Post-SOX	*difference*	Pre-SOX	Post-SOX
Trade Size, sales (%)	0.20	0.09	*<.01*	0.07	0.03	*<.01*	9,817	29,846
Trade Size, purchases (%)	0.09	0.04	*<.01*	0.02	0.01	*<.01*	8,417	5,423
Value, sales ($)	2,803,864	1,566,942	*<.01*	476,738	285,700	*<.01*	9,817	29,846
Value, purchases ($)	217,010	216,095	*0.93*	29,060	26,304	*0.04*	8,417	5,423
CAR_{6m} *(%)*	-4.76	-0.54	*<.01*	-7.57	-2.46	*<.01*	15,152	33,196
$CAR_{0,4}$ *(%)*	0.09†	0.15	*0.51*	-0.25	-0.14	*0.05*	15,152	33,196
$Volume_{0,4}$*(%)*	0.62	2.54	*<.01*	-0.67	0.65	*<.01*	15,458	32,432
10b5_1 (%)	0.55	9.53	*<.01*	-	-	-	18,234	35,269
Reporting Lag[1]	19.35	1.38	*<.01*	13.00	1.00	*<.01*	18,234	35,269
Recent Trades (%)	0.00	0.03	*<.01*	0.00	0.00	*<.01*	18,234	35,202
Size	6.00	6.65	*<.01*	5.93	6.55	*<.01*	16,350	33,889
Book-to-Market	0.53	0.42	*<.01*	0.41	0.37	*<.01*	16,322	33,867
R&D	0.45	0.48	*<.01*	-	-	-	16,413	34,060
Loss	0.31	0.19	*<.01*	-	-	-	16,412	34,046
Restrict	0.35	0.37	*<.01*	-	-	-	16,816	33,995

† indicates that a mean or median is insignificantly different from zero at the 0.10 level.
[1]Not logged in this table, in contrast to Tables 4 through 6.
Variable definitions:

Trade Size = number of shares purchased/sold by a top management team member (CEO, CFO, COO, board chairman, president) as reported on a Form 4, divided by common shares outstanding;

Value = dollar value of total shares purchased/sold by a top management team member (CEO, CFO, COO, board chairman, president) as reported on a Form 4;

CAR_{6m} = six-month abnormal stock returns starting on the first transaction date reported on a Form 4, adjusted for size and book-to-market using the Fama-French 5x5 portfolios based on market capitalization and book-to-market ratio;

$CAR_{0,4}$ = five-day abnormal stock returns starting on a Form 4 SEC filing date (t=0), adjusted for size and book-to-market using the Fama-French 5x5 portfolios based on market capitalization and book-to-market ratio;

$Volume_{0,4}$	=	daily abnormal trading volume starting on a Form 4 SEC filing date (t=0). It is measured by the coefficient on an indicator variable equal to 1 for days 0 to 4 in a firm-specific regression of daily trading volumes on lagged daily trading volumes and market-level trading volumes, as in Meulbroek (1992), Yermack (1997), and Heron and Lie (2007), and 0 otherwise. The coefficient is estimated using data from days -50 to +50;
10b5_1	=	indicator variable equal to 1 if the transaction reported on a Form 4 is identified as a pre-planned trade pursuant to Rule 10b5-1, and 0 otherwise;
Reporting Lag	=	number of trading days between the first insider transaction filed on a Form 4 and the receipt of the form by the SEC;
Recent Trades	=	number of shares purchased/sold as reported on Form 4's filed by insiders from the same firm within ten days prior to the observation, scaled by shares outstanding;
Size	=	natural logarithm of the market capitalization of the firm (Compustat Data61×Data14) as of the end of the most recent fiscal quarter;
Book-to-Market	=	book value of common stockholder equity (Compustat Data59) divided by market value of equity (Compustat Data61×Data14) as of the end of the most recent fiscal quarter;
R&D	=	indicator variable equal to 1 if the firm reported a non-zero R&D expense (Compustat Data46) in the most recent fiscal year, and 0 otherwise;
Loss	=	indicator variable equal to 1 if net income before extraordinary items (Compustat Data18) for the most recent fiscal year is strictly negative, and 0 otherwise; and
Restrict	=	indicator variable equal to 1 for all filings in a firm-fiscal year if 75% or more of insider trades executed during that year occur in a 30-day window following an earnings announcement, and 0 otherwise.

TABLE 2
Abnormal Returns and Trading Volumes around Form 4 Filing Dates of Insider Purchases, Pre- vs. Post-SOX

Panel A: Stock Returns

Days relative to Form 4 filing date	Means Pre-SOX	Means Post-SOX	*t-stat*	Medians Pre-SOX	Medians Post-SOX	*z-stat*
-1	-0.03%†	0.02%†	*0.68*	-0.12%	-0.04%	*1.91* *
0	0.10%	0.71%	*7.58* ***	-0.12%	0.33%	*8.78* ***
+1	0.16%	0.81%	*7.89* ***	-0.10%	0.38%	*9.54* ***
+2	0.37%	0.37%	*0.01*	0.03%†	0.13%	*2.23* **
+3	0.29%	0.21%	*-1.03*	0.01%†	0.05%	*0.75*
+4	0.16%	0.17%	*0.39*	-0.04%	0.02%	*1.51*
[0,+2]	0.59%	1.89%	*9.69* ***	-0.06%	0.99%	*10.63* ***
[0,+4]	1.00%	2.30%	*7.70* ***	0.02%	1.31%	*10.96* ***
N	6,587	4,561		6,587	4,561	

Panel B: Trading Volumes

Days relative to Form 4 filing date	Means Pre-SOX	Means Post-SOX	*t-stat*	Medians Pre-SOX	Medians Post-SOX	*z-stat*
-1	0.52%†	9.62%	*5.71* ***	0.00%†	4.30%	*4.07* ***
0	-0.37%†	16.81%	*11.29* ***	0.00%†	12.72%	*10.31* ***
+1	0.61%†	13.63%	*8.35* ***	-0.38%†	10.07%	*8.71* ***
+2	2.40%	3.53%	*0.74*	0.00%†	1.92%	*1.54*
+3	2.33%	4.12%	*1.15*	0.03%†	1.58%	*1.04*
+4	4.26%	4.71%	*0.29*	1.18%	3.08%	*1.64*
[0,+2]	1.03%†	12.03%	*11.64* ***	0.00%†	10.69%	*11.69* ***
[0,+4]	2.04%	9.87%	*10.03* ***	0.66%†	7.74%	*8.86* ***
N	6,579	4,469		6,579	4,469	

***,**, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.
†Indicates that a mean or median is insignificantly different from zero at the 0.10 level.
This table reports mean and median abnormal stock returns (Panel A) and trading volumes (Panel B) around Form 4 filing dates of insider purchases, separately for purchases executed before August 29, 2002 (pre-SOX) and on or after (post-SOX). The sample includes all purchases filed by top management team members from 1997 to 2006. Returns are adjusted using Fama-French 5x5 portfolios based on size and book-to-market. T-statistics (Z-statistics) are reported for the differences in means (medians).

TABLE 3
Abnormal Returns and Trading Volumes around Form 4 Filing Dates of Insider Sales, Pre- vs. Post-SOX

Panel A: Stock Returns

Days relative to Form 4 filing date	Means Pre-SOX	Means Post-SOX	*t-stat*	Medians Pre-SOX	Medians Post-SOX	*z-stat*
-1	-0.08%	0.08%	*3.20* ***	-0.15%	-0.04%	*3.25* ***
0	-0.04%	0.02%	*1.15*	-0.14%	-0.07%	*2.42* **
+1	-0.08%	-0.08%	*-0.14*	-0.16%	-0.11%	*1.30*
+2	-0.16%	-0.04%	*2.33* **	-0.16%	-0.09%	*2.12* **
+3	-0.17%	-0.04%	*2.59* ***	-0.17%	-0.08%	*2.39* **
+4	-0.15%	-0.03%	*2.35* **	-0.15%	-0.07%	*2.54* **
[0,+2]	-0.28%	-0.11%	*1.94* *	-0.32%	-0.19%	*2.29* **
[0,+4]	-0.61%	-0.20%	*3.90* ***	-0.51%	-0.30%	*2.37* **
N	8,542	28,659		8,542	28,659	

Panel B: Trading Volumes

Days relative to Form 4 filing date	Means Pre-SOX	Means Post-SOX	*t-stat*	Medians Pre-SOX	Medians Post-SOX	*z-stat*
-1	-0.58%†	3.81%	*5.23* ***	-1.66%	0.00%†	*3.14* ***
0	-0.03%†	1.43%	*1.82* *	-0.49%	-1.02%	*-0.67*
+1	-0.34%†	0.64%	*1.20*	-1.04%	-1.70%	*-0.88*
+2	-1.91%	0.75%	*3.20* ***	-3.32%	-1.77%	*2.16* ***
+3	0.16%†	1.37%	*1.50*	-0.51%†	-1.25%	*-0.65*
+4	0.15%†	0.66%	*0.62*	-0.51%†	-1.45%	*-1.25*
[0,+2]	-0.70%†	1.15%	*3.69* ***	-1.71%	-0.67%	*2.32* **
[0,+4]	-0.43%†	1.37%	*4.44* ***	-1.33%	-0.23%†	*2.91* ***
N	8,879	27,963		8,879	27,963	

***,**, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.
†indicates that a mean is insignificantly different from zero at the 0.10 level.
This table reports mean and median abnormal stock returns (Panel A) and trading volumes (Panel B) around Form 4 filing dates of insider sales, separately for sales executed before August 29, 2002 (pre-SOX) and on or after (post-SOX). The sample includes all purchases filed by top management team members from 1997 to 2006. Returns are adjusted using Fama-French 5x5 portfolios based on size and book-to-market. T-statistics (Z-statistics) are reported for the differences in means (medians).

TABLE 4
Abnormal Trading Volumes around Form 4 Filings: Regression Results

	Purchases	*t-stats*	Sales	*t-stats*
Intercept	0.0933 ***	*2.86*	0.0334 *	*1.77*
PostSOX	0.0528 ***	*3.14*	0.0002	*0.02*
10b5_1	-0.0896	*-1.57*	0.0010	*0.13*
Reporting Lag	-0.0287 ***	*-4.07*	-0.0073 *	*-1.79*
Recent Trades	0.1004	*0.79*	0.0163	*0.70*
Trade Size	0.0605 *	*1.70*	-0.0021	*-0.29*
Trade Size × PostSOX	0.1879 *	*1.81*	0.0666 ***	*4.09*
Book-to-market	-0.0172 *	*-1.88*	0.0084	*1.01*
Size	-0.0019	*-0.56*	-0.0054 ***	*-3.72*
R&D	0.0022	*0.19*	0.0061	*1.37*
Loss	0.0113	*0.94*	-0.0057	*-0.90*
Restrict	0.0095	*0.87*	0.0241 ***	*5.33*
N	9,659		35,571	
Adjusted R^2	1.92%		0.40%	

***,**, and * indicate significance at the 0.01, 0.05, and 0.10 two-tailed levels, respectively. The t-statistics are based on standard errors clustered by firm-month.

This table reports regression results in which the three-day average daily abnormal trading volume ($Volume_{0,2}$) around the filing date of a Form 4 is the dependent variable. The sample includes all purchases and sales filed by top management team members from 1997 to 2006. The coefficients are estimated separately for purchases and sales.

Variable definitions:

PostSOX = indicator variable equal to 1 for filings of trades executed on or after August 29, 2002, and 0 otherwise;

10b5_1 = indicator variable equal to 1 if the transaction reported on a Form 4 is identified as a pre-planned trade pursuant to Rule 10b5-1, and 0 otherwise;

Reporting Lag = number of trading days between the first insider transaction filed on a Form 4 and the receipt of the form by the SEC;

Trade Size = number of shares purchased/sold by a top management team member (CEO, CFO, COO, board chairman, president) as reported on a Form 4, divided by common shares outstanding;

Recent Trades = number of shares purchased/sold as reported on Form 4's filed by insiders from the same firm within ten days prior to the observation, scaled by shares outstanding;

Book-to-Market = book value of common stockholder equity (Compustat Data59) divided by market value of equity (Compustat Data61×Data14) as of the end of the most recent fiscal quarter;

Size = natural logarithm of the market capitalization of the firm (Compustat Data61×Data14) as of the end of the most recent fiscal quarter;

R&D = indicator variable equal to 1 if the firm reported a non-zero R&D expense (Compustat Data46) in the most recent fiscal year, and 0 otherwise;

Loss = indicator variable equal to 1 if net income before extraordinary items (Compustat Data18) for the most recent fiscal year is strictly negative, and 0 otherwise; and

Restrict = indicator variable equal to 1 for all filings in a firm-fiscal year if 75% or more of insider trades executed during that year occur in a 30-day window following an earnings announcement, and 0 otherwise.

TABLE 5
Abnormal Returns around Form 4 Filings: Regression Results

	Purchases	*t-stats*	Sales	*t-stats*
Intercept	0.0035	*0.87*	0.0020	*0.73*
PostSOX	0.0065 ***	*2.76*	-0.0038 **	*-2.44*
CAR_{6m}	0.0123 ***	*3.32*	0.0221 ***	*6.59*
CAR_{6m} × *PostSOX*	0.0108 *	*1.79*	-0.0036	*-0.97*
Reporting Lag	-0.0023 **	*-2.39*	-0.0018 ***	*-2.94*
10b5_1	-0.0121 **	*-2.59*	-0.0004	*-0.54*
Recent Trades	0.0204 **	*1.99*	-0.0037	*-1.54*
Trade Size	-0.0032	*-0.79*	-0.0010	*-0.27*
Trade Size × *PostSOX*	0.0207	*1.30*	-0.0030	*-0.70*
Book-to-market	0.0021 *	*1.74*	0.0014	*1.07*
Size	0.0004	*0.98*	0.0004 *	*1.93*
R&D	0.0067 ***	*3.93*	0.0009	*1.58*
Loss	0.0053 **	*2.94*	0.0004	*0.41*
Restrict	0.0013	*0.89*	-0.0020 ***	*-3.42*
N	10,640		36,393	
Adjusted R^2	2.70%		1.60%	

***,**, and * indicate significance at the 0.01, 0.05, and 0.10 two-tailed levels, respectively. The t-statistics are based on standard errors clustered by firm-month.

This table reports regression results in which the three-day abnormal stock return ($CAR_{0,2}$) around the filing date of a Form 4 is the dependent variable. The sample includes all purchases and sales filed by top management team members from 1997 to 2006. Returns are adjusted using Fama-French 5x5 portfolios based on size and book-to-market. The coefficients are estimated separately for purchases and sales.

Variable definitions:

PostSOX = indicator variable equal to 1 for filings of trades executed on or after August 29, 2002, and 0 otherwise;

CAR_{6m} = six-month abnormal stock returns starting on the first transaction date reported on a Form 4, adjusted for size and book-to-market using the Fama-French 5x5 portfolios based on market capitalization and book-to-market ratio;

Reporting Lag = number of trading days between the first insider transaction filed on a Form 4 and the receipt of the form by the SEC;

10b5_1 = indicator variable equal to 1 if the transaction reported on a Form 4 is identified as a pre-planned trade pursuant to Rule 10b5-1, and 0 otherwise;

Trade Size = number of shares purchased/sold by a top management team member (CEO, CFO, COO, board chairman, president) as reported on a Form 4, divided by common shares outstanding;

Recent Trades = number of shares purchased/sold as reported on Form 4's filed by insiders from the same firm within ten days prior to the observation, scaled by shares outstanding;

Book-to-Market = book value of common stockholder equity (Compustat Data59) divided by market value of equity (Compustat Data61×Data14) as of the end of the most recent fiscal quarter;

Size = natural logarithm of the market capitalization of the firm (Compustat Data61×Data14) as of the end of the most recent fiscal quarter;

R&D = indicator variable equal to 1 if the firm reported a non-zero R&D expense (Compustat Data46) in the most recent fiscal year, and 0 otherwise;

Loss = indicator variable equal to 1 if net income before extraordinary items (Compustat Data18) for the most recent fiscal year is strictly negative, and 0 otherwise; and

Restrict = indicator variable equal to 1 for all filings in a firm-fiscal year if 75% or more of insider trades executed during that year occur in a 30-day window following an earnings announcement, and 0 otherwise.

TABLE 6
Abnormal Returns around Form 4 Filings of Insider Sales:
High vs. Low Estimated *ex ante* Litigation Risk

	Low *ex ante* Litigation Risk	*t-stats*	High *ex ante* Litigation Risk	*t-stats*
Intercept	0.0040	*1.15*	-0.0055	*-0.91*
PostSOX	-0.0047 ***	*-2.66*	-0.0003	*-0.08*
CAR_{6m}	0.0252 ***	*6.35*	0.0122 *	*1.85*
CAR_{6m} × *PostSOX*	-0.0065	*-1.50*	0.0056	*0.79*
Reporting Lag	-0.0024 ***	*-3.50*	0.0002	*0.13*
10b5_1	-0.0003	*-0.30*	-0.0017	*-1.09*
Recent Trades	-0.0541 **	*-2.03*	0.0090	*1.41*
Trade Size	-0.0085	*-0.22*	0.0117	*0.14*
Trade Size × *PostSOX*	-0.0029	*-0.66*	-0.0064	*-0.75*
Book-to-market	-0.0004	*-0.27*	0.0080 **	*2.15*
Size	0.0004	*1.29*	0.0004	*1.11*
R&D	0.0009	*1.29*	0.0011	*1.09*
Loss	0.0003	*0.26*	-0.0007	*-0.35*
Restrict	-0.0017 ***	*-2.36*	-0.0026 **	*2.50*
N	25,852		9,539	
Adjusted R^2	1.87%		1.32%	

***,**, and * indicate significance at the 0.01, 0.05, and 0.10 two-tailed levels, respectively. The t-statistics are based on standard errors clustered by firm-month.

This table reports regression results in which the three-day abnormal stock return ($CAR_{0,2}$) around the filing date of a Form 4 is the dependent variable. The sample includes all sales filed by top management team members from 1997 to 2006. Returns are adjusted using Fama-French 5x5 portfolios based on size and book-to-market. The coefficients are estimated separately for sales executed by insiders in firms classified as high and low ex-ante litigation risk. Litigation risk is estimated using a model based on Rogers and Stocken (2005).

Variable definitions:

PostSOX = indicator variable equal to 1 for filings of trades executed on or after August 29, 2002, and 0 otherwise;

CAR_{6m} = six-month abnormal stock returns starting on the first transaction date reported on a Form 4, adjusted for size and book-to-market using the Fama-French 5x5 portfolios based on market capitalization and book-to-market ratio;

Reporting Lag = number of trading days between the first insider transaction filed on a Form 4 and the receipt of the form by the SEC;

10b5_1 = indicator variable equal to 1 if the transaction reported on a Form 4 is identified as a pre-planned trade pursuant to Rule 10b5-1, and 0 otherwise;

Trade Size = number of shares purchased/sold by a top management team member (CEO, CFO, COO, board chairman, president) as reported on a Form 4, divided by common shares outstanding;

Recent Trades = number of shares purchased/sold as reported on Form 4's filed by insiders from the same firm within ten days prior to the observation, scaled by shares outstanding;

Book-to-Market = book value of common stockholder equity (Compustat Data59) divided by market value of equity (Compustat Data61×Data14) as of the end of the most recent fiscal quarter;

Size = natural logarithm of the market capitalization of the firm (Compustat Data61×Data14) as of the end of the most recent fiscal quarter;

R&D = indicator variable equal to 1 if the firm reported a non-zero R&D expense (Compustat Data46) in the most recent fiscal year, and 0 otherwise;

Loss = indicator variable equal to 1 if net income before extraordinary items (Compustat Data18) for the most recent fiscal year is strictly negative, and 0 otherwise; and

Restrict = indicator variable equal to 1 for all filings in a firm-fiscal year if 75% or more of insider trades executed during that year occur in a 30-day window following an earnings announcement, and 0 otherwise.

TABLE 7
Insider Trades and Subsequent News

	Purchases	*t-stats*	Sales	*t-stats*
Intercept	0.1739 ***	*8.27*	0.1706 **	*1.98*
PostSOX	-0.0387 ***	*-3.54*	0.1280 ***	*3.44*
MBE_q	-0.0160	*-1.52*	0.1509 ***	*3.25*
$MBE_q \times PostSOX$	0.0227 *	*1.79*	-0.0706	*-1.16*
MBE_{q+1}	0.0100	*0.95*	-0.0040	*-0.10*
$MBE_{q+1} \times PostSOX$	-0.0222 *	*-1.74*	0.0597	*0.95*
MBE_{q+2}	-0.0097	*-0.98*	-0.0589 *	*-1.73*
$MBE_{q+2} \times PostSOX$	0.0219 *	*1.81*	0.1189 **	*2.36*
Book-to-market	0.0091	*0.89*	-0.1471 ***	*-4.05*
Size	-0.0119 ***	*-6.05*	0.0058	*0.63*
R&D	-0.0208 ***	*-3.36*	0.1465 ***	*4.66*
Loss	0.0414 ***	*4.41*	-0.0234	*-0.57*
$Return_{q-1}$	-0.1566 ***	*-8.04*	0.4659 ***	*5.28*
$Return_{q-1} \times PostSOX$	0.0094	*0.29*	0.3506 ***	*2.90*
$Return_q$	-0.0251	*-1.33*	-0.0023	*-0.03*
$Return_q \times PostSOX$	0.0084	*0.29*	0.4213 ***	*3.42*
$Return_{q+1,q+2}$	-0.0239 **	*-2.20*	-0.3237 ***	*-6.07*
$Return_{q+1,q+2} \times PostSOX$	0.0115	*0.61*	-0.0585	*-0.66*
$Purchases_{q-1}$	0.2075 ***	*7.42*		
$Sales_{q-1}$			0.4609 ***	*12.16*
N	36,994		36,994	
Adjusted R^2	7.61%		21.76%	

***,**, and * indicate significance at the 0.01, 0.05, and 0.10 two-tailed levels, respectively. The t-statistics are based on standard errors clustered by firm.

This table reports regression results in which quarterly insider transactions is the dependent variable. The sample includes all quarters with analyst forecast data available for one-, two- and three-quarter-ahead EPS forecasts, in firms with at least one insider transaction between 1997 and 2006. In the first (second) column, the dependent variable is the number of insider purchases (sales) executed during the quarter.

Variable definitions:

PostSOX = indicator variable equal to 1 for filings of trades executed on or after August 29, 2002, and 0 otherwise;

MBE_{q+n} = indicator variable equal to 1 if actual EPS for quarter q+n is at least as high as the consensus EPS forecast as of the beginning of quarter q, 0 otherwise;

Book-to-Market = book value of common stockholder equity (Compustat Data59) divided by market value of equity (Compustat Data61×Data14) as of the end of the most recent fiscal quarter;

Size = natural logarithm of the market capitalization of the firm (Compustat Data61×Data14) as of the end of the most recent fiscal quarter;

R&D = indicator variable equal to 1 if the firm reported a non-zero R&D expense (Compustat Data46) in the most recent fiscal year, and 0 otherwise;

Loss = indicator variable equal to 1 if net income before extraordinary items (Compustat Data18) for the most recent fiscal year is strictly negative, and 0 otherwise;

$Ret_{q-1(q)}$ = 90-day size-adjusted stock return ending the day prior to the earnings announcement for quarter q-1 (q);

$Ret_{q+1,q+2}$:	=	180-day size-adjusted stock return ending the day prior to the earnings announcement for quarter q+2; and
$Purchases_{q-1}$ $(Sales_{q-1})$	=	number of insider purchases (sales) executed in the firm over the preceding quarter.

TABLE 8
Abnormal Stock Returns and Trading Volumes around Announcement Dates of Insider Transactions in the U.K., Pre- and Post-August 29, 2002

Panel A: Firms not listed in the U.S.

	Mean returns			Mean volumes		
	Pre-SOX	Post-SOX	*t-stat*	Pre-SOX	Post-SOX	*t-stat*
Purchases						
[0,+2]	0.68%	0.68%	*0.00*	17.66%	14.25%	*-1.08*
[0,+4]	1.05%	0.93%	*-0.53*	13.90%	11.41%	*-0.95*
N	1,184	1,114		1,131	1,172	
Sales						
[0,+2]	-0.00%	-0.02%	*-0.07*	14.37%	12.84%	*-0.39*
[0,+4]	0.19%	-0.04%	*-0.61*	7.90%	7.69%	*0.07*
N	792	770		697	793	

Panel B: Firms listed in the U.S.

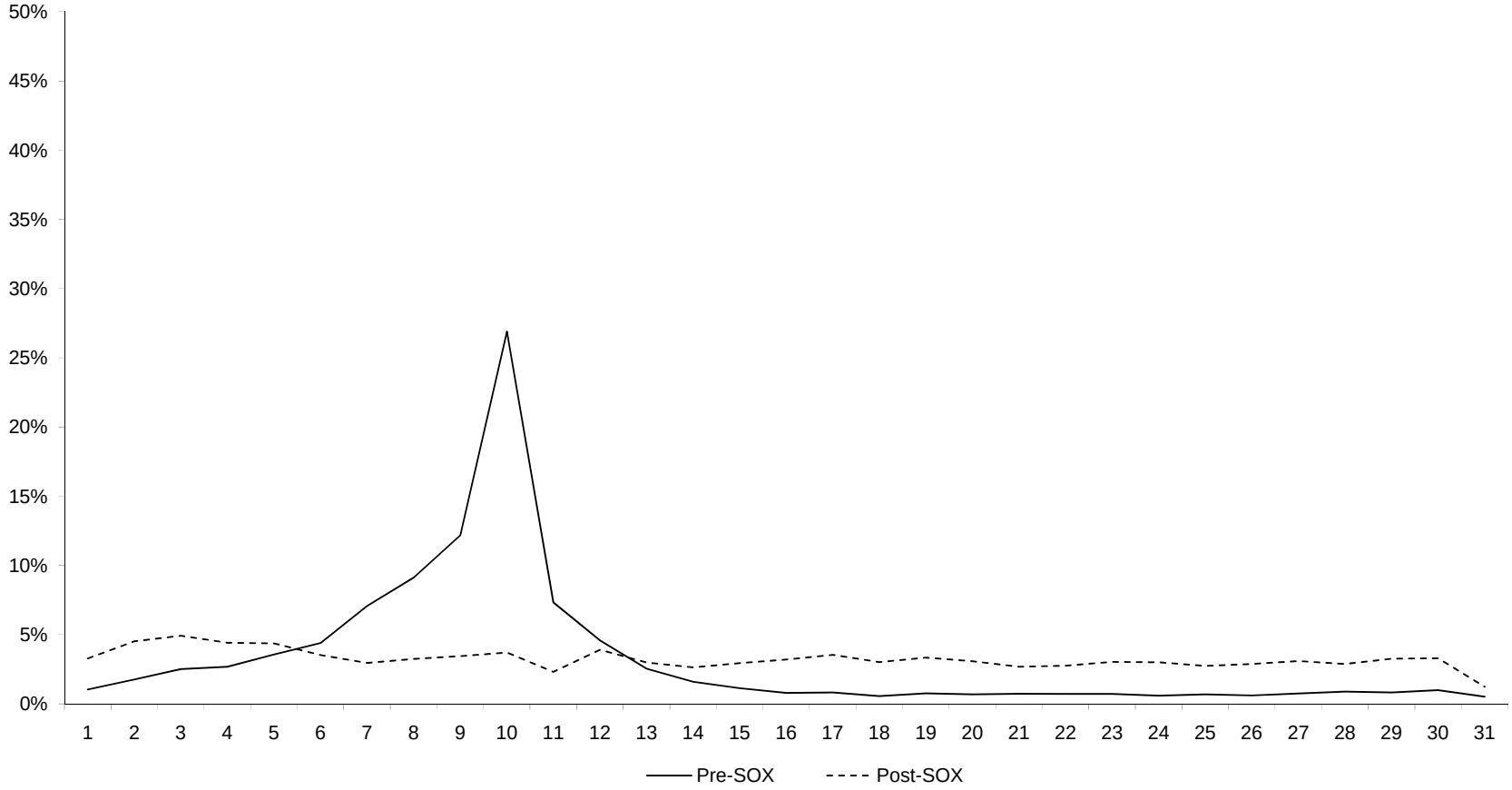
	Mean returns			Mean volumes		
	Pre-SOX	Post-SOX	*t-stat*	Pre-SOX	Post-SOX	*t-stat*
Purchases						
[0,+2]	0.80%	1.05%	*0.51*	4.49%†	3.22%†	*-0.33*
[0,+4]	0.76%	1.45%	*1.15*	1.81%†	1.29%†	*-0.16*
N	242	236		255	241	
Sales						
[0,+2]	-0.69%	0.14%	*2.00* **	2.20%†	2.57%†	*0.09*
[0,+4]	-0.83%	0.42%	*2.65* ***	-0.30%†	1.82%†	*0.74*
N	149	157		150	157	

***,**,* indicate significance at the 0.01, 0.05 and 0.10 levels.

† indicates that a mean is insignificantly different from zero at the 0.10 level.

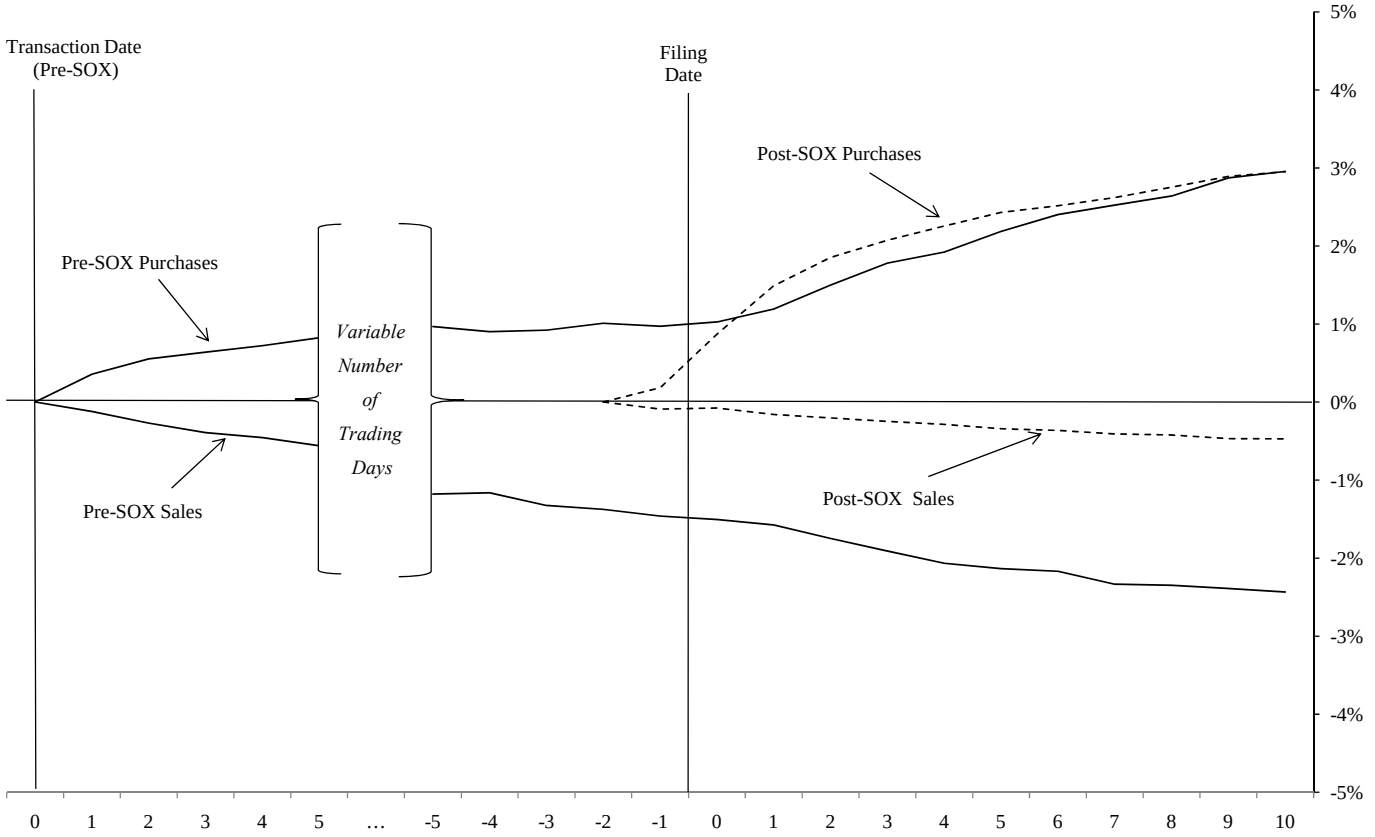
This table reports mean abnormal returns and trading volumes around announcement dates of insider purchases and sales in the U.K., separately for transactions executed before August 29, 2002 (pre-SOX) and on or after (post-SOX). Panel A reports results for trades in firms not listed on a U.S. stock exchange, while Panel B reports results for firms also listed on a U.S. stock exchange. The sample includes purchases and sales of at least 0.0005% of shares outstanding filed by directors of FTSE 350 firms from 1997 to 2006. Returns are adjusted using FTSE 350 value-weighted average daily returns. Abnormal volumes are calculated using Model (1), without indicator variables for dividend announcements. T-statistics (Z-statistics) are reported for the differences in means (medians).

FIGURE 1
Distribution of Form 4 Filing Dates by Calendar Day of the Month



This figure plots the distribution of Form 4 filing dates by calendar day of the month. The dates are determined by the receipt of the forms by the SEC. The sample includes all purchases and sales filed by top management team members from 1997 to 2006. Pre- and post-SOX filings refer to trades executed before August 29, 2002 and on or after August 29, 2002, respectively.

FIGURE 2
Cumulative Abnormal Returns after Insider Trades before and after SOX



This figure plots mean cumulative abnormal returns following insider transactions executed between 1997 and 2006 by top management team members separately for pre- and post-SOX purchases and sales. Pre- and post-SOX filings refer to trades executed before August 29, 2002 and on or after August 29, 2002, respectively. Returns are adjusted using Fama-French 5x5 portfolios based on size and book-to-market. Since the window between transactions and their SEC filings is subject to high variation before SOX, only the first five days after transaction dates and the last five days before filing dates are plotted, hence the discontinuity in the pre-SOX lines. Returns prior to insider transactions are not shown.