

**Are All Insider Sales Created Equal?**  
**First Evidence from Supplementary Disclosures in SEC Filings**

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# **Are All Insider Sales Created Equal?**

## **First Evidence from Supplementary Disclosures in SEC Filings**

### **Abstract**

This study is the first to analyse managers' voluntary supplementary disclosures in insider trade filings with the SEC. Based on the textual content of the disclosures, we are able to distinguish between discretionary and nondiscretionary sales. We document significantly negative abnormal filing returns to discretionary sales while abnormal returns to nondiscretionary sales are essentially zero. Examining the motivations for supplementary disclosures with discretionary sales, we find evidence consistent with insiders strategically disclosing liquidity needs to disguise informed trading. Disclosures to discretionary sales are more likely when the legal risk of trading is high and when insiders offload a large amount of stock. Although investors react negatively to these disclosures, we also find significantly negative long-term abnormal returns over the subsequent months suggesting that investors under-react to the negative information in these sales. A long-short portfolio investment strategy that exploits this under-reaction earns an economically significant 16% risk-adjusted return per year. Consistent with insiders selling ahead of bad news, discretionary sales for which insider provide disclosures are more likely to precede analyst downgrades and negative earnings surprises.

**Keywords:** Insider sales; Form 4 filings; voluntary disclosure; textual disclosure; information content; litigation risk

**JEL Classification:** G12, G14, G30, M41

**Data Availability:** Data are available from the public sources cited in the text.

## 1. Introduction

Insiders sell shares for a variety of reasons. They sell shares for liquidity needs such as to cover taxes, for personal consumption, or to rebalance their portfolios. This is particularly relevant for executives and directors as their wealth is often highly concentrated in their firm. Yet, insiders also enjoy preferential access to firm-specific information and might therefore exploit their information advantage by selling shares ahead of future bad news about the firm (Seyhun and Bradley 1997; Beneish, Press and Vargus 2004). Investment professionals and the financial media often mention insider sales when arguing against a particular investment.<sup>1</sup> The true motives for an insider's stock sale are, however, unobservable to outside investors, complicating any efforts to disentangle those sales that reflect informed trading from those genuinely based on liquidity needs.

In this paper, we examine the information insiders disclose about the reasons for their sales on the Form 4 for over two million insider transactions filed with the SEC in 2003-2011.<sup>2</sup> In doing so, our study is the first to analyse insiders' voluntary supplementary disclosures in footnotes on the SEC Form 4 that contain textual descriptions about the reasons for their stock sales.<sup>3</sup> Prior research suggests that managers voluntarily disclose information to reduce information asymmetries and to avoid adverse selection and litigation costs (Grossman and Hart 1980; Milgrom 1981; Skinner 1994; Brown, Hillegeist and Lo 2004). However, managers are reluctant to disclose if the associated costs of disclosure exceed its benefits (Verrecchia 1983; Nagar, Nanda and Wysocki 2003). Hutton, Miller and Skinner (2003) show that supplementary disclosures to earnings forecasts support the credibility of these forecasts and

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<sup>1</sup> See for example David Einhorn, "GAAP-uccino", presentation delivered at 2011 Value Investing Congress, New York, October 17, 2011 and "When Insiders Sell," Forbes, May 5, 2009.

<sup>2</sup> In our analyses we collapse these manager-level observations into 180,000 firm-day insider sales observations.

<sup>3</sup> Several studies have examined the information content of insider trade filings generally (e.g., Brochet 2010), but to our knowledge this paper is the first to examine the motivations and consequences of the supplementary textual disclosures in these filings.

are informative to investors. In this paper we investigate the motives for insiders' voluntary supplementary disclosures on the SEC Form 4 and their information content.

Insiders might disclose supplementary information during stock sales to credibly convey that these sales are genuinely made for liquidity or diversification reasons and have no information value. In addition, the disclosures might serve as protection against potential allegations that the insider has been dealing on material non-public information, particularly when the sale occurs during time periods when the information risk is high.<sup>4</sup>

By analysing these disclosures, we are first able to identify insider sales that occur for 'mechanical' reasons and are thus likely to be uninformative. These sales are 'mechanical' in the sense that the insiders have no discretion over the timing or the amount of the sale. We call these sales *nondiscretionary*. As expected, we find that these insider sales have no information value, i.e., they have no predictive power for the future performance of the firm.

We then examine the remaining insider sales which make up the majority and which we call *discretionary* sales. We find that in about 43% of transaction days involving discretionary sales insiders also voluntarily provide supplementary disclosures on the Form 4. Beyond simply being generic boilerplate disclosures, these footnotes often explain the reasons for the stock sale. They mention portfolio diversification motives, liquidity needs to cover tax liabilities or tuition fees for children, divorce settlements, or that the sale was part of a 10b5-1 plan, i.e., a pre-planned trade under safe harbour provisions.<sup>5</sup> These are stock sales, for which the insider has discretion over the timing or amount. Not disclosing the motives for these sales might therefore lead market participants to interpret them as negative news for the stock. Narayanan (2000) and Billings and Cedergren (2015) show that managers delay the disclosure

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<sup>4</sup> A large number of firms voluntarily implement insider trading policies limiting the extent of the discretion over the timing of sales, e.g., by discouraging or outright prohibiting trading before earnings announcements (Bettis, Coles and Lemmon 2000).

<sup>5</sup> Although these plans usually transfer trade execution to an uninformed party such as a broker who trades on behalf of the insider based on a pre-specified rule, insiders still retain discretion over the trades in so far as they can cancel the trades at any time before the execution date.

of bad news when they sell stock. Hence insider sales might be regarded as bad news especially when there is a lack of disclosure regarding their reasons. In such cases, investors may interpret silence as a sign that these sales occur for any reason other than portfolio rebalancing or liquidity needs.

However, even when insiders disclose the reasons for their stock sales, investors might not perceive these as credible signals of uninformed trading. Although it is unlikely that insiders will engage in blatant lying when disclosing the reasons for stock sales, they might still exploit their information advantage by timing these sales opportunistically or by selling more stock than would satisfy their genuine liquidity needs.<sup>6</sup> The truthfulness of disclosure is a central assumption of the unravelling argument in the disclosure literature. Cheap-talk models recognise that managers might not always truthfully disclose private information (Crawford and Sobel 1982). When managers' payoffs depend on investors' reactions to the disclosure and incentives are not perfectly aligned, full information revelation does not occur. Investors might therefore naturally be sceptical about these disclosures.

Prior research provides ample empirical evidence that managers exploit their information advantage strategically when disclosing material non-public information (Aboody and Kasznik 2000; Lang and Lundholm 2000; Nagar, Nanda and Wysocki 2003; Brockman, Khurana and Martin 2008) and several studies link insider trading with opportunistic disclosure behaviour around the trading activity. For example, Noe (1999) shows that managers concentrate their trades after earnings forecasts, i.e., sell more often after good news forecasts and buy more often after bad news forecasts. Similarly, Cheng and Lo (2006) find that managers adjust the timing and frequency of their earnings guidance opportunistically when purchasing shares. However, consistent with the litigation avoidance hypothesis (Skinner 1994) several studies fail to establish strong links between insiders' disclosure of positive news that precede stock

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<sup>6</sup> Insiders will likely be reluctant to disclose materially false information on the Form 4, even in a voluntarily provided footnote, to avoid higher litigation risk.

sales or the revelation of negative news immediately following stock sales likely because of the higher scrutiny and legal restrictions insiders face when selling shares. Ke, Huddart and Petroni (2003), for example, show that insiders increase their selling of shares up to two years prior to a break in a string of consecutive earnings growth, but not in the two quarters immediately prior to the break.

Building on this research, we first examine whether investors distinguish between nondiscretionary and discretionary sales upon news of an insider's stock sale. We then test whether investors react differently to discretionary sales which insiders supplement with footnote disclosures, compared to those for which they stay silent. That is, we investigate whether investors perceive the supplementary disclosures to be credible when the sale is discretionary. Further exploring the motivations for the disclosure, we examine whether insiders are more likely to disclose supplementary information about their trades when the ex-ante litigation risk is high and when they intend to trade during time periods of higher legal risk. Finally, we examine whether insiders use the disclosures strategically to obfuscate that they are trading on private information. Specifically, we investigate the association of discretionary sales, for which insiders disclose the reasons, with future stock returns and fundamental news.

Our findings are as follows: We document a significant difference in cumulative abnormal announcement returns between discretionary and nondiscretionary sales. Three-day cumulative abnormal Form 4 filing returns to discretionary sales are 32-36 basis points lower than returns to nondiscretionary insider sales. Furthermore, the market reaction is significantly more negative at  $-0.95\%$  for discretionary sales by the top two executives, the CEO and CFO, who most likely have the largest information advantage (Ravina and Sapienza 2010; Wang, Shin and Francis 2012). We further find the differential market reaction to discretionary versus nondiscretionary sales to be higher for firms that are perceived to have weaker internal controls and higher information asymmetries.

However, we largely find no difference in abnormal filing returns between discretionary sales with and without supplementary disclosures suggesting that investors do not believe the disclosures to credibly convey that these are liquidity-motivated sales. This is of no surprise as we document that discretionary sales, for which insiders disclose liquidity motivations, are six times the size of all other stock sales. In dollar terms, in these sales insiders on average liquidate US \$6.7 million worth of shares compared to around US \$1 million for all other sales. Given their significantly larger size, discretionary sales are also likely under higher public scrutiny. Consistent with this, we find that insiders are more likely to disclose the reasons for their sales in supplementary footnotes to the Form 4 when the ex-ante litigation risk is high and when the sales occur during time-periods of heightened legal risk, e.g., before earnings announcements. This also partly explains why insiders choose to disclose despite there being no immediate capital market benefit.

Another benefit emerges when we examine long-term abnormal buy-and-hold returns in the months following discretionary sales. We find evidence consistent with insiders disclosing strategically to delay the revelation of bad news. We document monotonically decreasing abnormal returns after months with discretionary sales (and monotonically increasing divergence in returns from nondiscretionary trades) over longer-term holding horizons. More importantly, we find that firms whose insiders engage in discretionary sales and disclose the reasons for their sale, perform significantly worse in the following calendar quarter. The difference in abnormal returns between discretionary and nondiscretionary trades in the month following the insider sale is about 1.2% but is almost an additional 30 basis points lower for those discretionary sales that include supplementary disclosures. In additional tests, we further find that firms with managers who more often disclose the reasons for their sales perform significantly worse. Our findings suggest that even though investors react more negatively to discretionary insider sales that claim liquidity motivations, they do not fully impound the negative news into stock prices immediately after the filing date. That is, the supplementary

disclosures that describe liquidity needs as reasons for the discretionary insider sale are partly successful in leading investors to under-estimate their information content.

We next examine the economic significance of the under-reaction by testing whether a sophisticated investor could exploit the delayed market reaction in a tradable investment strategy. A portfolio long in stocks that experienced nondiscretionary insider sales and short in stocks, for which insiders provided discretionary reasons for selling, held over one month earns an economically and statistically significant 16% risk-adjusted return per year. We support these findings by documenting that discretionary insider sales with supplementary disclosures are more likely to precede analyst downgrades and negative earnings surprises.

Collectively our findings suggest that insiders' supplementary disclosures on the SEC Form 4, which contain descriptions of the reasons for an insider's stock sale, are highly informative to investors. Our evidence suggests that insiders provide these disclosures strategically when the legal risk of trading is high in an attempt to disguise information-based sales as uninformative sales made for liquidity needs. Our study thus provides first evidence on the motivations and economic consequences of managers' textual supplementary disclosures on regulatory filings for stock sales.

The remainder of the paper is organised as follows. Section 2 discusses our contribution to the literature and introduces the setting. Section 3 describes the data. Section 4 presents the empirical analysis on the market reaction to discretionary insider sale disclosures and on their motivation. Section 5 presents the empirical analysis on the link between discretionary insider sale disclosures and long-term returns while Section 6 presents the empirical analysis on the link with future negative news events. Section 7 discusses robustness tests and section 8 concludes.

## **2. Contribution and Setting**

### *2.1. Contribution*



Our study contributes to several strands of the literature on voluntary disclosure and insider sales. Prior research examines the relationship between insider trading and management's disclosure behaviour *prior* to or *after* the insider trade (Noe 1999; Cheng and Lo 2006; Billings and Cedergren 2015) but does not examine disclosure choices that directly accompany an insider's transaction. This literature connects insider trading with strategic disclosure and generally finds that insider trading is correlated with the disclosure timing and management of earnings (Beneish and Vargus 2002; Bergstresser and Philippon 2006; Cheng and Lo 2006). Cheng and Lo (2006) show that corporate insiders endogenously decide their trading and disclosure timing to maximize private gains, taking into account the risk of potential civil litigation. Examining one particular kind of insider trade, Jagolinzer (2009) documents that pre-planned trades under the safe harbour provisions of SEC rule 10b5-1 are used strategically to hide private rent extraction.<sup>7</sup> We extend this line of research by showing that insiders strategically disclose liquidity needs as reasons for their sales on the Form 4 in an attempt to disguise that they are trading on private information. We identify insider sales, for which managers have discretion over the amount and timing of the sale and find that these are associated with negative long-term abnormal returns, particularly if they come with supplementary disclosures. The latter are also positively associated with the likelihood (and magnitude) of future analyst downgrades and negative earnings surprises. Although our evidence on the short-term market reaction to the disclosure suggests that investors are sceptical about the credibility of the disclosures, we find evidence that investors under-react to the full extent of the negative information inherent in these sales resulting in an exploitable trading strategy.

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<sup>7</sup> The gains to insider trading before bad earnings news are not confined to the firm's executives as shown in Ravina and Sapienza (2010). Their study finds that independent directors equally gain from insider sales in particular ahead of bad earnings news and earnings restatements, events that the authors use to distinguish information-based insider sales from liquidity-based sales.

The literature on opportunistic insider selling and disclosure also finds that litigation concerns play an important role when insiders attempt to exploit their information advantage. Beneish, Press and Vargus (2004) show that insiders are more likely to sell stock before they engage in earnings management that attempts to delay the revelation of bad earnings news. Their results suggest that managers try to avoid litigation that could arise from selling shares just ahead of bad earnings news. They do not find evidence of a higher propensity of earnings management before stock sales. Ke, Huddart and Petroni (2003) show that insiders increase their selling of shares up to two years prior to a break in a string of consecutive earnings growth, but not in the two quarters immediately prior to the break. More recently Billings and Cedergren (2015) show that managers are less likely to provide negative guidance for the next quarter with the earnings announcement for the current quarter when they sell shares in the two weeks immediately after the announcement, but that they are less likely to stay silent when the ex-ante litigation risk is high. Consistent with the litigation avoidance hypothesis, we find that insiders are more likely to disclose the reasons for their sale when the ex-ante litigation risk is high and when they trade in periods of high legal risk.

Finally, our findings also contribute to the literature that attempts to discriminate between informative insider sales and genuine liquidity/diversification-driven sales based on observable trade or firm characteristics. Identifying informative insider sales is particularly important to outside investors as managers generally delay disclosing bad news (Graham, Harvey and Rajgopal 2005; Kothari, Shu and Wysocki 2009) and there are few other capital market mechanisms that reveal negative information about a firm.<sup>8</sup> Two strands of this literature have emerged.

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<sup>8</sup> There are often significant constraints to short sales (Diamond and Verrecchia 1987; Beneish, Lee and Nichols 2015) and information intermediaries, such as analysts, are generally reluctant to cover underperforming firms or issue downgrades (McNichols and O'Brien 1997; O'Brien, McNichols and Lin 2005).

One strand examines the information content of insider sales and their predictive power for future stock returns by identifying bad news events *ex post*.<sup>9</sup> Among these, Seyhun and Bradley (1997) document that insiders are more likely to sell shares ahead of bankruptcy filings generating private trading gains. Similarly, Beneish (1999) examines the association between earnings overstatements and insider sales and finds a higher propensity of managers selling shares during the period of earnings manipulation. The other strand aims to distinguish liquidity-driven insider sales from information-based sales through the insiders' trading behaviour *ex ante*. Cohen, Malloy and Pomorski (2012) identify information-based insider trades by classifying insiders into routine and opportunistic traders according to the timing of their trades in relation to their past trading behaviour. Their study finds that opportunistic trades are predictive of future stock returns and news. In a similar vein, Karamanou, Pownall and Prakash (2016) classify insider trades by the insider's concurrent trading behaviour. Their study shows that stock sales in one firm by insiders to multiple firms that occur simultaneously with stock purchases in the other affiliated firms are informative and associated with future firm performance.

We contribute to this literature by using insiders' own disclosures about the nature of the sale to distinguish discretionary from nondiscretionary sales. We differ from the prior literature by discriminating between informative and uninformative insider sales based on insiders' own voluntary supplementary disclosures on the SEC Form 4. These disclosures are observable to investors at the time of the trade filing and arguably easier to process as information signals than disentangling the insiders' past trading patterns. We find that our distinction into discretionary and nondiscretionary sales identifies substantially more trades as informative than distinguishing them by the timing of the trades as in Cohen et al. (2012). Additionally, our

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<sup>9</sup> Various studies that examine the information content of insider sales more generally overall find mixed results (e.g., Seyhun, 1986; Lakonishok and Lee, 2001; Brochet 2010)

classification has incremental explanatory power for future stock returns after controlling for their opportunistic timing.

## 2.2. *Setting: Supplementary disclosures on SEC Form 4*

With the enactment of the Sarbanes-Oxley Act (SOX) in 2002 insider trade reporting underwent significant changes. Provisions in SOX require insiders to report trades (changes in ownership) to the SEC on the Form 4 within 2 business days following the transaction date instead of the 10-day period allowed prior to SOX. Since 2003, the SEC also requires Form 4 to be filed electronically. Form 4 contains identifying information of the firm and the insider as well as transaction information. The form also allows for supplementary information to be added in footnotes below the main table alongside the quantitative transaction details. These footnotes often contain textual explanations with clarifying information about the nature or purpose of an insider's sale of stock. They mention portfolio diversification motives, liquidity needs to cover tax liabilities or tuition fees for children, divorce settlements, or that the sale was part of a 10b5-1 plan, i.e., a pre-planned trade under safe harbour provisions. This paper is the first to examine the information in these supplementary textual disclosures.

Using the information in the footnotes on the Form 4, we are able to identify sales of stock for which the insider has little discretion over the *amount* or *timing* of the sale. We call these *Nondiscretionary Sales*. These are stock sales to cover tax obligations related to restricted stock or stock option grants, to correct previous errors, and those that are part of automatic trades other than 10b5-1 trades. Insiders have to declare stock grants as ordinary income and thus become liable for income tax. The US tax code allows insiders to elect whether to pay income tax on the vesting date or on the grant date. Managers usually cover the tax due by selling stock or by having the company withhold and sell part of their restricted stock on behalf of them on the grant date. That is, managers have no control over the amount of taxes

due related to the restricted stock grant and little discretion over the timing.<sup>10</sup> Similarly, insiders have no discretion over automated trades that are executed by the company as part of deferred compensation plans, when they are required to correct errors made in prior trades, or in instances when they are required by the SEC to sell their shares.<sup>11</sup>

We call all other insider sales *Discretionary Sales*. These are sales for which the supplementary information provided on the Form 4 suggests that the sale occurred for discretionary reasons. They include those that describe the sale as being part of options exercises, a gift, for divorce settlements, tuition payments, as part of a retirement plan, or on behalf of family members. For these types of sales the insider normally has discretion over the timing and over how many shares to sell. We further include sales executed under 10b5-1 plans in this category (but also examine these separately). In 10b5-1 trades insiders enter into a trading plan, often over multiple years, that pre-plans trades for specific dates in the future at a time when the insider is thought to possess no material non-public information. Rule 10b5-1 trades fall under the safe harbour provisions of the SEC and provide the insider with a legal defence against potential penalties. However, despite the fact that these trades are pre-planned the insider still possesses considerable discretion over the timing by being able to cancel these trades without penalty.<sup>12</sup>

As insiders always have an incentive to disclose when their sales are nondiscretionary, we consider sales, for which insiders do not provide any supplementary disclosures, as also

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<sup>10</sup> Insiders do however have discretion over whether they cover the taxes by selling stock or using cash. That is, insiders might choose to settle the income tax liability with cash instead of selling stock if they believe the value of their stock will rise. In contrast, they will more likely choose to sell stock if they believe the stock will likely decline in value or if they are liquidity-constrained. If the tax-related selling is occurring based on material non-public information, it would bias against our hypothesis that nondiscretionary sales have no information value.

<sup>11</sup> Anecdotal evidence illustrates an example of an insider sale mandated by the SEC. In one case the Chief Accounting Officer of a company sold a considerable amount of stock. According to the supplementary information in the Form 4 filing, the sale related to restricted stock that had to be forfeited because the officer was dismissed after having been found to be involved in accounting improprieties at the firm. See “Not All Insider Trading is Created Equally”, *Forbes*, October 31, 2014.

<sup>12</sup> Prior research finds that 10b5-1 sales tend to follow periods of stock price increases and tend to be followed by periods of stock price declines suggesting that they do not entirely reflect uninformed trading (Jagolinzer 2009).

being for discretionary reasons. We acknowledge that because supplementary disclosures to insider sales are voluntary, we likely mis-classify some nondiscretionary sales, for which the insiders chose not to disclose explanatory footnotes, as discretionary. However, as mentioned before, insiders have strong incentives to disclose if their sales are nondiscretionary to reduce adverse selection and to distinguish these from discretionary sales. That is, the measurement error associated with falsely classified discretionary sales is most likely small. In addition, the measurement error likely only reduces our ability to find significant associations for discretionary insider sales.

Using insiders' supplementary disclosures in Form 4 filings (or lack thereof) we are able to distinguish between discretionary and nondiscretionary insider sales. Specifically, we are interested in the motives for insiders' voluntary disclosures, particularly when the sales are discretionary, and in their information content. This setting also allows us to explore the economic consequences of hitherto under-researched disclosures that are available to investors at the time of the insider trade filing.

### **3. Sample Selection and Descriptive Statistics**

#### *3.1. Sample Selection*

We obtain all Form 4s filed electronically with the SEC on EDGAR from 2003 to 2011.<sup>13</sup> Table 1 provides an overview of the sample selection process. We identify 2,087,830 individual open market sales and purchases of common stock (non-derivative transactions with code S and P on SEC Form 4) by 6,970 firms that refer to sales or purchases of more than 100 shares and less than 20% of shares outstanding. As an insider may record multiple transactions on one Form 4 and multiple insiders can trade on the same day, we collapse the transaction-level sample at the firm-day level. That is, we aggregate all trades in firm  $i$  on day  $t$  and calculate

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<sup>13</sup> Our sample begins in June 2003 when the SEC first mandated electronic filings of Form 4. We thank Andy Leone for making his Perl code for SEC filings downloads publicly available.

the firm's daily net trading position (sales minus purchases). Consequently, our initial firm-day-level dataset contains 388,521 observations.

We then match firm observations with data from CRSP, Compustat, and IBES. We follow Lakonishok and Lee (2001) and remove observations for which the share price reported on the Form 4 deviates from the closing share price on CRSP by more than 20% and further remove firms with a stock price at the beginning of the year of less than \$2. Our sample on the firm-day level comprises 265,161 insider trading days of 6,372 firms. For our main analyses we further drop transaction-days that are net purchases of common stock, that are not trades by or on behalf of directors or executives, or that contain missing values in any of the transaction data on the Form 4. This leaves us with 184,742 transaction-days. In separate analyses, we further remove observations that cannot unambiguously be identified as discretionary or non-discretionary sales and restrict the sample to non-overlapping trades of one or the other category. The restricted sample of firm officer and director net sales transactions comprises 141,968 transaction-days of 4,196 firms and 35,391 insiders.

### *3.2. Descriptive Statistics*

Table 2 Panel A shows the number of observations, firms, and insiders by nondiscretionary and discretionary sales. We are able to identify 1,515 sales (by 380 firms and 1,318 insiders) as nondiscretionary. The remaining sales are discretionary with 8,464 (by 1,418 firms and 4,618 insiders) describing discretionary reasons for the sale other than 10b5-1 sales. More than a third of all discretionary sales (51,556) relate to 10b5-1 trades and for the majority of sales in our sample the insiders do not provide any supplementary disclosures (80,433), which per our definition above are also discretionary.

We next examine the size of the insider trades. Panel B shows the mean (median) trade size in U.S. Dollars by category for sales, purchases as well as the net of the two. The panel reveals that discretionary insider sales, for which insiders provide supplementary disclosures (excluding 10b5-1 trades), are significantly larger than all other insider sales. Insiders sell on

average \$6.7 million worth of stock when disclosing discretionary reasons (median of \$0.4 million). This compares to all other insider sales, which are significantly smaller in size at between \$1-\$1.2 million (median of \$0.1-\$0.2 million). This difference is economically meaningful suggesting that the motivations for discretionary sales that are accompanied by disclosures might be different from the motivations for all other sales. Due to their large size these sales are likely under higher scrutiny by law enforcement agencies pointing to one incentive why insiders include supplementary disclosures with these sales. The panel also reveals that the median trade sizes are significantly smaller relative to the means suggesting that the averages are skewed towards a smaller number of very large insider sales. The panel also shows that insider purchases are, on average, much smaller than insider sales.<sup>14</sup>

Panel C shows the mean (median) trade size as a fraction of common shares outstanding. The panel confirms that sales for discretionary reasons involve the largest net sales also relative to shares outstanding at about 0.35 (0.007) percent. Net sales for nondiscretionary reasons are significantly smaller in size at about 0.040 (0.005) percent of common shares outstanding. Panel D shows the results of two-sided tests of differences in mean size (in % of common shares outstanding) between the four insider sale categories. The univariate tests confirm that discretionary sales (excluding 10b5-1 trades) are significantly larger than all other sales.<sup>15</sup>

We next estimate cumulative abnormal daily returns (CAR) during the (0,2)-window around the Form 4 filing date using a size-adjusted market benchmark, i.e. the average return to the appropriate CRSP size decile, to assess the information content of the supplementary footnote disclosures. Table 3 reports mean CARs (Panel A) and differences in means (Panel

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<sup>14</sup> Insider purchases are also significantly fewer in numbers compared to insider sales. To alleviate concerns of skewness also use signed log transformations in our tests.

<sup>15</sup> We further investigate the cross-sectional differences in trade size in multivariate regressions that include control variables as well as firm and year fixed effects. Untabulated regression results confirm the results of the univariate tests. Discretionary insider sales with disclosures (excluding 10b5-1 trades) are 61% larger in dollar value than insider sales without disclosures (p-value < 0.01). Coefficient tests further reveal that these sales are also significantly larger than all other trade types. In contrast, nondiscretionary insider sales are, on average, 70% smaller in dollar value than discretionary insider sales without disclosures.



B) by insider sale type. On average, insider sales elicit a significantly negative market response around the filing date of the Form 4. The mean CAR for all sales is  $-0.13\%$  (p-value  $<0.001$ ). However, the mean CAR for nondiscretionary sales is not statistically different from zero (p-value = 0.95). In contrast, abnormal returns to discretionary insider sales, for which insiders disclose the reasons (excluding 10b5-1 sales) experience the largest negative market reaction of  $-0.17\%$  (p-value  $<0.001$ ), while abnormal returns to 10b5-1 sales are also significantly negative at  $-0.10\%$  (p-value  $<0.001$ ). Discretionary insider sales that do not contain a supplementary footnote on the Form 4 have a negative CAR of  $-0.15\%$  (p-value  $<0.001$ ).

The difference in mean CARs shown in Panel B between nondiscretionary sales and discretionary sales with supplementary disclosures (excluding 10b5-1 sales) and without disclosures is  $-0.17\%$  (p-value  $<0.1$ ) and  $0.15\%$  (p-value  $<0.1$ ), respectively. 10b5-1 sales also have a less negative market reaction to the filing than discretionary sales without disclosures by  $0.04\%$  (p-value  $<0.05$ ).

The descriptive comparisons in this section reveal that discretionary sales are significantly larger than all other sales and experience a comparably more negative market reaction. Nondiscretionary sales, on the other hand, do not seem to contain any information value. These preliminary results also point towards potentially different underlying motivations for discretionary sales, particularly the ones, for which insider disclose the reasons. Given their size these sales are likely exposed to higher litigation risk – something we will investigate in more detail in the next section. The univariate results further suggest that it is important to control for trade size in tests that attempt to isolate the information signal of the supplementary disclosures from the information content of the trade size. We now turn to our main analyses.

#### **4. Information Content and Determinants of Form 4 Supplementary Disclosures**

The univariate results suggest that supplementary disclosures on the Form 4 contain valuable information about the nature of the insider sale. We therefore next estimate equations

(1a) and (1b) to assess the market reaction to insider sales disclosures in a multivariate setting controlling for cross-sectional differences in firm, trade and manager characteristics.

$$CAR_{i,t} = \beta_0 + \beta_1 DISC\_SALE_{i,t} + \beta_2 X_{i,t} + \gamma_i + \delta_t + \varepsilon_{i,t} \quad (1a)$$

$$CAR_{i,t} = \beta_0 + \beta_1 DISC\_SALE\_FN_{i,t} + \beta_2 NONDISC\_SALE_{i,t} + \beta_3 X_{i,t} + \gamma_i + \delta_t + \varepsilon_{i,t} \quad (1b)$$

$CAR_{i,t}$  is the three-day (0,2) cumulative abnormal event-study return starting from the insider trade filing day using the size-adjusted market return as the benchmark.<sup>16</sup> In equation (1a) our main variable of interest is the dummy variable *DISC\_SALE*, which is equal to 1 if the insider sale is discretionary (including those with and without disclosures) and zero otherwise.<sup>17</sup> In equation (1b) we further separate discretionary sales into *DISC\_SALE\_FN*, which is equal to one for discretionary sales, for which the insider provides supplementary disclosures. We include 10b5-1 sales in this category, but also provide robustness tests excluding them. Equation (1b) also includes an indicator variable *NONDISC\_SALE* equal to one if the insider sale is nondiscretionary. The benchmark category are discretionary sales without disclosures. That is, equation (1b) allows the classification of insider sales into discretionary and nondiscretionary to overlap using two separate indicators equal to one representing each category (with trades without disclosures or disclosure that cannot be classified into either category being zero).  $X_{i,t}$  is a vector of control variables,  $\gamma_i$  and  $\delta_t$  are firm and year fixed effects, respectively. In additional tests we control for manager and firm-manager fixed effects.

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<sup>16</sup> Our inferences remain the same if we use the two-day window CAR(0,1). We do not include the day prior to the filing day to avoid capturing the price impact of the sale in cases in which the Form 4 is filed within 24 hours of the trade.

<sup>17</sup> In these regressions we exclude sales if the supplementary disclosures within one Form 4 filing refer to both discretionary and nondiscretionary trading reasons or if the footnote description does not allow classification into any of the above categories (e.g., if the footnote refers to information not related to the sale). In contrast, we allow for overlapping categories in equation (1b).

We control for variables identified in the prior literature to be associated with insider trading and for commonly known determinants of stock returns. Insiders of large firms and firms that have performed well (Lakonishok and Lee 2001) and insiders of growth firms (Rozeff and Zaman 1998) tend to sell more shares. We control for firm size (measured as the natural logarithm of market value), prior month return (measured as the raw return in the month prior to the insider filing), and for growth firms (measured as the natural logarithm of the book-to-market ratio) (Fama and French 1993, Cohen et al. 2012). In addition, we control for leverage (measured as the debt-to-asset ratio), trade size (measured as number of shares sold divided by number of shares outstanding at the beginning of the fiscal year), whether the trade was the result of a direct ownership by the insider, and whether the trade is made by the CEO or CFO or on behalf of them (Seyhun 1986).

#### *4.1. Baseline results*

The left-hand side columns in Table 4 with the heading “Full Sample” present the regression results of estimations of equation (1a) in column (1) and of estimations of equation (1b) in columns (2)-(4) for the entire sample of insider trades. Standard errors are clustered by firm in the estimations in column (1) and (2), by manager in column (3) and by firm-manager in column (4). The results in column (1) reveal that discretionary insider sales experience significantly lower abnormal returns than nondiscretionary sales around the filing date. The coefficient on *DISC\_SALE* is  $-0.32\%$  (p-value  $<0.05$ ). Abnormal returns are 32 basis points lower for discretionary insider sales than for nondiscretionary sales suggesting that the former are interpreted by the market as negative news for the stock. This difference is economically large in absolute terms, but also relative to the unconditional market reaction to all insider sales of  $-13$  basis points we reported above. The results in column (1) further reveal that sales of insiders of larger firms, growth firms, and firms with higher leverage have lower CARs. Additionally, there is some evidence that sales by the CEO and CFO earn more negative CARs – a group of insiders we will examine in further detail below.

The estimation results of equation (1b) in column (2)-(4) show that investors do not react differently to discretionary sales, for which the insider provides supplementary disclosures, compared to discretionary sales without disclosures (the benchmark group in these regressions), but that both experience significantly lower abnormal returns than nondiscretionary sales. The coefficient on *DISC\_SALE\_FN* in column (2) is not statistically different from zero, whereas the coefficient on *NONDISC\_SALE* is 0.30% (p-value <0.01).

The estimations in columns (3) and (4) further control for manager and manager-firm fixed effects. The latter allows us to hold manager-firm pairings fixed and assess whether the negative market reaction to discretionary sales can be explained by manager characteristics.<sup>18</sup> The results in column (3) reveal that the market reaction to discretionary insider sales is significantly more negative than to nondiscretionary sales by the same manager by about 44 basis points (p-value <0.01) and column (4) shows that this difference is larger at 48 basis points for sales by the same manager at the same firm (p-value <0.01).<sup>19</sup>

The evidence in several studies implicitly suggests that trades by CEOs and CFOs are the most informative among insider trades as these executives most likely have the greatest information advantage (Jeng, Metrick and Zeckhauser 2003; Wang, Shin and Francis 2012). We therefore estimate equations (1a) and (1b) separately for these two groups of executive insiders to provide direct evidence on this conjecture.

If the CEO and CFO have the greatest information advantage and investors anticipate that they exploit this advantage when selling shares for discretionary reasons, we expect to find a larger negative market reaction to discretionary sales by CEOs and CFOs. Table 4 columns

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<sup>18</sup> As different managers might trade on the same day our sample observations increase slightly in the tests with manager and manager-firm fixed effects taking into account multiple trades per firm (by different managers) on the same day.

<sup>19</sup> In additional analyses we further control for 10b5-1 trades separately instead of including them in our *DISC\_SALE\_FN* dummy. Untabulated findings reveal that our results are not influenced by the inclusion of 10b5-1 trades. In further tests we interact our indicator variables of interest with trade size. Untabulated results reveal that the interaction effects are not significantly different from zero and that the main effects only decline marginally. This suggests that the results are not driven by only a few very large insider sales.

(5) to (8) summarize the results. The regression results in column (5) are consistent with this conjecture. The coefficient on *DISC\_SALE* is  $-0.95\%$  (p-value  $<0.01$ ). That is, there is a 95 basis point relative difference in the market reaction to discretionary sales compared to nondiscretionary sales if the selling insiders are the CEO or the CFO of the company. This difference is three times larger than the difference documented over the entire sample in column (1). The estimations of equation (1b) on sales by the CEO and CFO produce similar results, reported in columns (6)-(8). The coefficients on *NONDISC\_SALE* are  $0.66\%$ ,  $0.68\%$ , and  $0.70\%$  (p-values  $<0.01$ ), respectively. That is, abnormal returns on discretionary sales by CEOs and CFOs are significantly lower by around 60-70 basis points compared to nondiscretionary sales in estimations robust to controlling for manager characteristics and within manager-firm pairings.

Overall, our results on short-term returns demonstrate that discretionary insider sales contain significant information value, i.e., are perceived by the market as negative news, particularly if these sales are made by the CEO or CFO of the company. Our findings cannot be explained by firm and trade characteristics and are robust to within manager and manager-firm estimations. This stands in contrast to much of the prior literature that fails to find insider sales to have any information content (Seyhun, 1986; Lakonishok and Lee, 2001; Jeng, Metrick and Zeckhauser, 2003). Our results suggest that investors believe that insiders exploit their information advantage when engaging in discretionary sales. In contrast, when insiders have no discretion over the timing and amount of their sales, investors expect them not to be able to exploit their preferential access to non-public information. We therefore next examine whether mechanisms that potentially limit managerial discretion, such as stronger governance and control systems, also limit their ability to exploit their information advantage. To do this we exploit the adoption of the Sarbanes-Oxley Act and its exemptions as a source of cross-sectional variation in the perceived strength of internal governance and control systems. We expect the market reaction to discretionary sales to be less negative at firms where internal

governance and control systems are perceived to be strong. We report the results in the next sub-section.

Thus far we also documented that even though insiders disclose liquidity needs (e.g., divorce settlements, tuition payments, gifts, etc.) as reasons for discretionary sales, the market reacts just as negatively to these as to sales for which the insiders provide no disclosure of the reason. That is, discretionary insider sales with supplementary disclosures are penalized just as much as discretionary sales that come with no additional disclosure. This suggests that these disclosures lack credibility due to the discretionary nature of the sale (as opposed to nondiscretionary sales). It thus raises the question why insiders disclose anything at all if the sale is for discretionary reasons. In other words, what are the benefits of adding a disclosure that suggests liquidity needs as reasons for discretionary sales if it fails to convince the market that these sales are genuinely made for liquidity needs? We examine this question in more detail in sub-section 4.3.

#### *4.2. Do Perceived Differences in Internal Controls Matter?*

The Sarbanes-Oxley Act (SOX) of 2002 not only requires more timely disclosures of insider trade filings (Section 403 of SOX), but also includes other far-reaching corporate governance and reporting requirements for U.S. publicly listed companies. Among these, Section 302 mandates internal controls and procedures for accurate disclosure and Section 404(b) requires the company's management and auditors to report on the effectiveness of internal controls. Section 404(b) was highly contentious due to its perceived high compliance burden particularly on small companies. This led to a temporary exemption for companies with a market capitalization of less than \$75 million, so-called nonaccelerated filers, which was subsequently made permanent in the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010. At the same time, it was initially discussed to also alleviate the compliance burden for companies with a market capitalization of \$75-\$250 million, which culminated in a study

published by the SEC in 2011.<sup>20</sup> The exemption from SOX Section 404(b) was later expanded to and introduced for companies with a market cap of \$75-\$700 million.<sup>21</sup>

The exemption of selected SOX requirements for small companies during our sample period potentially led investors to perceive these companies as being afforded laxer disclosure and internal control requirements. In addition, smaller firms generally have fewer analyst following and larger short sale constraints. Hence, investors face higher information asymmetries with respect to smaller firms and are more likely to react more negatively to insider sales by executives of these firms. We therefore test whether the differential market reaction to discretionary versus nondiscretionary sales is more pronounced for firms with less than \$75 million and \$75-\$250million in market capitalization and whether the supplementary disclosures with discretionary sales for these firms are perceived to be less credible.

Table 5 summarizes the results. We focus on estimations of equation (1b) and further add a separate indicator variable for 10b5-1 sales in the regressions excluding them from the *DISC\_SALE\_FN* group. This allows us to examine whether pre-planned 10b5-1 sales (a large fraction of the discretionary sales) are perceived differently by the market compared to other discretionary sales. For brevity we do not tabulate the control variables which are the same as in Table 4.

Table 5 documents a monotonically increasing difference in CARs between discretionary and nondiscretionary sales with decreasing firm size threshold. The difference in CARs is 2.1% (p-value <0.05) for firms with a market capitalization smaller than \$75 million compared to 0.7% (p-value <0.1) for firms in the size bracket \$75-250 million and 0.22% (p-value <0.05) for firms with a market capitalization larger than \$250 million. These differences are even higher for sales by CEOs and CFOs at 6.5% (p-value <0.01), 1.91% (p-value <0.05) and 0.46%

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<sup>20</sup> See SEC, Study and Recommendations on Section 404(b) of the Sarbanes-Oxley Act of 2002 For Issuers With Public Float Between \$75 and \$250 Million, April 2011, available at <https://www.sec.gov/news/studies/2011/404bfloat-study.pdf> (last accessed 11 March 2019).

<sup>21</sup> See SEC final rule 17 CFR Parts 201, 229 and 249 available at <https://www.sec.gov/rules/final/2010/33-9142.pdf> (last accessed 11 March 2019).

(p-value <0.01), respectively. The findings are consistent with the notion that investors consider discretionary sales more likely to be informative, i.e., to signal negative news, if internal controls (and potentially their enforcement) are perceived to be weaker. We do not find any differences in the market reaction to discretionary sales that provide supplementary disclosures compared to those without disclosures or to 10b5-1 sales.<sup>22</sup> The latter finding is consistent with prior evidence in Jagolinzer (2009) that 10b5-1 sales contain information value.

#### *4.3. Why do insiders disclose supplementary information with discretionary stock sales?*

Insiders are likely to disclose supplementary information with their stock sales if the benefits of disclosing outweigh the costs. In the case of nondiscretionary sales there is always a benefit to disclose in order to reduce adverse selection costs and separate these sales from discretionary sales that are not accompanied by any disclosure.<sup>23</sup> Our evidence on the non-negative short-term market reaction to these sales is consistent with this notion. Yet, for sales that are disclosed as discretionary, our findings of a negative short-term reaction show no immediate capital market benefit from the disclosure. This suggests insiders might disclose supplementary information with discretionary sales for other than immediate capital market benefits.

The reduction of legal risk is commonly discussed in the literature as one motive for voluntary disclosure (Skinner 1994). Prior evidence on insider trading indicates that insiders time their trades opportunistically to exploit their information advantage (Noe 1999, Cheng and Lo 2006), but that legal risks prevent them from engaging in overtly opportunistic selling behaviour such as immediately prior to negative earnings news (Huddart et al. 2007). Insiders might therefore provide supplementary disclosures to reduce the litigation risk by signalling that the selling occurred for liquidity needs particularly when the ex-ante legal risk of trading

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<sup>22</sup> If anything, among sales by the CEO and CFO in the largest company size bracket discretionary sales that come with supplementary disclosures perform worse than those without (coefficient = -0.16%), albeit the difference is only marginally statistically significant.

<sup>23</sup> The disclosure of nondiscretionary sales is also likely perceived as credible given the lack of control by the insider over these sales.



is high. Specifically, prior research documents that insiders are less likely to engage in opportunistic selling during time-periods restricted by company policy (Bettis et al. 2000) or when the ex-ante litigation risk is high (Billings and Cedergren 2015). These findings suggest that insiders have a stronger incentive to disclose the reasons for selling stock when they are employed at firms that face increased risk of litigation or when they trade outside their company's safe trading window. We test these hypotheses next.

First, we examine whether insiders at firms that are exposed to higher ex-ante litigation risk are also more likely to provide supplementary disclosures when they engage in discretionary sales. Second, we examine whether insiders are more likely to provide supplementary disclosures when they sell stock outside the trading window recommended by company policy. Bettis et al. (2000) report that the vast majority of companies have insider trading restrictions outside of a narrow two-week period after the company's quarterly earnings announcement in place.<sup>24</sup>

Table 6 Panel A summarizes the results of logit regressions of indicator variables equal to one if a (discretionary) insider sale is accompanied by supplementary disclosures, and zero otherwise. Our variables of interest are proxies of ex-ante litigation risk. The regressions include the same firm and trade controls as before and standard errors are clustered at the firm level.<sup>25</sup> The columns on the left report marginal effects of a litigation risk proxy based on industry membership in the biotechnology, computers, electronics, and retail industries as commonly used in the prior literature (Francis, Philbrick and Schipper 1994). The columns on the right report marginal effects of the ex-ante litigation risk measure developed in Kim and Skinner (2012).<sup>26</sup> The results reveal that insiders at firms with a higher ex-ante litigation risk

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<sup>24</sup> Jagolinzer, Larcker and Taylor (2011) document that about 24% of all insider trades nevertheless occur within restricted trading windows

<sup>25</sup> In untabulated results we further control for manager characteristics such as age, options and shareholdings. The results remain unchanged.

<sup>26</sup> We follow Kim and Skinner (2012) and measure a company's ex-ante litigation risk by estimating a binomial logistic regression of a lawsuit dummy variable of securities lawsuit filings from the Securities Class Action Clearinghouse on the covariates in model (2) in their table 7 (p.302) over the time period 1996-2011. We then

are more likely to provide supplementary information when selling stock, specifically for discretionary sales. Insiders at firms in high litigation risk industries have a 13% higher propensity of disclosure (p-value <0.001). Similarly, a one standard deviation increase in the Kim and Skinner (2012) litigation risk measure (a roughly 2.8% increase in ex-ante litigation risk) increases the likelihood of disclosure with discretionary sales by about 4%. This increase is economically meaningful compared to an approximately 10% unconditional likelihood of disclosure with discretionary sales (excluding 10b5-1 sales).

Table 6 Panel B reports the results of logit regressions on an indicator variable equal to one when the insider sale occurred within the two-week window after the quarterly announcement date. Our variables of interest are indicator variables for the disclosure of supplementary information with insider sales generally (*FN disclosure vs. no disclosure*) and with discretionary sales in particular (*Discretionary FN vs. no disclosure*). The regressions include the same control variables as before and standard errors are clustered at the firm level. The results in Panel B reveal that insiders are more likely to provide supplementary disclosures with their (discretionary) sales when these sales occur outside the safe two-week period after the company's quarterly earnings announcement, i.e., in periods when the legal risk of trading is higher. Disclosure is associated with an almost 6% higher likelihood of trading outside the safe trading window (p-values <0.01).

Overall, the results in Table 6 are consistent with the notion that insiders provide supplementary disclosures when the legal risk of selling stock is high. We thus document one motivation for the disclosure: reducing litigation risk. An alternative motivation might be to delay the revelation of bad news. Above we found no difference in the negative market reaction to discretionary sales with or without disclosure suggesting that disclosing that discretionary sales occurred for liquidity-needs is not perceived as a credible signal. However, it is possible

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use the estimated coefficients to predict each company's litigation risk by year. We use the litigation risk in the year prior to the insider sale as our measure of ex-ante litigation risk in the regressions on disclosure likelihood.

that the disclosure impedes the market's ability to fully reveal the extent of the negative information of discretionary sales in market prices. That is, examining short-term returns does not reveal whether the disclosure successfully delays the impounding of bad news into market prices. The market might still be underreacting to the negative information in discretionary sales due to the opportunistic disclosure. We therefore next estimate the association of insider sales and supplementary disclosures with long-term returns measured over one month, three months, and 12 months.

## 5. Long-Term Returns

If discretionary insider sales are opportunistic and indicative of impending future negative news about the firm and if investors do not fully impound that information immediately into prices after the filing date, we expect a negative association of discretionary insider sales with long-term returns. Moreover, we discussed above that insiders have an incentive to disclose the reasons for their discretionary sales if their ex-ante litigation risk is high. Similarly, insiders might use the disclosures in an attempt to signal that they are not selling when in possession of material non-public information, e.g. when disclosing that the sales occurred for liquidity reasons or as part of a 10b5-1 plan. If insiders strategically use these disclosures to disguise the true nature of the sale, we expect discretionary sales that come with supplementary disclosures to perform significantly worse than discretionary sales without disclosures.

Equations (2) summarizes the estimating equation for the relationship between long-term returns and discretionary and nondiscretionary insider sales controlling for cross-sectional differences in firm and trade characteristics:

$$BHAR_{i,t+k} = \beta_0 + \beta_1 DISC\_SALE \text{ (or } DISC\_SALE\_FN)_{i,t} + \beta_2 NONDISC\_SALE_{i,t} + \beta_3 X_{i,t} + \gamma_i + \delta_t + \varepsilon_{i,t} \quad (2)$$

$BHAR_{i,t+k}$  is the one month buy-and-hold abnormal return in the calendar month after the insider trade using the size-adjusted market return as benchmark or the three months and twelve months buy-and-hold abnormal return starting from the calendar month after the month of the insider trade. Returns are measured monthly. As we measure firm-trades by month in this specification we allow for *DISC\_SALE* (*DISC\_SALE\_FN*) and *NONDISC\_SALE* to enter the regression simultaneously. In this specification, *DISC\_SALE* (*DISC\_SALE\_FN*) is equal to one if there has been at least one discretionary sale (discretionary sale with supplementary disclosures) and *NONDISC\_SALE* is equal to one if there has been at least one nondiscretionary sale during the calendar month.

As an alternative specification, we calculate our variables of interest as the natural logarithm of one plus the net number of the specific sale type in month  $t$ .  $X_{i,t}$  is a vector of control variables,  $\gamma_i$  and  $\delta_t$  are firm and month fixed effects, respectively. In addition to the usual control variables used before we also include the prior year buy-and-hold returns.

### 5.1. Baseline results

Table 7 summarizes the regression results. Panel A shows results using the indicator variables allowing for overlap and Panel B shows the results using the net count variables. Panel A columns (1)-(3) reveals monotonically decreasing coefficients on *DISC\_SALE* and monotonically increasing coefficients on the *NONDISC\_SALE* the longer the holding period for the buy-and-hold abnormal returns. The coefficient on *DISC\_SALE* in the regression of one month buy-and-hold abnormal returns is significantly negative at  $-0.22\%$  (p-value  $<0.05$ ), decreasing to  $-0.43\%$  (p-value  $<0.1$ ) over three months, and to  $-2.14\%$  (p-value  $<0.01$ ) over 12 months. In contrast, the coefficient on *NONDISC\_SALE* in the same regressions is significantly positive at  $1.13\%$  (p-value  $<0.01$ ), increasing to  $1.74\%$  over three months (p-value  $<0.05$ ), and to  $1.93\%$  over 12 months (albeit the latter being statistically insignificant). These differences in returns are economically significant.

Moreover, when comparing *DISC\_SALE\_FN*, i.e. discretionary sales with supplementary disclosures, and *NONDISC\_SALE* to discretionary sales without disclosures in columns (4)-(5), we find that discretionary insider sales with footnote disclosures are associated with significantly lower returns. The coefficients on *DISC\_SALE\_FN* in the regressions on one- and three-months abnormal returns are  $-0.29\%$  and  $-0.63\%$  (p-values  $<0.01$ ), respectively. In contrast the coefficients on *NONDISC\_SALE* are significantly positive at  $1.17\%$  and  $1.80\%$  (p-values  $<0.01$  and  $<0.05$ ), respectively. The results show that firms whose insiders engage in discretionary sales and who provide supplementary disclosures perform significantly worse over the medium term compared to those with discretionary insider sales without disclosures and compared to nondiscretionary sales. Furthermore, column (6) reports an insignificant coefficient on *DISC\_SALE\_FN* over the 12-months horizon suggesting that the negative information in these sales is impounded into stock priced within 12 months. These findings suggest that investors under-react to the negative signal inherent in discretionary insider sales when these are accompanied by supplementary disclosures. In contrast, medium to long-term stock returns after nondiscretionary insider sales are significantly higher than after discretionary insider sales.

Table 7 Panel B shows the results using the monthly count variables. The results are consistent with those in Panel A. The coefficient on *DISC\_SALE\_COUNT* over one month is  $-0.73\%$  (p-value  $<0.01$ ), decreasing to  $-1.4\%$  (p-value  $<0.01$ ) over three months, and further decreasing to  $-2.56\%$  (p-value  $<0.01$ ) over 12 months. The results suggest that discretionary insider sales are associated with  $2.56\%$  lower future returns than nondiscretionary insider sales.<sup>27</sup> Overall, the results in this section demonstrate that discretionary insider sales are negatively associated with long-term abnormal returns. Together with the results on short-term

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<sup>27</sup> The coefficients of *DISC\_SALE\_FN (count)* display a similar monotonic pattern declining from a significantly negative  $-0.72\%$  (p-value  $<0.01$ ) when regressed on one-month abnormal returns, to  $-1.61\%$  (p-value  $<0.01$ ) in the regression on three-months buy-and-hold abnormal returns, to  $-2.27\%$  (p-value  $<0.01$ ) in the regression on 12-months buy-and-hold abnormal returns.

filing returns in the previous section, the results indicate that investors fail to fully impound the negative information in discretionary insider sales into stock prices immediately after the filing date leading to a medium to long-term underperformance of these firms in the subsequent months. The results further suggest that insiders successfully delay the revelation of bad news by disclosing the reasons for their discretionary sales. That is, insiders strategically use these disclosures to disguise the true nature of the sale. We next examine whether sophisticated investors could potentially exploit the market's under-reaction to discretionary insider sales that are disguised as liquidity-motivated sales in a long-short trading strategy.

## 5.2. Portfolio Returns

Table 7 Panel C presents results of calendar-time portfolio regressions. In each month the investment strategy creates an equally-weighted long portfolio of stocks with nondiscretionary insider sales and a short portfolio of stocks with discretionary insider sales that come with supplementary disclosures. It then holds the portfolios over the next month following the insider trades and rebalances at the end of the month based on the new insider trades of that month. The panel shows average returns as well as excess returns of the Fama-French three-factor model and of the Cahart-four-factor model for the full sample and only using trades by CEOs and CFOs. The results show that going long a portfolio of nondiscretionary insider sales and short a portfolio of discretionary insider sales earns an average return of 0.86% (p-value <0.05), or 1.25% (p-value <0.05) focusing on CEO/CFO trades, per month before transaction costs. After controlling for Fama-French and Cahart factors, the strategy earns monthly excess returns of 0.78% (p-value <0.05) and 0.81% (p-value <0.05), respectively, that increase to 1.15% and 1.23% if the strategy only uses trades by CEOs and CFOs.<sup>28</sup> This translates into an economically meaningful 16% risk-adjusted return per year. The portfolio results provide

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<sup>28</sup> We exclude 10b5-1 sales from the portfolio analysis. Our results remain qualitatively similar when we include 10b5-1 sales in the discretionary category producing monthly (excess) returns of 1.12%, 0.97% and 0.96% on average and controlling for Fama-French and Cahart factors, respectively, when focusing on trades by the CEO and CFO.

further evidence that the market misinterprets the supplementary disclosures in discretionary sales leading to an exploitable trading strategy.

### *5.3. Repeated Discretionary Trades*

In this section we examine whether firms whose executives disclose discretionary reasons with their stock sales more often perform worse. That is, we ask the question whether there are executives that more often claim to trade for liquidity and other discretionary reasons than others and whether this disclosure behaviour contains incremental information about the nature of their insider sales. To investigate this question, we cross-sectionally divide the sample into quartiles based on each executive's frequency of discretionary sales to total insider sales and re-run our BHAR regression tests over the one-month holding period. Table 8 reports the results for executives with less than 25% discretionary sales (column 1), between 25-75% discretionary sales (column 2) and more than 75% discretionary sales (column 3). The regressions use the same *DISC\_SALE\_FN* and *NONDISC\_SALE* indicators and controls as in the baseline regressions.

The results in Table 8 show that the return differential between discretionary and nondiscretionary sales increases monotonically with the increasing frequency of discretionary insider sales with disclosure. The table further reveals that discretionary sales, for which the insider provides supplementary disclosures, perform significantly worse than discretionary sales without disclosure. The magnitude of the relative underperformance also increases with an increasing frequency of disclosures. The coefficient on *DISC\_SALE\_FN* is  $-0.002$  (p-value  $<0.05$ ) when less than a quarter of the insider's discretionary sales contain supplementary disclosures, decreasing to  $-0.014$  (p-value  $<0.01$ ) in column (2) and further decreasing to  $-0.016$  (p-value  $<0.01$ ) when more than three quarters of the insider's discretionary sales contain supplementary disclosures. In contrast, the coefficient on *NONDISC\_SALE* is not statistically different from zero in column (1) and increases to  $0.147$  (p-value  $<0.01$ ) in column (3). These results are consistent with our previous results above. Insiders seem to disclose

supplementary information with discretionary sales strategically, claiming these trades happened for liquidity reasons, while they are likely to exploit their information advantage with these trades. Our results suggest that there are managers that more often disclose discretionary reasons for their sales and that these sales are more informative in predicting future negative stock returns.

In summary, the findings in this section suggest that discretionary insider sales of executives, particularly the CEO and CFO, are predictive of future negative stock returns. The observed relation between discretionary sales and negative long-term stock returns strengthens for discretionary sales, for which insiders provide supplementary information, and for those insiders that do so more often. This is consistent with the notion that these disclosures are strategically motivated and that investors do not fully anticipate the negative information associated with discretionary sales at the time of the trade filing. We next examine whether discretionary insider sales predict fundamental negative information as the underlying source of the negative long-term stock return performance.

## **6. What Bad News Do Discretionary Insider Sales Predict?**

In this section we analyse whether discretionary insider sales are predictive of future negative fundamental news. That is, we examine whether insiders who disclose the reasons for their discretionary sales are more likely to trade preceding important negative information events of the firm. We define as negative information events future analyst recommendation downgrades and negative earnings surprises.

### *6.1. Analyst Recommendation Downgrades*

We start by examining the association of *DISC\_SALE\_FN* with future analyst recommendation downgrades. Table 8, Panel A presents results of tobit regressions on a continuous variable, *Weighted Downgrade*, bounded between zero and four. *Weighted Downgrade* is measured as an indicator variable that is equal to one if analyst consensus recommendations in the 6, 12,



and 18 months prior to the month of the insider sale filing were higher than in the same period after the filing month, weighted by the magnitude of the downgrade. That is, the dependent variable captures whether the insider sale preceded a general lowering of recommendations for the firm by analysts and by how much.<sup>29</sup> For example, a downgrade by one notch from hold to sell is weighted by one, whereas a downgrade from buy to sell by two notches is weighted by two. The maximum weight is four, which reflects a downgrade from Strong Buy to Strong Sell.

As before, we show results using our indicator variables as well as counts, the latter of which is measured as the natural logarithm of one plus the net number of discretionary insider sales with footnote disclosures in month  $t$ . The regressions include the same control variables as before as well as month fixed effects. If the supplementary disclosures with discretionary insider sales are strategic, despite claiming liquidity-motivated sales, we expect *DICS\_SALE\_FN* and *DISC\_SALE\_FN\_COUNT* to be associated with future negative news, in this case, a higher propensity of analysts downgrades as well as downgrades of larger magnitude. The results in Table 8, Panel A are consistent with this notion.

The coefficients on *DISC\_FN* are positive and increasing with the length of the measurement period from 0.025 (p-value <0.05) at six months to 0.022 (p-value <0.05) at 12 months, and 0.030 (p-value <0.01) at 18 months. The results demonstrate that discretionary sales, for which insiders provide supplementary disclosures, are positively associated with downgrades and downgrades of larger magnitude than discretionary insider sales that are not accompanied by any disclosure. We do not find such an increase in the downgrade likelihood and severity for nondiscretionary insider sales. If anything, the coefficients on *NONDISC\_SALE* are negative, albeit statistically insignificant.<sup>30</sup>

The results are similar when using *DISC\_SALE\_FN\_COUNT*. For the 6, 12, and 18 months horizon, the coefficients are 0.028 (p-value <0.05), 0.039 (p-value <0.01), and 0.034

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<sup>29</sup> We find similar results using an unweighted indicator for a consensus downgrade as the dependent variable.

<sup>30</sup> Untabulated results using unweighted indicators suggest that *DISC\_SALE\_FN* is associated with a 3.4% increase in the analyst consensus downgrade likelihood over the coming 18 months.

(p-value <0.01), respectively. For example, over the 18 months horizon, a one unit increase in the log number of discretionary insider sales with disclosures in a month is associated with a 3.4% higher average downgrade magnitude.

## 6.2. Negative Earnings Surprises

To further establish whether insiders' disclosures with discretionary sales precede the revelation of bad news about the firm, we next examine the relationship between discretionary insider sales disclosures and the likelihood and magnitude of earnings misses on the next fiscal year end earnings announcement as well as on the four quarters ahead quarterly earnings announcement. To do so, we run tobit regressions on a weighted indicator, *Earnings Miss*, equal to one if the company fails to meet or beat its analyst earnings per share consensus forecast for the closest fiscal year end (irrespective of whether the fiscal year end is one or four quarters away from the month of the insider trade) and for the fiscal quarter four quarters ahead (i.e., keeping the distance between the insider trade-month and the earnings announcement always at four quarters), weighted by the magnitude of the negative earnings surprise.

As before, we run the regressions using the indicator variables *DISC\_SALE\_FN* and *NONDISC\_SALE* as well as the count variable *DISC\_SALE\_FN\_COUNT*. The regressions include the same control variables as before as well as month fixed effects. When using *Earnings Miss* at fiscal year-end we additionally control for the time between the insider trade and the next fiscal year end. If discretionary insider sales with supplementary disclosures are more likely to precede negative earnings surprises, we expect the coefficients on *DISC\_SALE\_FN* and *DISC\_SALE\_FN\_COUNT* to be positive.

Table 8 Panel B presents the results. We find some weak evidence of a positive association of discretionary insider sales accompanied by footnote disclosures with the likelihood of future negative earnings surprises. The coefficient on *DISC\_SALE\_FN\_COUNT* is positive and statistically significant in the regressions on the next fiscal year end (0.10, p-value <0.1) and four quarters ahead earnings announcement (0.16, p-value <0.05). The latter

suggests a one unit increase in the log number of discretionary footnotes in a month increases the magnitude of a negative earnings surprise of a company at the quarterly earnings announcement four quarters ahead by 16%.<sup>31</sup> However, we do not find statistically significant coefficients when using both indicators simultaneously, i.e., allowing for a trade-month to be classified as having discretionary and nondiscretionary sales.

In summary, our findings suggest that months in which insiders disclose (and more often disclose) the reasons for their discretionary sales precede months with analyst downgrades and negative earnings surprises. We acknowledge, however, that the evidence on earnings surprises is somewhat weak. Nevertheless, taken together, the results in this section are consistent with the notion that insiders are more likely to provide supplementary disclosures with their discretionary sales ahead of negative news events.

## **7. Robustness tests**

Prior attempts in the literature to distinguish information-based insider trades from uninformative liquidity-based trades use insiders' trading patterns as an identifying criterion. Cohen, Malloy and Pomorski (2012), for example, identify information-based insider trades by classifying insiders into routine and opportunistic traders according to the timing of their trading each year compared to their past trading record. Insiders that execute their trades in the same calendar month every year for three years are classified as routine and their trades are predicted to be uninformative. Those that show no discernible pattern are classified as opportunistic. Cohen et al. (2012) show that opportunistic sales are associated with significantly negative returns one month ahead.

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<sup>31</sup> We find similar results when using an unweighted indicator as the dependent variable. For example, untabulated results reveal that a one unit increase in DISC\_SALE\_FN\_COUNT in a month increases the propensity of a company missing its earnings consensus forecast for the fiscal year by 11.1% and for four quarters ahead by 2.1%.

As a robustness test, we therefore assess to what extent insider sales that we identify as discretionary overlap with opportunistic sales as defined by Cohen et al (2012). Table 10, Panel A shows that we identify 23,454 insider trade months in our sample as discretionary that are not classified as opportunistic using Cohen et al.'s (2012) classification, whereas 303 insider trade months that we identify as nondiscretionary are opportunistic according to Cohen et al. (2012). In other words, for our sample we are able to identify an additional set of insider trades as informative using the insiders' own disclosures that we would have missed by simply using their past trading behaviour.

In addition, we test whether our results on long-run returns are robust to the inclusion of a classifier that identifies opportunistic sales based on the insider's prior trading behaviour. If footnote disclosures in the Form 4 are incrementally informative for future negative stock returns our results should remain robust and have incremental explanatory power to the inclusion of an indicator variable that follows Cohen et al.'s (2012) classification into opportunistic trades.

Table 10, Panel B summarizes the results. Panel B shows the results of the regressions on buy-and-hold abnormal returns over one, three, and 12 months using our indicator variables *DISC\_SALE* and *DISC\_SALE\_FN*. The table replicates our regressions on long-term abnormal buy-and-hold returns presented in Table 6 and includes an additional indicator variable *Opportunistic Trade* defined as in Cohen et al. (2012) as all trades of the same firm that have no obvious discernible pattern in relation to the previous three years.<sup>32</sup>

Table 10 Panel B shows that the coefficient on *Opportunistic Trade* loads negatively and is statistically significant, consistent with Cohen et al. (2012). However, our *DISC\_SALE* and *DISC\_SALE\_FN* indicators retain their explanatory power for future negative stock returns and their monotonically decreasing relationship with holding period length. Importantly, the

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<sup>32</sup> A key difference between our implementation and Cohen et al. (2012) is that we aggregate our trade data on the firm-month level and include firm fixed effects in addition to month fixed effects.

coefficients on *DISC\_SALE* and *DISC\_SALE\_FN* are significantly larger in magnitude than *Opportunistic Trade*. Over the 12-months period the coefficient on *DISC\_SALE* is  $-4.21\%$  (p-value  $<0.05$ ) compared to the coefficient on *Opportunistic Trade*, that is  $-1.81\%$  (p-value  $<0.05$ ). An F-Test confirms that this difference is statistically significant ( $F = 7.67$ , p-value  $<0.01$ ). The results suggest that identifying discretionary insider sales is incrementally informative to investors and significantly more potent as a signal of negative future returns than the insider's previous trading patterns. Overall, the robustness tests in this section confirm that the insiders' disclosure behaviour with their stock sales contains incremental information value over and above what investors might be able to discern from the insider's past trading patterns.

## **8. Conclusions**

This study examines managers' voluntary supplementary disclosures on insider trade filings with the SEC. These disclosures describe the reasons for the insider's stock sale. Analysing the descriptions in these supplementary disclosures we identify two types of insider sales. *Nondiscretionary sales*, which are stock sales for which the insider has no discretion over the amount or timing and *discretionary sales*, which occur at the insider's full discretion. The former are, for example, insider sales in which shares are withheld and sold by the company for tax purposes. In contrast, the latter are sales that are executed for personal diversification, consumption or liquidity needs including those for which insiders remain silent about the reason. We document significantly negative abnormal filing returns to discretionary sales, particularly to those by the CEO and CFO, while abnormal returns to nondiscretionary sales are essentially zero. Among the discretionary sales we find no difference in abnormal returns between those for which the insiders disclose supplementary information and those for which they remain silent about the reasons. This suggests that the market does not consider the disclosures of the reasons to credibly convey that these sales are uninformed trading. One

reason for the market's scepticism might stem from the fact that discretionary sales, for which insiders disclose liquidity motivations, are significantly larger than all other sales netting the insider \$6.7 million on average. In contrast, the volume for all other sales is about \$1 million.

We then investigate the motivations why insiders provide supplementary disclosures with their discretionary sales despite these having no immediate capital market benefits and find evidence that insiders are more likely to disclose when the legal risk of trading is high. Further studying the economic consequences of the supplementary disclosures to discretionary insider sales we find significantly negative long-term abnormal returns. Our findings thus suggest that even though investors react more negatively to discretionary insider sales that claim uninformed trading, they do not fully impound the full extent of the negative information in these trades into stock prices immediately after the filing date. Investigating the sources of the negative news we find that these insider sales are more likely to precede analyst downgrades and negative earnings surprises. A long-short portfolio investment strategy that exploits this under-reaction earns an economically significant 16% risk-adjusted return per year.

Collectively our findings suggest that insiders' supplementary disclosures on the SEC Form 4, which contain descriptions of the reasons for an insider's stock sale, are highly informative to investors. Our findings are important to investors, regulators, and other market participants as they suggest that insiders provide these disclosures strategically in an attempt to disguise information-based sales as uninformative sales made to cover liquidity needs. We show that the information insiders disclose on SEC filings with regards to the stock sale allow investors to identify those sales that are potentially based on material non-public information. This is particularly important as there are generally few market mechanisms that reveal negative information (e.g. reluctance of managers to disclose bad news, significant short sale constraints, and often positively biased sell-side research). Our results suggest that these supplementary disclosures on insider trade filings should potentially be scrutinized more closely by regulators.

## Appendix A

### Form 4 Supplementary Footnote Disclosures

We use a Python script to parse each Form 4 and collect identifying information and transaction details such as name and position of the insider, name and ticker of the company, number of shares traded, and share price at sale. We then identify whether the form contains a footnote. We electronically parse the words in the footnotes and summarize them under keywords according to their frequency of occurrence. We then manually inspect the list of keywords and, based on the keyword frequencies, assign each insider sale filing into one of the following groups: *no supplementary disclosure*, *10b5-1 sale*, *gift*, *discretionary liquidity needs such as divorce or children's tuition*, *retirement plan*, *trade on behalf of family*, *option exercise*, *tax settlement*, *error correction*, and *automatic trade*. The following table provides examples for each supplementary disclosure on the Form 4 assigned to our two insider sale categories.

#### Examples

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##### Discretionary Sales

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###### Gift

“this transaction involved a gift of securities by the reporting person to a charity that operates on land and in a building owned by the reporting person. the charity subsequently sold these securities. the reporting person disclaims beneficial ownership of the shares held by the charity, except to the extent of his pecuniary interest therein.” (*cusip: 69318J10; date: 02 Dec. 2011*)

“on september 18, 2008 mr. dodson gifted 150 shares. this gift of shares will be reported on a form 5 for the year ending 2008.” (*cusip: 66765510; date: 12 Nov. 2008*)

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###### Liquidity

“shares sold to diversify investments.” (*cusip: 89011010; date: 28 Feb. 2007*)

“reporting person diversifying his portfolio as part of estate planning.” (*cusip: G3223R10; date: 29 Oct. 2008*)

“sale pursuant to distribution of marital assets in divorce settlement.” (*cusip: 75991610; date: 22 Feb. 2008*)

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###### Retirement

“reflects sale of shares held by the johnson outdoors 401(k) retirement and savings plan (the "401(k) plan"). sale of shares occurred due to the administrative procedures of the 401(k) plan, which would require a portion of future administrative sales of class a common stock by the 401(k) plan to be allocated to ms. johnson-leipold as a result of her holdings in the 401(k) plan.” (*cusip: 47916710; date: 16 Dec. 2010*)

“includes 4,950 shares deferred until reporting person's retirement.” (*cusip: 65339F10; date: 10 Sept. 2010*)

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###### Family

“held jointly with spouse.” (*cusip: 00103110; date: 31 Jan. 2005*)

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“in addition, there are 428,520 shares owned by reporting person's spouse. the reporting person disclaims beneficial ownership of these securities, and this report shall not be deemed an admission that the reporting person is the beneficial owner of the securities for purpose of section 16 or for any other purposes.” (cusip: 59491810; date: 22 Nov. 2004)

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### **Options**

“same day sale of shares exercised pursuant to the canyon resources corporation incentive and non-qualified stock option plans.” (cusip: 13886930; date: 19 November 2003)

“exercised stock options were scheduled to expire on january 31, 2012.” (cusip: 90781810; date: 28 Oct. 2011)

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### **10b5**

“sale of shares pursuant to rule 10b5-1 plan adopted on january 31, 2006.” (cusip: 68389X10; date: 20 March 2006)

“shares were sold pursuant to a rule 10b5-1 plan.” (cusip: 72913210; date: 04 Jan. 2011)

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### ***Nondiscretionary Sales***

#### **Tax**

“sale of additional shares to cover personal federal income tax obligation.” (cusip: 94106L10; date: 29 Jan. 2008)

“shares sold to cover cost of exercise and taxes” (cusip: 36955010; date: 05 Sept. 2003)

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#### **Error**

“dummy entry as required by software error.” (cusip: 03062T10; date: 30 Sept. 2003)

“due to an administrative error, adjustment of total shares by 1.933 based upon the dividend reinvestment of the september 21 stock dividend payment.” (cusip: 33791510; date: 02 Dec. 2009)

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#### **Automatic**

“vested rsu shares automatically sold by company on behalf of employee in conjunction with company's deferred compensation plan.” (cusip: 25454310; date: 29 May 2009)

“automatic sale pursuant to 1065-1 plan.” (cusip: 71271430; date: 06 July 2006)

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## APPENDIX B

### *Variable Definitions*

Variable Name	Definition
<b>Firm-level</b>	
<i>CAR(0,2)</i>	Cumulative abnormal return around the insider trade filing day (in percent) where daily abnormal returns are calculated as the raw return minus value weighted CRSP-return. Raw returns are winsorized at the top and bottom 1% (source: <i>CRSP</i> )
<i>BHAR(-2,-12)</i>	Buy-and-hold-abnormal returns from 2 months prior to the insider filing ( $t=-2$ ) to 12 months prior to the filing where abnormal returns are calculated as raw returns minus the returns on the CRSP size decile portfolio (in percent) (see Cohen et al. 2012) (source: <i>CRSP</i> )
<i>BHAR</i> (1 month, 3 months, 12 months)	Buy-and-hold-abnormal returns in the one month after the insider filing and up to three and 12 months after the filing where abnormal returns are calculated as raw returns minus the returns on the CRSP size decile portfolio (in percent) (source: <i>CRSP</i> )
<i>PRIOR MONTH RETURN</i>	Raw Return in the month prior to insider filing (in percent) (source: <i>CRSP</i> )
<i>LEVERAGE</i>	Total liabilities / total assets (source: <i>Compustat</i> )
<i>LITIGATION</i>	Ex-ante litigation risk measure: (a) indicator equal to one if company is part of the biotechnology, computers, electronics, and retail industries (Francis, Philbrick and Schipper 1994); and (b) probability measure estimated as in Kim and Skinner (2012) (source: <i>Stanford Securities Class Action Clearing House</i> )
<i>BOOK-TO-MARKET</i>	Natural logarithm of book-to-market value (source: <i>Compustat</i> )
<i>SIZE</i>	Natural logarithm of market capitalization (source: <i>Compustat</i> )
<i>ROA</i>	Return on assets (source: <i>Compustat</i> )
<b>Trade-level</b>	
<i>CEO/CFO</i>	Indicator equal to one if at least one of the trades on a day is made by the CEO or CFO (source: <i>EDGAR</i> )
<i>DIRECT OWNERSHIP</i>	Indicator equal to one if transaction is the result of direct (as opposed to indirect) ownership (i.e., executive/director directly and not for relatives etc.) (source: <i>EDGAR</i> )

*(Continued on next page)*

## Appendix B

(continued)

<b>Variable Name</b>	<b>Definition</b>
<b>Trade-level</b>	
<i>DISC_SALE_FN</i>	Indicator equal to one if the insider sale is discretionary based on the supplementary disclosures in Appendix A, zero otherwise (source: <i>EDGAR</i> )
<i>DISC_SALE</i>	Indicator equal to one if <i>DISC_SALE_FN</i> or if no supplementary disclosure, zero otherwise (source: <i>EDGAR</i> )
<i>NONDISC_SALE</i>	Indicator equal to one if the insider sale is nondiscretionary based on the supplementary disclosures in Appendix A, zero otherwise (source: <i>EDGAR</i> )
<i>DISC_SALE_FN_COUNT</i>	One plus the natural logarithm of the number of discretionary sales in month t plus one
<i>TRADESIZE</i>	Number of shares sold divided by number of shares outstanding at the beginning of the fiscal year (in percent). At <u>monthly level</u> : this variable is the average trade size per month (with trade size defined as above) (source: <i>EDGAR</i> )
<b>Analysts</b>	
<i>Weighted Consensus Downgrade 6 / 12 / 18 Months</i>	Indicator equal to one if analyst consensus recommendations in 6, 12 and 18 months prior to the insider filing are higher than in the same period after the filing weighted by change in the consensus recommendation (source: <i>I/B/E/S</i> )
<i>EA Missed Weighted</i>	Indicator equal to one if the firm missed the analyst forecast at the closest subsequent earnings announcement date and zero otherwise weighted by the amount of the earnings surprise; bounded at lower end by zero (source: <i>I/B/E/S</i> )

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**Table 1**  
*Sample Selection*

	<b>Observations</b>	<b>Firms</b>
Open market firm-insider transactions (transaction level)	2,236,307	6,980
- Large trades of > 20% of shares outstanding	(599)	
- Small transactions (<100 shares)	(147,878)	
=	2,087,830	6,970
After collapsing at firm-day-level	388,521	6,970
- Observations without CRSP-data available	(79,335)	
- Observations without Compustat-data available	(10,801)	
- Observations without IBES-data available	(33,224)	
=	265,161	6,372
- Missing transaction data	(12,720)	
- Non-net sale transactions	(55,192)	
- Observations from non-directors and non-officers	(12,497)	
= <b>Sample allowing for overlapping classifications</b>	<b>184,742</b>	
- Not unambiguously classified	(42,774)	
= <b>Final Sample</b>	<b>141,968</b>	<b>4,196</b>

*Notes:* This table presents the sample selection process starting with all downloaded SEC Form 4 filings at the transaction level, then collapsed to the firm-day-level. The table presents both the total number of observations as well as the number of unique firms at each step of the process.

**Table 2***Insider Trade Summary Statistics*

<b>Panel A: Observations by Footnote Category</b>			
	<b>N</b>	<b># Firms</b>	<b># Insiders</b>
Nondiscretionary Sales	1,515	380	1,318
Discretionary Sales			
- Reasons disclosed (excl. 10b5-1)	8,464	1,418	4,618
- 10b5-1 Sales	51,556	1,890	9,507
- No supplementary disclosure	80,433	3,923	28,168
<b>Total</b>	<b>141,968</b>	<b>4,196</b>	<b>35,391</b>
<b>Panel B: Mean (Median) Trades Size in US Dollar ('000)</b>			
	<b>Sale Size</b>	<b>Purchase Size</b>	<b>Net Sale Size</b>
Nondiscretionary Sales	1,254 (125)	242 (48)	1,242 (120)
Discretionary Sales			
- Reasons disclosed (excl. 10b5-1)	6,713 (427)	164 (57)	6,682 (423)
- 10b5-1 Sales	1,093 (220)	95 (33)	1,093 (193)
- No supplementary disclosure	1,002 (231)	131 (33)	1,000 (230)
<b>Panel C: Mean (Median) Trade Size in % of Common Shares Outstanding</b>			
	<b>Sale Size</b>	<b>Purchase Size</b>	<b>Net Sale Size</b>
Nondiscretionary Sales	0.042 (0.008)	0.031 (0.001)	0.040 (0.005)
Discretionary Sales			
- Reasons disclosed (excl. 10b5-1)	0.352 (0.037)	0.131 (0.010)	0.349 (0.007)
- 10b5-1 Sales	0.053 (0.017)	0.012 (0.003)	0.053 (0.036)
- No supplementary disclosure	0.079 (0.022)	0.039 (0.005)	0.078 (0.017)
<b>Panel D: Test of Difference in Average Trade Size (% of Common Shares)</b>			
	<b>Nondiscretionary Sales</b>	<b>Discr. Sales Reasons Disclosed (excl. 10b5-1)</b>	<b>10b5-1 Sales</b>
Nondiscretionary Sales			
Discretionary Sales			
- Reasons disclosed (excl. 10b5-1)	0.309***		
- 10b5-1 Sales	0.013**	-0.296***	
- No supplementary disclosure	0.038***	-0.271***	0.025***

*Notes:* This table presents sub-sample characteristics and descriptive statistics of the final sample of observations. Panel A shows the number of observations by footnote category. Panel B shows the mean (median) trade size in U.S. Dollar and Panel C shows the average trade size as % of common shares outstanding. Panel D shows the difference in average trade size (as % of common shares) between footnote categories (rows minus columns). \*\*\*, \*\*, \* denotes statistical significance on the 1%, 5%, and 10%-level, respectively, based on two-tailed tests. Please refer to Appendix B for a full description of all variables.

**Table 3***Filing Date Abnormal Returns*

<b>Panel A: Mean CAR(0,2)</b>			
	Obs.	Mean	P-Value
Nondiscretionary Sales	1,515	0.0054	0.956
Discretionary Sales			
- Reasons disclosed (excl. 10b5-1)	8,464	-0.1688	0.000***
- 10b5-1 Sales	51,556	-0.1024	0.000***
- No supplementary disclosure	80,433	-0.1460	0.000***
All Sales	141,968	-0.1299	0.000***
<b>Panel B: Differences in Means (Row minus Column)</b>			
	Nondiscretionary Sales	Discr. Sales Reasons Disclosed (excl. 10b5-1)	10b5-1 Sales
Nondiscretionary Sales			
Discretionary Sales			
- Reasons disclosed (excl. 10b5-1)	-0.174*		
- 10b5-1 Sales	-0.114	0.060	
- No supplementary disclosure	-0.151*	-0.023	-0.044**

*Notes:* This table provides results for univariate tests of mean cumulative abnormal returns (CAR) around the Form 4 filing date window (0,2) in Panel A and differences in means in Panel B for the different insider sale categories. \*\*\*, \*\*, \* denote statistical significance on the 1%, 5%, and 10%-level, respectively, based on two-tailed tests. Please refer to Appendix B for a full description of all variables.

**Table 4***Short-Term Filing Abnormal Returns*

	<b>Full Sample</b>				<b>CEO/CFO only</b>			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>DISC_SALE</i>	-0.321** (0.133)				-0.952*** (0.239)			
<i>DISC_SALE_FN</i>		-0.065 (0.043)	-0.055 (0.064)	-0.072 (0.065)		-0.148* (0.082)	-0.068 (0.123)	-0.044 (0.123)
<i>NONDISC_SALE</i>		0.299*** (0.086)	0.438*** (0.086)	0.483*** (0.088)		0.657*** (0.158)	0.679*** (0.174)	0.701*** (0.178)
<i>BOOK-TO-MARKET</i>	-0.642*** (0.056)	-0.604*** (0.049)	-0.703*** (0.044)	-0.755*** (0.055)	-0.860*** (0.117)	-0.834*** (0.095)	-0.861*** (0.100)	-0.873*** (0.105)
<i>SIZE</i>	0.162*** (0.048)	0.186*** (0.041)	0.174*** (0.033)	0.240*** (0.050)	0.178* -0.105	0.150* (0.082)	0.282*** (0.090)	0.306*** (0.099)
<i>LEVERAGE</i>	-0.689*** (0.196)	-0.565*** (0.172)	-0.664*** (0.163)	-0.771*** (0.198)	-0.793* (0.409)	-0.936*** (0.333)	-1.130*** (0.384)	-1.170*** (0.400)
<i>DIRECT OWNERSHIP</i>	-0.106** (0.043)	-0.076** (0.036)	-0.084 (0.056)	-0.091 (0.058)	-0.078 (0.123)	-0.077 (0.092)	-0.146 (0.132)	-0.133 (0.133)
<i>CEO/CFO</i>	-0.059** (0.025)	-0.064*** (0.021)	-0.007 (0.060)	0.007 (0.065)				
<i>TRADESIZE</i>	0.000 (0.000)	0.014** (0.006)	0.000** (0.000)	0.000* (0.000)	-0.036* (0.021)	0.000 (0.016)	0.000 (0.000)	0.000 (0.000)
<i>PRIOR MONTH RETURN</i>	-0.004*** (0.001)	-0.004*** (0.001)	-0.754*** (0.108)	-0.794*** (0.109)	-0.007*** (0.002)	-0.008*** (0.002)	-1.024*** (0.221)	-1.019*** (0.221)
<u>Fixed Effects</u>								
Year	YES	YES	YES	YES	YES	YES	YES	YES
Firm	YES	YES			YES	YES		
Manager			YES				YES	
Firm-Manager				YES				YES
N	141,968	184,742	204,806	204,806	38,057	49,450	47,900	47,900
Adj. R-squared	0.005	0.005	0.005	0.006	0.007	0.007	0.007	0.007



**Table 4**  
(continued)

*Notes:* This table summarizes pooled OLS regression results for the relation between insider sales and cumulative abnormal announcement returns  $CAR(0,2)$ .  $DISC\_SALE$  is an indicator equal to one if the insider sale is discretionary (including those with and without disclosures) and zero for nondiscretionary sales.  $DISC\_SALE\_FN$  is an indicator equal to one for those discretionary insider sales, for which the insider disclosed supplementary information in the footnotes to the Form 4, and zero otherwise.  $NONDISC\_SALE$  is an indicator variable equal to one if the insider sale is nondiscretionary. All variables are described in Appendix B. Reported statistics are based on standard errors that are clustered by firm in columns (1)-(2) and (5)-(6), clustered by manager in columns (3) and (7) and clustered by firm-managers in columns (4) and (8). \*\*\*, \*\*, \* denotes statistical significance on the 1%, 5%, and 10%-level, respectively, based on two-tailed tests.

**Table 5**  
*SOX Firm Size Thresholds*

	Full Sample			CEO/CFO		
	<75m	75-250m	>250m	<75m	75-250m	>250m
<i>DISC_SALE_FN</i> ( <i>ex 10b5-1</i> )	-0.382 (0.540)	-0.281 (0.174)	-0.071 (0.047)	-0.910 (0.993)	-0.450 (0.427)	-0.155* (0.088)
<i>NONDISC_SALE</i>	2.100** (1.014)	0.703* (0.409)	0.217** (0.095)	6.503*** (1.384)	1.909** (0.761)	0.459*** (0.173)
<i>10b5-1</i>	-0.290 (0.334)	-0.112 (0.143)	0.047 (0.033)	0.689 (0.921)	-0.052 (0.234)	0.091 (0.074)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year and Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
N	4,645	17,976	127,989	1,042	4,951	36,160
Adj. R <sup>2</sup>	0.007	0.005	0.004	0.034	0.013	0.005

*Notes:* This table summarizes pooled OLS regression results for the relation between insider sales and cumulative abnormal announcement returns CAR(0,2) by SOX firm size thresholds. *DISC\_SALE\_FN* is an indicator equal to one for discretionary insider sales, for which the insider disclosed supplementary information in the footnotes to the Form 4 excluding 10b5-1 trades, and zero otherwise. *NONDISC\_SALE* is an indicator variable equal to one if the insider sale is nondiscretionary. *10b5-1* is an indicator equal to one if the footnote on Form 4 refers to a 10b5-1 sale. The benchmark category are discretionary insider sales without supplementary disclosures All regressions include the same firm and trade controls as in table 4. All variables are described in Appendix B. \*\*\*, \*\*, \* denotes statistical significance on the 1%, 5%, and 10%-level, respectively, based on two-tailed tests. Reported statistics are based on standard errors that are clustered by firm.

**Table 6***Supplementary Disclosures and Litigation Risk*

<b>Panel A: Effect of ex-ante litigation risk on supplementary disclosure</b>				
	Ex-ante litigation risk based on industry membership		Ex-ante litigation risk based on Kim and Skinner (2012)	
	FN disclosure	Discretionary FN disclosure	FN disclosure	Discretionary FN disclosure
<i>Litigation Risk</i>	0.129*** (0.020)	0.128*** (0.020)	1.516*** (0.462)	1.463*** (0.465)
<i>Controls</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
<i>Year FE</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
<i>Firm FE</i>	<i>No</i>	<i>No</i>	<i>Yes</i>	<i>Yes</i>
N	124,453	122,938	123,202	121,712
Pseudo R-squared	0.0685	0.0691	0.0614	0.0616
<b>Panel B: Likelihood of trading within safe trading window after earnings announcements (0,15)</b>				
	Trading Occurs Within Safe Trading Window			
<i>FN disclosure</i>	-0.056*** (0.005)			
<i>Discretionary FN disclosure</i>		-0.057*** (0.005)		
<i>Controls</i>	<i>Yes</i>	<i>Yes</i>		
N	141,968	140,453		
Pseudo R-squared	0.0106	0.0107		

*Notes:* This table summarizes logit regression results for the relation between litigation risk and supplementary disclosure. Panel A reports the results of regressions of indicator variables equal to one if an insider sale (a discretionary insider sale) is accompanied by a supplementary disclosure, and zero otherwise, on a proxy of ex-ante litigation risk. Panel B reports the results of logit regressions of an indicator variable equal to one if the insider sale occurred within the two-week window after the quarterly announcement date, and zero otherwise, on indicator variables equal to one if any sale (*FN disclosure*) or a discretionary sale (*Discretionary FN disclosure*) is accompanied by a supplementary footnote disclosure. All regressions include the same firm and trade controls as in table 4. All variables are described in Appendix B. \*\*\*, \*\*, \* denotes statistical significance on the 1%, 5%, and 10%-level, respectively, based on two-tailed tests. Reported statistics are based on standard errors that are clustered by firm.

**Table 7**  
*Long-Term Abnormal Returns*

<b>Panel A: BHAR regressions on discretionary and nondiscretionary sales indicators</b>						
	Dependent Variable = <i>BHAR</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
	<b>1 Month</b>	<b>3 Months</b>	<b>12 Months</b>	<b>1 Month</b>	<b>3 Months</b>	<b>12 Months</b>
<i>DISC_SALE</i>	-0.221** (0.107)	-0.426* (0.230)	-2.141*** (0.507)			
<i>NONDISC_SALE</i>	1.132*** (0.347)	1.742** (0.739)	1.927 (0.507)			
<i>DISC_SALE_FN</i>				-0.287*** (0.102)	-0.633*** (0.230)	-0.690 (0.563)
<i>NONDISC_SALE</i>				1.172*** (0.347)	1.804** (0.730)	2.727* (1.558)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm & Month FE	Yes	Yes	Yes	Yes	Yes	Yes
N	79,356	79,356	76,936	79,356	79,356	76,936
Adj. R <sup>2</sup>	0.012	0.030	0.190	0.012	0.030	0.190
<b>Panel B: BHAR regressions on discretionary and nondiscretionary sales counts</b>						
	Dependent Variable = <i>BHAR</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
	<b>1 Month</b>	<b>3 Months</b>	<b>12 Months</b>	<b>1 Month</b>	<b>3 Months</b>	<b>12 Months</b>
<i>DISC_SALE_COUNT</i>	-0.734*** (0.100)	-1.375*** (0.215)	-2.555*** (0.481)			
<i>DISC_SALE_FN_COUNT</i>				-0.720*** (0.164)	-1.610*** (0.361)	-2.273*** (0.824)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm & Month FE	Yes	Yes	Yes	Yes	Yes	Yes
N	65,585	65,585	63,517	28,832	28,832	27,687
Adj. R <sup>2</sup>	0.013	0.031	0.189	0.016	0.025	0.182

**Table 7**  
(continued)

<b>Panel C: Monthly Calendar-Time Portfolio Returns</b>		
	<i>NONDISC_SALE (long) - DISC_SALE_FN (short)</i>	
	Full Sample	CEO/CFO
<i>Avg. Return</i>	0.86**	1.25**
<i>Fama-French Alpha</i>	0.78**	1.15*
<i>Carhart Alpha</i>	0.81**	1.23**
N	101	101

*Notes:* Panels A and B in this table summarize pooled OLS regression results for the relation between insider sales and buy-and-hold abnormal returns over different holding periods. *DISC\_SALE* is equal to one if a given month contains at least one discretionary sale. *NONDISC\_SALE* is equal to one if a given month contains at least one nondiscretionary sale. *DISC\_SALE\_FN* is equal to one if a given month contains at least one discretionary insider sale with supplementary disclosure. The count variables are equal to the natural logarithm of one plus the net number sales. Panel C summarizes calendar-time portfolio average monthly (excess) returns of a trading strategy that in each month during the sample period buys stocks that have had nondiscretionary insider sales and sells stocks that have had discretionary insider sales with supplementary disclosures (excluding 10b5-1 sales) and holds the portfolio over the next month. All regressions in Panel A and Panel B include control variables as in Table 4 plus prior year buy-and-hold returns as well as firm- and month-fixed effects. All variables are described in Appendix B. \*\*\*, \*\*, \* denotes statistical significance on the 1%, 5%, and 10%-level, respectively, based on two-tailed tests. Reported statistics are based on standard errors that are clustered by firm.

**Table 8***Repeated Discretionary Sales*

Dependent Variable = <i>BHAR</i>	<i>Supplementary Disclosures</i>		
	<i>&lt;25%</i>	<i>25-75%</i>	<i>&gt;75%</i>
	<i>DISC_SALE_FN</i>	-0.002** (0.001)	-0.014*** (0.003)
<i>NONDISC_SALE</i>	0.009 (0.006)	0.055* (0.032)	0.147*** (0.055)
Controls	Yes	Yes	Yes
Manager & Month FE	Yes	Yes	Yes
N	157,297	153,618	146,954
Adj. R <sup>2</sup>	0.015	0.026	0.136

*Notes:* This Table summarizes the results of the pooled OLS regression for the relation between insider sales and buy-and-hold abnormal returns partitioned by the percentage of a manager's discretionary sales that contain supplementary disclosures. *DISC\_SALE\_FN* is equal to one if a given month contains at least one discretionary sale with supplementary disclosures in the footnote on Form 4. *NONDISC\_SALE* is equal to one if a given month contains at least one nondiscretionary sale. The benchmark category are discretionary sales without disclosure. All regressions include control variables as in Table 4 plus prior year buy-and-hold returns as well as manager and month-fixed effects. All variables are described in Appendix B \*\*\*, \*\*, \* denotes statistical significance on the 1%, 5%, and 10%-level, respectively, based on two-tailed tests. Reported statistics are based on standard errors that are clustered by firm.

**Table 9***Analyst Recommendation Downgrades and Negative Earnings Surprises*

	Dependent Variable = <i>Weighted Consensus Downgrade</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
	<b>6 Months</b>	<b>12 Months</b>	<b>18 Months</b>	<b>6 Months</b>	<b>12 Months</b>	<b>18 Months</b>
<i>DISC_SALE_FN</i>	0.025** (0.010)	0.022** (0.010)	0.030*** (0.010)			
<i>NONDISC_SALE</i>	-0.007 (0.034)	-0.016 (0.029)	-0.018 (0.028)			
<i>DISC_SALE_FN_COUNT</i>				0.028** (0.014)	0.039*** (0.013)	0.034*** (0.011)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
N	58,559	65,954	68,179	22,440	24,731	25,294
Pseudo R <sup>2</sup>	0.006	0.008	0.011	0.007	0.010	0.012

*(Continued on next page)*

**Table 9**  
(continued)

	Dependent Variable = <i>EA Missed Weighted</i>			
	Fiscal Year		4 Quarters Ahead	
	(1)	(2)	(3)	(4)
<i>DISC_SALE_FN</i>	-0.021 (0.036)		0.063 (0.050)	
<i>NONDISC_SALE</i>		-0.143 (0.104)		-0.095 (0.120)
<i>DISC_SALE_FN_COUNT</i>		0.101* (0.057)		0.161** (0.080)
Controls	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
N	77,988	27,811	41,075	14,813
Pseudo R <sup>2</sup>	0.018	0.021	0.013	0.012

*Notes:* This table provides Tobit regression results for the relation between insider sales and analyst consensus recommendation downgrades (Panel A) and negative earnings surprises (Panel B). The dependent variable in Panel A is an indicator equal to one if the consensus recommendation for the firm in the 6, 12, and 18 months after the insider trade month is lower than the consensus recommendation in the equivalent time period before the insider trade month weighted by the magnitude of the downgrade. The dependent variable in Panel B is an indicator equal to one if the firm missed its analyst consensus earnings forecast for the closest fiscal year end and for the four quarters after the insider trade month weighted by the magnitude of the earnings miss. *DISC\_SALE\_FN* is equal to 1 if a given month contains at least one discretionary insider sale with supplementary footnote disclosures on the Form 4. *NONDISC\_SALE* is equal to 1 if a given month contains at least one nondiscretionary insider sale. *DISC\_SALE\_FN\_COUNT* is equal to the natural logarithm of one plus the net number of discretionary sales with disclosures. All regressions include Direct Ownership, Tradesize, Debt-to-Assets, Size, ROA, ln(Book-to-Market), Prior Month Return, BHAR(-2,-12) and a CEO/CFO-Indicator as well as month fixed effects as control variables. Appendix B provides a full description of all variables. \*\*\*, \*\*, \* denotes statistical significance on the 1%, 5%, and 10%-level, respectively, based on two-tailed tests. Reported statistics are based on standard errors that are clustered by firm.



**Table 10**  
*Robustness Tests*

<b>Panel A: Discretionary vs Opportunistic Classification</b>			
<i>Opportunistic</i>	<i>Discretionary</i>		
	0	1	
0	741	<b>23,454</b>	24,195
1	<b>303</b>	7,699	8,002
Total	1,044	31,153	32,197

  

<b>Panel B: Discretionary versus Opportunistic BHAR</b>						
	Dependent Variable = <i>BHAR</i>					
	(1) <b>1 Month</b>	(2) <b>3 Months</b>	(3) <b>12 Months</b>	(4) <b>1 Month</b>	(5) <b>3 Months</b>	(6) <b>12 Months</b>
<i>DISC_SALE</i>	-1.376*** (0.431)	-1.838** (0.907)	-4.207** (1.899)			
<i>DISC_SALE_FN</i>				-1.684*** (0.492)	-2.432** (1.130)	-3.680 (2.500)
<i>Opportunistic Trade</i>	-0.433*** (0.107)	-1.691*** (0.289)	-1.806** (0.756)	-0.305* (0.171)	-1.275*** (0.489)	0.450 (1.261)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm & Month FE	Yes	Yes	Yes	Yes	Yes	Yes
N	67,583	67,583	65,422	30,541	30,541	29,314
Adj. R <sup>2</sup>	0.013	0.031	0.189	0.016	0.023	0.179
Difference Discretionary - Opportunistic						
F	4.41	0.02	1.37	6.88	0.84	2.10
P-value	0.036	0.878	0.242	0.009	0.359	0.147

*(Continued on next page)*

## Table 10

(continued)

*Notes:* Panel A in this table cross-tabulates the frequency of insider sales per firm-month classified as opportunistic according to Cohen et al. (2012) and of discretionary insider sales. Panel B presents pooled OLS regression results for the relation between insider sales and buy-and-hold abnormal returns over different holding periods. *DISC\_SALE* is equal to one if a given month contains at least one discretionary insider sale. *DISC\_SALE\_FN* is equal to one if a given month contains at least one discretionary insider sale with a supplementary Form 4 footnote. *Opportunistic Trade* is defined similar to Cohen et al. (2012) and is equal to one if the month of the insider trade is preceded by insider trades in the past two years during the same month by the same firm. All regressions include control variables as in Table 9. Appendix B provides a full description of all variables. \*\*\*, \*\*, \* denotes statistical significance on the 1%, 5%, and 10%-level, respectively, based on two-tailed tests. Reported statistics are based on standard errors that are clustered by firm.