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"Insider Trading Before Loss Reversals"

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Insider Trading Before Loss Reversals

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Abstract

Investors face difficulty incorporating expected loss persistence into their valuation of loss firms. This study examines whether insiders have private information about loss persistence and trade upon such information by analyzing insider trading patterns before the end of a loss string. We find that stock purchase (sales) by insiders increase (decrease) one to five quarters prior to the announcement of loss reversals. Moreover, this increase (decrease) in stock purchases (sales) only occurs with opportunistic trades not with routine trades. We further find economically significant abnormal returns associated with insider buying over the period from the time of insider trade until the loss reversal is announced. While Ke et al. [2003] find that insiders sell far ahead of announcing bad news to avoid the appearance of trading on earnings news, our findings suggest asymmetric litigation risks perceived by insiders when trading on good news.

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1. INTRODUCTION

This study examines whether insiders have private information about loss persistence and trade upon such information by analyzing insider trading patterns before the end of a loss string. These questions are of interest because the incidence of losses reported by firms has increased over time. More than 40 percent of the firms in Compustat database reported losses at some point in last 10years (Hayn [1995], Joos and Plesko [2005]). In addition, recent research suggest that, when firms report losses, investors have difficulty incorporating expected loss persistence into their valuations.(Balakrishnan et al.[2010], Li[2011], Dhaliwal et al.[2013]) Given increased incidence of losses and the difficulty investors face when pricing loss firms, investors may be able to get an important cue from insider trading, which subsequently can improve pricing efficiency of loss firms[1].

Balakrishnan et al. [2010] document that the mispricing of loss firms is associated with investors' naive use of unconditional probability (instead of conditional probability) of a loss/profit in predicting subsequent quarter earnings. Li [2011] contends that investors do not fully distinguish the differences in loss persistence captured by financial statement indicators and instead assume all losses are transitory, thus surprised again by future announcement of losses. On the other hand, insiders may

[1]Loss(profit) firms are defined as firms reporting negative(positive)earnings before extraordinary items and discontinued operations (Compustat data item IBQ.

have better understanding about their firms future prospect. Dhaliwal et al. [2013] find that tax categories based on whether management appears to have recognized a material change in the VA, and whether or not the firm has positive taxable income, contain information about the persistence of accounting losses, suggesting that managers use private information about persistence of losses when setting valuation allowance(VA).

However, while insiders have favored access to private information about the firm, thus may have foreknowledge about loss persistence of their firms, it is not clear that insiders trade on such information. Because of preferential access to inside information, insiders are subject to increased scrutiny, regulation, and restrictions regarding their trading activities. Moreover, insiders in loss firms may perceive higher litigation risk than insiders in profit firms. Research on securities class action litigation suggests that most investor lawsuits follow unexpected declines in stock prices (Johnson et al., [2007]). Therefore, whether insiders trade on private information about loss persistence is empirical question.

We define "loss string" as consecutive loss-reporting quarters, and "break" (or "loss reversal") as the first profit quarter after a loss string. We first establish significantly positive market reaction around the announcement of the break; breaking a longer loss string, and the length of profit quarters following a loss string correspond

to stronger market reactions. This suggests insiders' incentives to buy stock prior to the break are higher in such cases. Therefore, we investigate the trading behavior of insiders in the quarters preceding a break.

We find an increased intensity of net insider purchase in the five to immediately before the announcement of the break. Net number of shares traded and net frequency of trade in the open market by insiders significantly increase in the five to immediately before the break, while net value of trades increase in the three to immediately before the break. This pattern is present after controlling for stock returns subsequent to the trade, which indicates that insider trades are motivated in part by specific foreknowledge of the break, not by other private information that generate subsequent abnormal returns.

Cohen et al.[2012] find that only opportunistic insider trades contain information about firms' prospect. Therefore, we investigate whether there is a difference in pattern between opportunistic trades and routine trades before the break. We find that increased net insider buying only exist with opportunistic trades, not with routine trades.

Finally, we analyze abnormal returns over the period from the time of insider trades until the announcement of break. We find that the mean abnormal returns is significantly positive for firms in which insiders net buy stocks (Buy group), from

quarters -4 to 0, where quarter 0 is the quarter of the break. In addition, we show that there is significant difference in abnormal returns between Buy and Sell group (in which insiders net sell stocks) for quarters -3 to -1 relative to the break. This is consistent with the interpretation that insiders trade on foreknowledge about the break in loss strings.

The rest of the paper is organized as follows. Section 2 summarizes the relates literature. Section 3 describes the data and reports descriptive statistics. Section 4 present the main empirical results, and Section 5 concludes.

2. RELATED LITERATURE

Prior literature suggest that investors face difficulty incorporating expected loss persistence into their valuation of loss firms. Balakrishnan et al. [2010] document that the mispricing of loss firms is associated with investors' naive use of unconditional probability (instead of conditional probability) of a loss/profit in predicting subsequent quarter earnings. Li [2011] contends that investors do not fully distinguish the differences in loss persistence captured by financial statement indicators and instead assume all losses are transitory, thus surprised again by future announcement of losses. On the other hand, insiders may have better understanding about their firms future prospect. Dhaliwal et al. [2013] find that tax categories, that assigns

loss firm-years into three categories based on whether management appears to have recognized a material change in the VA, and whether or not the firm has positive taxable income, contain information about the persistence of accounting losses over the following three years, suggesting that managers use private information about persistence of losses when setting valuation allowance(VA).

Prior research has also examined insider trading behavior around earnings announcements but the results are not conclusive. Ke et al. [2003] investigate insider trades prior to the announcement of a break in a string of consecutive increases in quarterly earnings. They find that insidersales increase three to nine quarters before the break of earnings increase, but refrain from significant selling in the two quarters immediately preceding the announcement to avoid the appearance of trading on near term, material news about earnings. In contrast, studies focusing on insider trading around short-window information events produce mixed results. Givoly and Palmon [1985] are unable to find a link between insider trading profits and subsequent disclosure events including earnings announcements, while Noe [1999] examines insider trading around management forecasts of earnings and finds the trading patterns to be unrelated to the forecasted earnings news. Sivakumar and Waymire [1994] find that insider transactions following quarterly earnings announcements are profitable but the trades are not associated with analyst forecast errors of the subsequent quar-

ter suggesting that insiders do not trade on future earnings surprises. The results of these studies imply that insiders do not trade on future earnings information.

More recent studies find that insiders increasingly engage in passive trading i.e. they postpone their selling (buying) transactions until after good (bad) news announcements. McVay et al. [2006] show a significant association between the likelihood of firms' meeting or missing analyst forecasts and subsequent insider sales. Huddart et al. [2007] find that insider transactions are clustered immediately after the earnings announcement but before the 10 K/Q filing dates. The results of these studies suggest that regulatory enforcement may affect the timing of insider trading but not their ability to exploit inside information.

3. DATA AND DESCRIPTIVE STATISTICS

3..1 Sample Selection

The data in this study come from several sources. Our primary data on insider trades are come from the Thomsom Reuters insider filings database. Section 16(a) of the Securities and Exchange Act of 1934 requires that open market trades by corporate insiders be reported to the SEC within 10days after the end of month in which they took place. This deadline was later changed to 2days in 2002. Thomsom Reuters insider filings database provide insider transactions by corporate insiders,

which include directors and officers (including CEOs, CFOs, and board chairs) and others, such as beneficial owner of more than 10% of a company's stock. In our analysis, we only include trades made by directors or officers during the period 1988 to 2010. Our analysis focuses on open market stock purchases and sales by insiders, hence exclude options exercise and private transactions.

We merge our insider transaction data with firm-level data from CRSP/Compustat, including earnings, stock returns, and market capitalization. The sample include all firm-quarters that had available at least eight consecutive quarterly earnings data during the period 1988 to 2010 to reasonably measure the length of loss string. To measure the length of loss string and the length of post break profit quarters, we use quarterly earnings data as needed from the period 1976 to 2012.

We include all firm-quarters with at least one insider transaction in the observation quarter with following exceptions. First, we exclude ongoing loss strings as of December 2012. That is, firm-quarters that are part of a loss string that ends after 2012 are excluded because we need to identify when the loss string ends to determine where the firm-quarter lie within the string. Second, to avoid complications related to delayed earnings announcement, we only include firm-quarters in which the earnings announcement is made within 60days after calendar quarter end. Third,in order to eliminate thinly traded stocks,we exclude all firm-quarters with stock prices at the

end of quarter below $1. In addition, we also exclude firm-quarters with negative book value of equity at the end of the quarter. The final sample for primary set of test includes 154,775 firm-quarters for 9,258 distinct firms. There are 9,686 instance of loss strings for 4,631 distinct firms. The sample selection procedures are shown in Table1.

3..2 Key Variables and Descriptive Statistics

Panel A of Table2 provide descriptive statistics on variables of all firm-quarters. We measure intensity of insider trading, NETBUY, in three different ways; 1)NETBUY1,the total number of net shares traded per active insiders(the number of shares purchased less the number of shares sold), 2)NETBUY2,the total value traded (the value of shares purchased less the value of shares sold), 3)NETBUY3, the total number of net transactions (the number of purchase transactions less the number of sales transactions). Blackout periods, when corporate policy prohibits insiders from trading, are usually a month up until the earnings announcement date. Accordingly, we measure NETBUY from one day after earnings announcement of quarter q-1 to the end of quarter q. We divide NETBUY1 by 1000 and NUTBUY2 by 1000000 to preserve significant digits of the coefficient estimate on the independent variables. The mean value of NETBUY1(NETBUY2) is -78.03(-6.50) thousand shares, which

is consistent with prior literature that open market transactions by insiders are predominantly sales.

Seyhun [1986] reports that insider trading varies cross-sectionally with firm size. Lakonishok and Lee [2001] find that insiders are more active traders in larger firms and insiders sell more than they buy. Accordingly, we include SIZE, defined as the natural logarithm of the market value of the equity at the beginning of the quarter, to control for the impact of firm size on insider trading. Piotroski and Roulstone [2005] demonstrate that insider purchases are positively related to book-to-market ratio, while Huddart et al. [2007] reports different sign of coefficient on BM depending on the measure of insider trading. Thus, we also include BM, defined as book-to-market ratio at the beginning of the quarter, to control for possible impact of book-to-market ratio may have on insider trading.

DUR is the number of the quarters since the loss string began, inclusive of observation quarter. The probability of a break in a loss string may be higher as the string becomes longer. However, Joos and Plesko [2005] find that the longer the string of losses in loss firms, the less likely the loss firm return to profitability in the following period. Hence, insiders may buy less (or sell more) stock during a long loss string unless a break is anticipated in the next period. Thus, the effect of duration of loss string on insider trading is an empirical question. Inclusion of the variable

DUR serves as a control for the effect of prior string length on insiders trading decision. DUR has a mean of 0.83 and a median of 0, because approximately 77% of firm-quarters in our sample are profit quarters with the value of DUR 0.

Piotroski and Roulstone [2005],among others, find evidence that insiders are contrarian investors who buy stock with poor past performance. If insiders have contrarian beliefs, insider trading should be negatively correlated with the stock returns proceeding the earnings announcement. Thus prior stock returns, PRIORRET, defined as the raw returns over the previous 12 months ending the prior month of the earnings announcement (i.e. months -12 to -1), is included. EVENTRET is defined as the raw returns for the period starting 2 days before to 1 day after the earnings announcement date(i.e. days -2 to 1). POSTRET6 and POSTRET12 are defined as the raw returns for the first 6 months after the earnings announcement month (i.e. months 1 to 6), and for the next 6 months after the earnings announcement month (i.e. months 7 to 12). These variables are included because prior research document positive relation between insiders' net purchases and subsequent stock returns (Seyhun[1998] and Ke et al. [2003]) The distributions of PRIORRET, EVENTRER, POSTRET6, and POSTRET12 are generally consistent with the those of prior literature. (Ke et al. [2003])

Panel B of Table2 provide descriptive statistics on variables of firm-quarters that

break a string of losses. LEN_LOSS_STRING is defined as the number of consecutive loss quarters before the quarter that break a string of losses. The shortest loss string has a length of one. The mean of LEN_LOSS_STRING is 2.41, while the median is 1. Thus, on average the loss strings consist of 2 to 3 loss quarters with most of strings only have 1 loss quarters, indicating that losses typically are transitory. LEN_POST_BREAK_PROFIT is the number of consecutive profit quarters following a string of losses. The mean of LEN_POST_BREAK_PROFIT is 7.30, so on average loss strings are followed by 8 profit quarters.

We measure unexpected earnings on the day of earnings announcement of break, UE, as the size of profit, scaled by beginning of quarter total assets, in the first profit quarter following a string of losses minus the average magnitude of losses, scaled by beginning of quarter total assets, in prior quarters during the loss string. Alternatively we measure unexpected earnings in two different ways; 1) the size of profits of the first profit quarter after a string of losses scaled by beginning of quarter total assets. 2)the difference between the size of the profit in the first profit quarter following a string of losses minus the earnings in the same quarter during the previous year scaled by average beginning of the quarter total assets. We try to capture the magnitude of the turnaround when a firm announces a break of a loss string. Of course UE has positive values by constructions for all firm-quarters that break a

string of losses.

SAR(-30,1) is the size-adjusted buy-and-hold abnormal return for the period from 30 days before to 1 day after the announcement of break. SAR(-2,1) is the size-adjusted buy-and-hold abnormal return for the period from 2 days before to 1 day after the announcement of break. Consistent with previous research, there is a large positive stock price response both in a short window and in a longer window in which break is announced. The mean (median) of SAR(-30,1) is 4.96% (1.64%) and mean (median) of SAR(-2,1) is 2.61% (1.13%), suggesting that the break of loss string is not fully anticipated by the market prior to the earnings announcement.

4. RESEARCH DESIGN AND EMPIRICAL RESULTS

In this section, we present our empirical method and main results. First, we examine the market reaction around the announcement of loss reversal. Next, we investigate insider trading intensity in each quarter prior to the announcement. Last, we examine whether there is different insider trading patterns between opportunistic trading and routine trading.

4..1 Stock Price Response to Loss Reversals

Our analysis focuses on the insider trading before the loss reversals, thus we first examine market response to the announcement of break of the loss strings. To test whether there is an incremental market reaction to the fact that a firm break a loss string beyond unexpected earnings, we specify the following regression model for firm-quarters that break a loss string:

$$SAR_{it} = \alpha_{oi} + \alpha_{1t} + \beta_1 LEN\_LOSS\_STRING_{it} + \beta_2 LEN\_POST\_BREAK\_PROFIT_{it} + \beta_3 BM_{it} + \beta_4 SIZE_{it} + \beta_5 UE_{it} + \epsilon_{it} \quad (1)$$

We measure abnormal returns over two period; a 4-day window, SAR(-2,1); and a 32-day window, SAR(-30,1). We include a broader window because firms sometimes preannounce earnings news before earnings announcement. We include unexpected earnings, UE, to control for the effect of magnitude of earnings surprise on abnormal returns. In addition, we include controls for well-known determinant of stock returns, SIZE and BM.

Table 3 reports the results of OLS regression of Eq.(1). All non-dummy variables are winsorized at 5% and 95% [2], and standard errors are clustered both at firm and

[2]We obtain similar results when wisorizing each variable at 1% and 99%.

quarter level following Gow et al.(2010). There is a significantly positive coefficient on UE, which demonstrate a consistent findings that unexpected earnings and stock returns around the earnings announcement are positively correlated. [3] Significantly negative coefficient on SIZE suggest that there is more positive stock price response to the break of loss string for smaller firms, consistent with prior literature that there are more pre-announcement going on for large firms. Significant positive coefficient on BM indicate that firms with a high BM (i.e. value firms) experience more positive stock price reaction to the break of loss strings.

As expected, the coefficient on LEN_LOSS_STRING is significantly positive, indicating that firms with longer loss string have a more positive stock price responses when announcing the break. On average, there is an incremental 0.136% of excess returns during a 4-day window for breaking an additional quarter of a loss string. The significant positive coefficient on LEN_POST_BREAK_PROFIT demonstrates that longer profit quarters after loss are associated with more positive market reaction. This suggest that investors predict persistence of the loss reversals at the beginning of the break.

Combined, the findings in Table 3 indicate that breaking a string of losses is a big informational event beyond the unexpected earnings, which correspond to a big

[3]We obtain nearly indistinguishable results when we use two alternative measure of unexpected earnings.

positive market reaction. Thus, insiders would have incentive to buy more or sell less the stocks if they have private information about the end of loss string.

4..2 Insider Trading Patterns Before Loss Reversals

If insiders know in advance when the loss string will end and can predict that market react positively to the announcement of break, insiders may trade ahead to benefit from this foreknowledge. Consider how insider may profit from the foreknowledge about the timing of the break in loss string. First, insiders may buy before the announcement of the break. Further, when insiders need to sell stock for diversification or personal liquidity needs, they may delay the sale until after the break is announced if they have some discretion over when to sell. In both ways, insiders' net buying activity would increase before the break of loss stings. In this section we examine the pattern of insider trading before announcing a break. We estimate the following regression model for all firm-quarter observations:

$$\begin{aligned} NETBUY_{it} =& \alpha_{0i} + \alpha_{1t} + \beta_0 BREAKit + \Sigma_{q=1}^{16} \beta_q STRINGq_{it} + \beta_{17} BEGSTRINGit \\ &+ \beta_{18} SIZE_{it} + \beta_{19} BM_{it} + \beta_{20} DUR_{it} + \beta_{21} PRIORRET_{it} \\ &+ \beta_{22} EVENTRET_{it} + \beta_{23} POSTRET6_{it} + \beta_{24} POSTRET12_{it} \\ &+ \epsilon_{it} \end{aligned} \tag{2}$$

Firm-quarter observations are arranged in event time according to the length of the period by which they precede the break. Since Huddart and Ke [2003] demonstrate the systematic variation in insider trading across firms, we include α_{0i} to control for firm-specific fixed effects. In addition, regulatory changes or other matters may induce systematic variation in insider trading, we also include α_{1t} control for time fixed effects. BREAK is an indicator variable equal to 1 if the loss string ends in that quarter, i.e. first profit quarter after a string of losses. STRINGq is an indicator variable equal to 1 if observation quarter is part of a loss string at least q quarters long and is q quarters before the break in a loss string, otherwise 0. BEGSTRING is indicator variable equal to 1 if observation quarter is part of a loss string and is more than 12 quarters before the break in a loss string, otherwise 0. Other variables are defined above. Coefficient on BREAK and STRINGq capture the effect of whether there is any systematic trading activity in each quarter prior to the announcement of a break. BEGSTRING allows us to observe systematic behavior of insider during early stage of a long loss string.

Table 4 reports the result of insider trading intensity before the loss reversal. All non-dummy variables are winsorized at 5% and 95%[4], and standard errors are clustered both at firm and quarter level following Gow et al.(2010). Consistent to prior research, coefficient on SIZE is significantly negative as insiders are more

[4]We obtain similar results when wisorizing each variable at 1% and 99%.

likely to buy in small firms (Lakonishok and Lee [2001], Seyhun [1986]). Coefficient on BM is significantly positive since insiders tend to buy value firms (Rozeff and Zaman [1998]). Joos and Plesko [2005] find that the longer the string of losses in loss firms, the less likely the loss firm return to profitability in the following period. Thus, significant negative coefficient on DUR reflect insiders' beliefs about firm's reduced possibility of loss reversal during a longer loss string. In addition, consistent with prior literature that insiders are contrarian investors (Rozeff and Zaman [1998], Lakonishok and Lee [2001], and Piotroski et al. [2005]), coefficient on PRIORRET is significantly negative, suggesting that insiders purchase after stock price decreases and sell after stock price increases. Since net purchase by informed insiders should increase prior to price run-ups and decrease prior to price decline (Seyhun [1988]), we predict and find positive coefficient on EVENTRET, POSTRET6, and POSTRET12. Significance of the coefficient estimate on the BREAK and STRINGq variables in the presence of control variable EVENTRET, POSTRET6, and POSTRET12 allow us to argue that insider trade is driven incrementally by specific foreknowledge of the loss reversal, and not simply a variety of other non-break related private information that drive insider trade.

The coefficient on BREAK or STRINGq variable is the mean increase in the net shares(dollar value or number of transaction depending on the measure of NETBUY)

in the quarter or q quarters before the loss reversal, relative to a firm-quarter that is not part of a loss string. The coefficient on BREAK is significantly positive, indicating that insiders significantly purchase more (or sell less) stocks in the quarter of loss reversal, which is just before announcing the break of loss string. In addition, when the dependent variable is NETBUY1 or NETBUY3, the coefficient on STRING1 to STRING5 are significantly positive, suggesting that insiders engage in significantly more buying activity or less selling activity 1 to 5 quarters before the break of loss string. For instance, the coefficient on STRING1, 4.568, implies that 1 quarter before the loss reversal there are 4,568 more shares purchased by insiders, on average, relative to a firm-quarter non-loss-reversal profit quarters. Note that, when dependent variable is NETBUY2, the coefficient on STRING1 to STRING3 are significantly positive, while the coefficient on STRING4 and STRING5 are not significant, suggesting that there are greater number of shares purchased and more buying transactions by insiders during 4 and 5 quarters prior to the loss reversal but value of insider trades is not significantly different relative to non-loss-reversal profit quarters. The coefficient estimate on STRING6 to STRING12 are generally not significantly different form zero at 5% level, except for STRING10 when dependent variable is NETBUY2 and STRING10 and STRING11 when dependent variable is NETBUY3.

In general, both the significance level and the magnitude of coefficient on BREAK is weaker than those of STRING1 to STRING5, suggesting that insiders engage in less purchase just before announcing the break of a loss string, consistent with the explanation of litigation risk or scrutiny insiders face when they trade ahead of announcing important corporate news. On the other hand, significantly positive coefficient on BREAK and STRING1 are notable since Ke et al. [2003] find that insiders sales occurs between 3 to 9 quarters before the break of earnings increase. This may be because insiders face asymmetric litigation risk when announcing good news and bad news.

In sum, our findings in Table 4 suggest that insiders significantly buy more (sell less) stocks up to 5 quarters before they announce the break of loss strings.

4..3 Opportunistic versus Routine Trading Before Loss Reversals

While the findings up to now suggest that insiders engage in more buying or less selling activities up to 5 quarters before the loss reversal, it may be because trading behavior of insiders in loss firms is systematically different from those of insiders in profit firms for unidentifiable reasons which are not controlled in the model. Accordingly, we compare opportunistic insider trade patterns with routine insider trade patterns. If there is unobservable factors that systematically affect insider trading

in loss firms, that should affect both opportunistic and routine trade. On the other hand, if insiders have foreknowledge about the break of loss strings and trade on this private information, then only opportunistic buying should increase before the break but not routine trading.

Cohen et al. [2012] find that insider trading only by opportunistic traders possess information about firms' future, while abnormal returns associated with routine traders are not different form zero. Similar to Cohen et al. [2012], we define a trade as a routine trade if the insider placed a same direction of trade in the same calendar month at least three consecutive years. We define opportunistic trade as every transaction else, that is trades that we cannot detect an obvious discernible pattern. The essence of this approach is that, on average, trades made for information reasons are less likely to be regular in the timing, and trades made to diversification and liquidity reasons are more likely to be regular in their timing.

We measure NETBUY with opportunistic trades and routine trades separately, and require firm-quarter observations have at least one opportunistic trade or routine trade. Then, we estimate Eq.(2) with each dependent variable NETBUY.

Table 5 reports the result of insider trading intensity before the loss reversal. The patterns of opportunistic trades are similar to the findings of previous section. The coefficient on BREAK and STRING1 to STRING5 are significantly positive, except

the coefficient on STRING5 is not significant when using NETBUY1 as dependent variable, and only the coefficient estimates on STRING1 and STRING3 are significant when NETBUY2 is dependent variable. On the other hand, for routine trades, none of the coefficient on BREAK nor STRINGq are significant except for STRING5 when NETBUY1 is used as dependent variable.

Significantly negative coefficient on PIORRET indicate that both opportunistic trades and routine trades are increase after price drop and decline after price increase. While the coefficient on POSTRET6 and POSTRET12 are significantly positive for opportunistic trades, these coefficients are not significantly positive, even negative, for routine trades, which is consistent with Cohen et al. [2012] that routine trades do not earn abnormal returns.

In sum, our findings in Table 5 suggest that there are different trading patterns between opportunistic trades and routine trades before the break of loss strings, and that only opportunistic trades increase before the loss reversals. This finding suggest that insiders not only have foreknowledge about when the loss sting ends but also trade on this foreknowledge.

4..4 Returns to Insider Trades

The evidence presented to this point suggest that insider buying is more intense up to 5 quarters before the break of a loss string. If insiders have private information about the end of loss string, then it should be the case that insiders are better off,i.e. earn abnormal returns, buying prior to the loss reversal than they would be if the buying were postponed to after the break is announced. In this section, we investigate returns associated with insider trading before announcing the loss reversal.

We expect that when insiders buy in the quarters -q relative to loss reversal, the abnormal returns from the time of trade to the announcement of the break in loss string is positive. Otherwise, insiders would earn higher returns by postponing their purchase until after the reversal is announced. Further, in some firm-quarters insiders may sell stock before the reversal because of some bad new going on which is unrelated to the break of loss string. Thus, when insiders sell (i.e. NETBUY is negative), abnormal returns could be negative. Hence, we expect that abnormal returns subsequent to insider trading greater when insiders buy than when they sell.

We examine buy-and-hold abnormal returns that are associated with insider trades in each quarter -q relative to the announcement of break. When calculating buy-and-hold abnormal returns, we use two benchmark; size adjusted abnormal returns and four factor abnormal returns (Carhart [1997]). For insiders trade q

quarters prior to the break, abnormal returns are computed over 3*(q+1) calendar months that follows the earnings announcement in the previous quarter. For example, insider transactions that occurred in the quarter of the break (i.e. q=0), abnormal returns are computed over 3 months starting from next month of previous quarter's earnings announcement. Each observations are divided into Buy and Sell groups based on whether NETBUY for the firm-quarter is positive or negative.[5]

Panel A of Table 6 present the number of firm-quarter observations in each quarter -q relative to the announcement of break and the percentage of firm-quarters in the Buy and Sell group. The percentage of Sell observations is greater than that of Buy observations for every quarters prior to the break. There are more observations in the quarter near the ends of strings because there are more short loss strings than long strings.

Panel B and C of Table 6 reports the mean abnormal returns from the time of the insider trade to the announcement of the loss reversal. Further, to investigate whether the distributions of returns between Buy and Sell groups within the quarter are similar, we present p-values for Wilcoxon ranksum test. Consistent with our prediction, the mean abnormal returns is significantly positive for Buy group from quarters -4 to 0, where quarter 0 is the quarter of the break. This is also consistent

[5]Buy and Sell groups are divided based on NETBUY1, but when we divide firm-quarters based on other measures of insider trading, i.e. NETBUY2 and NETBUY3, the results are similar.

with the findings of previous section that insiders significantly buying more stocks up to 5 quarters prior to the break. On the other hand, the mean abnormal returns is only significantly positive for quarters -1 and 0 for Sell group. Inference is not affected by the choice of benchmark to calculate abnormal returns; i.e. the mean abnormal returns using four factor model yield similar results. The result of Wilcoxon ranksum test implies that there is significant difference in abnormal returns between Buy and Sell group for quarters -3 to -1.

In sum, results shown in Table 6 make it cleat that insider buying is not equally intense at each firm, and subsequent abnormal returns vary depending on whether insiders buy or sell stock.

5. Conclusion

In this study, we examines whether insiders have private information about loss persistence and trade upon such information by analyzing insider trading patterns before the end of a loss string. These questions are of interest because investors face difficulty in incorporating expected loss persistence into their valuation, thus investors may be able to get an important cue from insider trading, which subsequently can improve pricing efficiency of loss firms. While prior research document managers use of private information about persistence of losses when setting valua-

tion allowance(VA), it is not clear that insiders trade on such information because insiders are subject to increased scrutiny, regulation, and restrictions regarding their trading activities, especially for insiders in loss firms.

We first document significantly positive market reaction surrounding the announcement of the break, suggesting insiders' stronger incentives to buy stock prior to the break. Multivariate regression analysis of the trading patterns in the 12 quarters prior to the loss reversal show that there is an increased intensity of net insider purchase in the five to immediately before the announcement of the break after controlling for stock returns subsequent to the trade. We further find that this increased net insider buying only exist with opportunistic trades, not with routine trades. An analysis of abnormal returns over the period from the time of insider trades until the announcement of break show that the mean abnormal returns is significantly positive for firms in which insiders net buy stocks (Buy group), from quarters -4 to the quarter of the break. While accounting information is not helpful in predicting future prospects of loss firms, our study provide evidence that insider trading provide useful information about loss persistence to investors.

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Table 1
Sample Selection

Panel A : Firm-quarter sample selection

Sample Selection Criteria	Number of firm-quarters	Number of distinct firms
All firm-quarter observations with required quarterly data on Compustat and also appear on CRSP universe during sample period 1988–2010	490,008	15,115
With at least eight consecutive quarterly earnings data available to measure length of loss string	462,201	12,266
Firm-quarters that are not part of a loss string that ends after 2012 or that cannot identify the end of loss string	456,838	12,185
Firm-quarters in which the earnings announcement is made within 60days after the calendar quarter end	418,395	12,183
Firm-quarters with at least one insider transaction in the observation quarter	174,201	10,143
Firm-quarters with non-missing returns data to calculate prior, event, and post returns around earnings announcement	159,179	9,466
With positive book value of the equity and stock price at the end of the quarter above $1	154,775	9,258
Primary firm-quarter observations	154,775	9,258

Panel B : Insider trading sample selection

Sample Selection Criteria	Number of trading
All insider stock transactions made by officers and directors of firms that appear on CRSP universe during sample period 1988–2010	9,911,469
Reported transactions with sufficient level of accuracy and reasonableness (TFN Cleanse Indicator = 'R' or 'H')	5,870,019
Insider transactions occurred on the open market	2,978,088
Insider transactions occurred during non-blackout period (from one day after earnings announcement of the previous quarter to the end of the quarter)	2,246,959
With available transaction price and the number of shares	2,246,735
Primary insider trading observations	2,246,735

Table 2
Descriptive Statistics

Variable	Mean	Standard Deviation	25%	Median	75%
Panel A : 154,775 firm-quarters					
NETBUY1	-78.03	1,344.83	-46.67	-6.50	1.00
NETBUY2	-3.09	35.74	-1.11	-0.12	0.01
NETBUY3	-7.91	64.38	-6.00	-1.00	1.00
MVE	3,839.41	17,074.31	118.90	456.96	1,747.99
BM	0.59	0.51	0.29	0.49	0.74
DUR	0.83	3.12	0.00	0.00	0.00
PRIORRET	24.70	85.71	-13.55	11.98	41.58
EVENTRET	0.60	9.20	-3.42	0.11	4.28
POSTRET6	7.24	40.70	-12.50	4.24	21.53
POSTRET12	7.33	41.69	-12.37	4.38	21.49
Panel B : 9,686 firm-quarters that break a string of losses					
LEN_LOSS_STRING	2.38	3.28	1.00	1.00	2.00
LEN_POST_BREAK_PROFIT	8.00	12.12	1.00	3.00	9.00
UE	0.05	0.08	0.01	0.02	0.05
SAR(-30,1)	4.96	24.99	-7.17	1.64	12.82
SAR(-2,1)	2.61	11.65	-2.87	1.13	6.41

**Note:* This table presents descriptive statistics of the sample we use in this paper during the period 1988 to 2010. NETBUY1 is defined as the net total number of shares traded (purchase minus sale) from one day after earnings announcement of quarter q-1 to the end of quarter q. (in thousand shares) NETBUY2 is the net total value of trades (purchase minus sale) from one day after earnings announcement of quarter q-1 to the end of quarter q. (in million dollars) NETBUY3 is net total number of transactions (purchase minus sale) from one day after earnings announcement of quarter q-1 to the end of quarter q. MVE is the market value of the equity at the beginning of the quarter, in million dollars. BM is book-to-market ratio at the beginning of the quarter . DUR is the number of the quarters since the loss string began, inclusive of observation quarter. PRIORRET, defined as the raw returns over the previous 12 months ending the prior month of the earnings announcement (i.e. months -12 to -1). EVENTRET the raw returns for the period starting 2 days before to 1 day after the earnings announcement date(i.e. days -2 to 1). POSTRET6 and POSTRET12 are the raw returns for the first 6 months after the earnings announcement month (i.e. months 1 to 6), and for the next 6 months after the earnings announcement month (i.e. months 7 to 12). LEN_LOSS_STRING is defined as the number of consecutive loss quarters before the quarter that break a string of losses. LEN_POST_BREAK_PROFIT is the number of consecutive profit quarters following a string of losses. UE is defined as the size of profit, scaled by beginning of quarter total assets, in the first profit quarter following a string of losses minus the average magnitude of losses, scaled by beginning of quarter total assets, in prior quarters during the loss string. SAR(-2,1) is the size-adjusted buy-and-hold abnormal return for the period from 2 days before to 1 day after the announcement of break. SAR(-30,1) is the size-adjusted buy-and-hold abnormal return for the period from 30 days before to 1 day after the announcement of break.

Table 3
Stock Price Response to the Break of Loss String

		(1) SAR(-2,1)	(2) SAR(-30,1)
	Predicted Sign	Coefficient estimate	Coefficient estimate
LEN_LOSS_STRING	+	0.136 *	0.301 **
		(1.761)	(2.007)
LEN_POST_BREAK_PROFIT	+	0.067 ***	0.179 ***
		(5.283)	(6.544)
SIZE	-	-1.742 ***	-4.653 ***
		(-6.597)	(-8.898)
BM	+	0.512	3.313 ***
		(1.076)	(3.103)
UE	+	17.087 ***	35.926 ***
		(3.974)	(4.286)
Firm Fixed Effects		Included	Included
Year Quarter Fixed Effects		Included	Included
N		9686	9686
Adjusted R^2		0.052	0.125

Note:* This table presents the result from the regression of abnormal returns around the announcement of a break of a loss string on explanatory variables. SAR(-2,1) is the size-adjusted buy-and-hold abnormal return for the period from 2 days before to 1 day after the announcement of break. SAR(-30,1) is the size-adjusted buy-and-hold abnormal return for the period from 30 days before to 1 day after the announcement of break. LEN_LOSS_STRING is defined as the number of consecutive loss quarters before the quarter that break a string of losses. LEN_POST_BREAK_PROFIT is the number of consecutive profit quarters following a string of losses. Size is natural logarithm of the market value of the equity at the beginning of the quarter. BM is book-to-market ratio at the beginning of the quarter. UE is defined as the size of profit, scaled by beginning of quarter total assets, in the first profit quarter following a string of losses minus the average magnitude of losses, scaled by beginning of quarter total assets, in prior quarters during the loss string. Firm fixed effects and Year quarter fixed effects are included. Standard errors are clustered both at firm and quarter level following Gow et al.(2010). t-statistics are shown below the estimates in parentheses; 1%, 5%, and 10% statistical significance is indicated with *, **, and *, respectively.

Table 4
Insider Trading Patters Before Loss Reversals

	N (Dummy = 1)	Predicted Sign	(1) NETBUY1		(2) NETBUY2		(3) NETBUY3	
BREAK	9,686	?	2.432 **	(2.359)	0.064 *	(1.862)	0.570 ***	(4.849)
STRING1	9,189	?	4.568 ***	(3.670)	0.152 ***	(3.923)	0.603 ***	(4.539)
STRING2	4,116	?	4.283 ***	(2.732)	0.095 *	(1.925)	0.382 **	(2.139)
STRING3	2,421	?	7.354 ***	(4.151)	0.111 **	(2.175)	0.351 *	(1.750)
STRING4	1,643	?	6.724 ***	(3.094)	0.085	(1.353)	0.663 ***	(2.633)
STRING5	1,355	?	5.788 **	(2.113)	0.114	(1.629)	0.880 ***	(3.240)
STRING6	1,101	?	2.585	(0.880)	0.113	(1.334)	0.397	(1.213)
STRING7	920	?	0.205	(0.068)	0.055	(0.601)	0.426	(1.249)
STRING8	788	?	3.181	(1.039)	0.073	(0.883)	0.475	(1.415)
STRING9	654	?	6.137 *	(1.790)	0.119	(1.300)	0.814 *	(1.843)
STRING10	598	?	6.330 *	(1.912)	0.211 **	(2.137)	1.181 ***	(2.908)
STRING11	477	?	4.514	(0.868)	0.123	(0.976)	1.118 **	(2.447)
STRING12	374	?	-2.249	(-0.362)	-0.018	(-0.110)	0.402	(0.664)
BEGSTRING	2,796	?	0.177	(0.054)	-0.057	(-0.594)	0.338	(0.977)
SIZE		-	-17.664 ***	(-17.686)	-0.884 ***	(-20.882)	-1.679 ***	(-17.057)
BM		+	6.135 ***	(3.288)	0.078	(1.120)	1.030 ***	(4.790)
DUR		?	-1.165 ***	(-2.650)	-0.032 ***	(-2.658)	0.044	(0.930)
PRIORRET		-	-0.319 ***	(-21.555)	-0.011 ***	(-18.039)	-0.038 ***	(-19.422)
EVENTRET		+	0.246 ***	(6.757)	0.006 ***	(4.799)	0.026 ***	(7.626)
POSTRET6		+	0.083 ***	(6.255)	0.002 ***	(3.790)	0.008 ***	(5.982)
POSTRET12		+	0.053 ***	(4.492)	0.001 ***	(3.214)	0.005 ***	(4.375)
Firm Fixed Effects			Included		Included		Included	
Year Quarter Fixed Effects			Included		Included		Included	
N			154775		154775		154775	
Adjusted R^2			0.099		0.132		0.145	

Note:* This table presents the result from the regression of NETBUY on dummy variables denoting the time between the observation quarter and the subsequent break in loss string. NETBUY1 is defined as the net total number of shares traded (purchase minus sale) from one day after earnings announcement of quarter q-1 to the end of quarter q. (in thousand shares) NETBUY2 is the net total value of trades (purchase minus sale) from one day after earnings announcement of quarter q-1 to the end of quarter q. (in million dollars) NETBUY3 is net total number of transactions (purchase minus sale) from one day after earnings announcement of quarter q-1 to the end of quarter q. Size is natural logarithm of the market value of the firm at the beginning of the quarter. BREAK is an indicator variable equal to 1 if the loss string ends in that quarter, i.e. first profit quarter after a string of losses. STRINGq is an indicator variable equal to 1 if observation quarter is part of a loss string at least q quarters long and is q quarters before the break in a loss string, otherwise 0. BEGSTRING is indicator variable equal to 1 if observation quarter is part of a loss string and is more than 16 quarters before the break in a loss string, otherwise 0. BM is book-to-market ratio at the beginning of the quarter . DUR is the number of the quarters since the loss string began, inclusive of observation quarter. PRIORRET, defined as the raw returns over the previous 12 months ending the prior month of the earnings announcement (i.e. months -12 to -1). EVENTRET the raw returns for the period starting 2 days before to 1 day after the earnings announcement date(i.e. days -2 to 1). POSTRET6 and POSTRET12 are the raw returns for the first 6 months after the earnings announcement month (i.e. months 1 to 6), and for the next 6 months after the earnings announcement month (i.e. months 7 to 12). Firm fixed effects and Year quarter fixed effects are included. Standard errors are clustered both at firm and quarter level following Gow et al.(2010). t-statistics are shown below the estimates in parentheses; 1%, 5%, and 10% statistical significance is indicated with *, **, and *, respectively.

Table 5
Opportunistic versus Routine Trading Patters Before Loss Reversals

	Predicted Sign	Oppotunistic Trades			Routine Trades		
		(1) NETBUY1	(2) NETBUY2	(3) NETBUY3	(4) NETBUY1	(5) NETBUY2	(6) NETBUY3
BREAK	?	2.00 ** (2.17)	0.04 (1.35)	0.53 *** (4.96)	1.19 (0.47)	0.11 (1.14)	-0.03 (-0.09)
STRING1	?	3.87 *** (3.46)	0.13 *** (3.78)	0.52 *** (4.22)	1.36 (0.45)	0.06 (0.60)	0.02 (0.05)
STRING2	?	3.28 ** (2.24)	0.07 (1.61)	0.30 * (1.86)	0.71 (0.17)	-0.07 (-0.51)	-1.25 (-1.64)
STRING3	?	6.35 *** (3.83)	0.09 * (1.96)	0.38 ** (2.14)	-1.62 (-0.34)	-0.11 (-0.72)	-0.76 (-0.78)
STRING4	?	5.25 ** (2.45)	0.06 (1.01)	0.54 ** (2.28)	8.04 (1.24)	0.10 (0.53)	-0.19 (-0.19)
STRING5	?	3.68 (1.43)	0.08 (1.15)	0.70 *** (2.81)	10.85 * (1.82)	0.09 (0.52)	0.09 (0.09)
STRING6	?	1.07 (0.41)	0.06 (0.73)	0.23 (0.74)	9.15 (1.18)	0.37 (1.52)	1.04 (0.96)
STRING7	?	-0.16 (-0.06)	0.03 (0.32)	0.30 (0.95)	-4.62 (-0.59)	-0.07 (-0.28)	0.09 (0.07)
STRING8	?	0.74 (0.25)	0.03 (0.43)	0.24 (0.79)	0.69 (0.09)	0.15 (0.62)	0.16 (0.14)
STRING9	?	5.30 (1.60)	0.11 (1.26)	0.68 * (1.73)	-0.21 (-0.02)	0.02 (0.05)	-0.60 (-0.48)
STRING10	?	4.82 (1.56)	0.17 * (1.79)	1.06 *** (2.87)	13.81 (1.63)	0.43 (1.54)	-2.34 (-1.26)
STRING11	?	3.36 (0.65)	0.10 (0.82)	0.94 ** (2.18)	-2.18 (-0.21)	0.07 (0.28)	-2.26 (-1.13)
STRING12	?	-3.73 (-0.61)	-0.06 (-0.38)	0.29 (0.51)	6.78 (0.74)	0.20 (0.94)	0.15 (0.11)
BEGSTRING	?	-1.24 (-0.39)	-0.07 (-0.76)	0.12 (0.37)	5.34 (0.85)	0.36 * (1.85)	1.29 (0.92)
SIZE	-	-15.50 *** (-17.68)	-0.79 *** (-20.77)	-1.45 *** (-17.18)	-8.00 *** (-3.58)	-0.87 *** (-10.24)	-0.76 ** (-2.38)
BM	+	6.11 *** (3.59)	0.08 (1.31)	1.07 *** (5.42)	3.66 (0.62)	0.10 (0.46)	0.71 (0.72)
DUR	?	-0.83 ** (-2.04)	-0.03 ** (-2.46)	0.04 (1.00)	-1.94 (-1.61)	-0.02 (-0.50)	0.17 (0.71)
PRIORRET	-	-0.30 *** (-21.83)	-0.01 *** (-18.10)	-0.04 *** (-19.79)	-0.06 *** (-4.31)	-0.01 *** (-10.45)	-0.01 *** (-5.52)
EVENTRET	+	0.23 *** (6.32)	0.01 *** (4.40)	0.02 *** (7.62)	0.14 ** (2.02)	0.01 * (1.79)	0.03 *** (4.06)
POSTRET6	+	0.09 *** (7.68)	0.00 *** (4.73)	0.01 *** (7.44)	-0.01 (-0.55)	-0.00 (-1.07)	-0.01 ** (-2.41)
POSTRET12	+	0.06 *** (5.83)	0.00 *** (4.08)	0.01 *** (6.04)	0.02 (0.85)	0.00 (1.25)	-0.01 * (-1.78)
Firm Fixed Effects		Included	Included	Included	Included	Included	Included
Year Quarter Fixed Effects		Included	Included	Included	Included	Included	Included
N		151020	151020	151020	21551	21551	21551
Adjusted R^2		0.098	0.129	0.145	0.043	0.105	0.068

Note:* This table present the result from the regression of opportunistic NETBUY on dummy variables denoting the time between the observation quarter and the subsequent break in loss string. Similar to Cohen et al. (2012), opportunistic trades are defined as non-routine trades, where routine trades are the trades by insiders in the same calendar month for at least three consecutive years. NETBUY1 is defined as the net total number of shares traded (purchase minus sale) from one day after earnings announcement of quarter q-1 to the end of quarter q. (in thousand shares) NETBUY2 is the net total value of trades (purchase minus sale) from one day after earnings announcement of quarter q-1 to the end of quarter q. (in million dollars) NETBUY3 is net total number of transactions (purchase minus sale) from one day after earnings announcement of quarter q-1 to the end of quarter q. Size is natural logarithm of the market value of the firm at the beginning of the quarter. BREAK is an indicator variable equal to 1 if the loss string ends in that quarter, i.e. first profit quarter after a string of losses. STRINGq is an indicator variable equal to 1 if observation quarter is part of a loss string at least q quarters long and is q quarters before the break in a loss string, otherwise 0. BEGSTRING is indicator variable equal to 1 if observation quarter is part of a loss string and is more than 16 quarters before the break in a loss string, otherwise 0. BM is book-to-market ratio at the beginning of the quarter . DUR is the number of the quarters since the loss string began, inclusive of observation quarter. PRIORRET, defined as the raw returns over the previous 12 months ending the prior month of the earnings announcement (i.e. months -12 to -1). EVENTRET the raw returns for the period starting 2 days before to 1 day after the earnings announcement date(i.e. days -2 to 1). POSTRET6 and POSTRET12 are the raw returns for the first 6 months after the earnings announcement month (i.e. months 1 to 6), and for the next 6 months after the earnings announcement month (i.e. months 7 to 12). Firm fixed effects and Year quarter fixed effects are included. Standard errors are clustered both at firm and quarter level following Gow et al.(2010). t-statistics are shown below the estimates in parentheses; 1%, 5%, and 10% statistical significance is indicated with *, **, and *, respectively.

Table6

Abnormal returns from the end of the observation quarter untile the break, by direction of insider trade

Quarter relative to the break	*Panel A* % of net buy and net sell			*Panel B* Size adjusted abnormal returns from the observation quarter to the break		P-value for Wilcoxon Rank-sum test	*Panel C* Four factors abnormal returns from the observation quarter to the break		P-value for Wilcoxon Rank-sum test
	N	% Buy	% Sell	Buy	Sell	Buy vs. Sell	Buy	Sell	Buy vs. Sell
0	9,603	45.2%	54.5%	9.17 ***	4.85 ***	0.30	8.24 ***	4.14 ***	0.13
-1	9,105	42.7%	56.9%	9.51 ***	3.17 ***	0.00	6.90 ***	1.88 ***	0.00
-2	4,082	47.6%	52.0%	14.57 ***	1.09	0.00	10.73 ***	-0.36	0.00
-3	2,382	47.9%	51.6%	16.63 ***	3.00	0.01	11.09 ***	2.25	0.19
-4	1,614	49.1%	50.2%	15.48 ***	0.03	0.29	10.27 **	-2.80	0.54
-5	1,307	47.8%	51.9%	1.90	-6.03	0.73	0.50	-6.71	0.52
-6	1,082	44.5%	55.2%	0.21	-17.53 ***	0.15	-3.07	-20.55 ***	0.08
-7	900	45.2%	54.6%	0.82	-18.53 ***	0.79	-9.76	-23.43 ***	0.94
-8	755	45.2%	54.4%	1.10	-31.49 ***	0.02	-3.45	-28.71 ***	0.40
-9	629	43.6%	55.8%	-13.63 *	-35.71 ***	0.42	-23.12 ***	-21.05 **	0.25
-10	574	43.4%	56.4%	-22.97 ***	-40.23 ***	0.23	-36.55 ***	-41.90 ***	0.99
-11	454	41.9%	57.3%	-10.89	-41.70 ***	0.08	-28.67 *	-39.95 ***	0.65
-12	365	40.0%	60.0%	-5.29	-42.31 ***	0.03	-5.31	-33.99 ***	0.37

Note: This table reports the mean abnormal returns from the time of the insider trade to the announcement of the loss reversal., and compares the abnormal returns between Buy and Sell subgroups in each quarter. Firm-quarter observations are grouped according to the number of quarters until the break of loss strings. The observations are further divided to subgroups according to whether the value of NETBUY1 is positive (net insider purchase firm-quarters), zero (net no trade firm-quarters), or negative (net insider sales firm-quarters). NETBUY1 is defined as the net total number of shares traded (purchase minus sale) from one day after earnings announcement of quarter q-1 to the end of quarter q. Panel A reports the number of firm-quarters, and the percentage of net insider buying(selling) firm-quarters. Panel B reports the size-adjusted buy-and-hold abnormal returns insiders might have earned through their trading. For insiders trade q quarters prior to the break, abnormal returns are computed over 3*(q+1) calendar months that follows the earnings announcement in the previous quarter. For example, insider transactions that occurred in the quarter of the break (i.e. q=0), abnormal returns are computed over 3 months starting from next month of previous quarter's earnings announcement. In Panel C, abnormal returns are calculated based on Carhart's(1997) four-factor model. 1%, 5%, and 10% statistical significance is indicated with ***, **, and *, respectively.