



The Timing of Insider Trades around Earnings Announcements: Evidence from CEOs, CFOs, and COOs

Yong-Chul Shin,^a Weimin Wang,^b

a. Assistant Professor of Accounting College of Management University
of Massachusetts Boston 100 Morrissey Blvd. Boston, MA 02125,
U.S.A.

b. Assistant Professor of Accounting John Cook School of Business Saint
Louis University 3674 Lindell Boulevard St. Louis, MO 63108, U.S.A.

Abstract: This paper examines whether top managers time their trades of company stocks based on their private knowledge of current earnings report as well as future earnings prospects. We investigate insider trades made by CEOs, CFOs, and COOs before and after earnings announcement date. We find evidence that managers take advantage of their superior knowledge of future earnings prospects and opportunistically time their trades to exploit information in both current earnings report and future earnings. When current quarter earnings report contradicts future earnings prospect, CFOs buy (sell) more shares after a bad (good) earnings report in anticipation of good (bad) future earnings. When current earnings report is consistent with future earnings prospects, all managers buy more shares before good earnings news. This paper is the first attempt to examine top managers' timing of insider trades conditional on both the current earnings news and future earnings prospects.

Keywords: insider trading, quarterly earnings announcements, future earnings prospects, chief financial officers (CFOs).

1. Introduction

Top executives can possess private information about the earnings prospects of the firm because they are intimately involved in forming and implementing the corporate strategy, overseeing operations and finance, and producing

accounting reports. Because of their information advantage over other investors, U.S. securities laws¹ prohibit corporate insiders (including but not limited to top executives) from trading on private company news² (Bloomenthal, 1995). However, whether illegal trading takes place or not can be hard to prove as it is confounded by the fact that managers will need to trade shares for legitimate purposes such as personal consumption, diversification of wealth, and liquidity (e.g., repayment of loans). So managers can still trade opportunistically on insider information as long as they can mask it as legitimate transactions.

Recent corporate scandals often reveal that executives sell their company shares before bad news (e.g., Enron and Global Crossing). While these much publicized stories are only anecdotal, it is necessary to investigate whether corporate insiders in general act opportunistically in trading behavior. It will be of grave concern to the investing public and regulators if there is a general pattern of managers profiting from inside information at the expense of other shareholders.

In contrast to past studies that investigate the timing of insider trades around a single period earnings report (for example, Sivakumar and Waymire, 1994; Noe 1999), we investigate whether top executives trade opportunistically using information about future earnings prospects as well as current earning reports. Such a research setting bears two advantages. First, optimal trades that yield the best trading profit for insiders should be timed with respect to both current period earnings news and future period earnings prospects. For example, when current period earnings news is bad but future period earnings prospects are good³, the insider should purchase (or refrain from selling) shares *after* the release of bad news concerning current period earnings to take full advantage of the information. Simply focusing on a single period earnings report may not detect the opportunistic trading pattern in this case because it would appear that the insider just engages in innocuous contrarian trading (buying after bad news). Second, trading before an imminent earnings report carries high risk of litigation costs to insiders. As a result, rational insiders are more likely to trade upon information about future prospects than current period earnings release (see Ke, Huddart, and Petroni, 2003 for an

¹ SEC Act 1934 Section 16 and Insider Trading and Securities Fraud Enforcement Act of 1984 and 1988.

² In this paper, we use insider trading to refer to all trades of company stock by top executives from their personal or controlled accounts. As is customary in many accounting and finance research, insider trading in this paper does not necessarily imply wrongdoing. In contrast, in legal terms “insider trading” refers to trading on company news not yet made public, which is in direct violation of U.S. securities law.

³ Here it is assumed that information about future prospects is private information and not known to the public. The public act on the information in current earnings report only.

example). Focusing on future earnings prospects increases the power to detect opportunistic trading patterns.

Another feature of this study is that we separately examine the trading patterns of chief executive officers (CEOs), chief financial officers (CFOs), and chief operating officers (COOs). Extant insider trading literature usually treats these top executives as a homogeneous entity (e.g., Jaffe, 1974; Finnerty, 1976; Seyhun, 1986, 1998; Rozeff and Zaman, 1988; Lin and Howe, 1990; Jeng, Metrick, and Zeckhauser, 2003). However, they may differ in their incentives, financial expertise, decision capacities, and/or the amount of public scrutiny of their actions, which may differentially impact their trading behavior. Especially, CFOs, by virtue of their responsibilities and expertise, may possess better information about the future performance of the firm than other executives (Tuna, 2008; Jiang, Petroni, and Wang, 2010). Wang, Shin, and Francis (2011) find that CFO trades are more informative than CEO trades and CFOs incorporate more information about future earnings than CEOs.

We predict that top executives (CEOs, CFOs, and COOs)⁴ opportunistically time their trades to exploit information of both current earnings report and future earnings prospects. Specifically, we predict that when current quarter earnings report contradicts future earnings prospects⁵, managers will buy more shares *after* a bad earnings report in anticipation of good future earnings and sell more shares *after* a good earnings report in anticipation of bad future earnings. We also predict that when current earnings report is consistent with future earnings prospects, managers will buy more shares *before* good earnings news and sell more shares *before* bad earnings news. The timing aspect of insider trade is of particular interest because it gives the insiders extra trading gains beyond simply trading on news in the current period.

⁴ We also looked at other top level titles in the corporation such as president and senior vice president. One difficulty with including these titles is that they have substantial overlap with CEOs, CFOs, and COOs. It is not usually for an executive to be president (or senior vice president) and COO (or CFO) at the same time. This makes interpretation of results difficult. Therefore, we only report the results for the CEOs, CFOs, and COOs which are usually different persons in a corporation.

⁵ Current earnings news may contradict with future prospects for a number of reasons. It could be the result of a turnaround (or the opposite), or the probable success of a new line of business that nonetheless requires heavy initial spending. It could also be due to a seasonal effect. For example, if some big-ticket sales are not closed by current fiscal quarter end, it will not be booked as current period revenues, but will be booked as revenues for the next period. As a result, current period earnings will be depressed and the next period earnings will be inflated.

Our empirical results provide some support for our predictions. On whether managers opportunistically time their trade on private knowledge about future earnings prospects, we find the following regularities. First, when current earnings report contradicts future prospects, we find that CFOs, but not CEOs or COOs, buy more shares after a bad earnings report when future prospects are good and sell more shares after a good earnings report when future prospects are bad. Second, when current earnings report is consistent with future prospect, there is significantly more buying before good earnings report for all managers. However, the buying is conditional on good future prospects only. There is significantly less buying before a good current report when future prospects are bad. We find no evidence of more selling before bad earnings report and bad future prospects.

In addition to the evidence about managers' active trades, our results also suggest that they benefit from knowledge of future earnings prospects by carefully avoiding trading at non-optimal time. We find that managers buy fewer shares when future earnings prospects are bad, even though the upcoming quarter earnings news is good. They also sell fewer shares when future prospects are good.

This paper contributes to the literature in two ways. First, we examine whether and how insiders time their trades around quarterly earnings announcements to take advantage of their superior knowledge about the future earnings prospects of the firm. Past research has examined insider trading activities around a single information event such as management earnings forecast (Noe, 1999; Penman, 1982), new issue announcements (Karpov and Lee, 1991), stock repurchase announcements (Lee, Mikkleson, and Partch, 1992), bankruptcy news (Seyhun and Bradley, 1997), or dividend announcements (John and Lang, 1991). However, quarterly earnings release is arguably an even more important form of information disclosure. In addition, quarterly earnings release is observed more frequently since it is done by practically all public companies. Thus the results obtained in this sample are potentially more representative. So far, research on the relation between insider trading and earnings report has found either no evidence of opportunistic trading in the short window (Sivakumar and Waymire, 1994) or evidence in the long window only (Ke et al., 2003)⁶. In this study, we present evidence of opportunistic trading in the short window both before and after earnings release.

Second, this paper finds empirical evidence that suggests that CFOs take advantage of the firm's future earnings prospects and time their trading in such a

⁶ Ke et al. (2003) find abnormal selling as early as three to nine quarters before bad earnings news.

way that capitalizes on both the nature of current earnings news and their private knowledge of future earnings. Recent studies have pointed to the important influence of CFOs in financial decisions of the firm (e.g. Jiang et al., 2010) and find that CFO trades contain more information than CEO trades (Wang et al., 2011). In this study, we find that CFOs not only utilize information about future earnings prospects in their trades, they also time their trades to take advantage of the disagreement between current earnings report and future earnings prospects.

The rest of the paper is organized as follows. Section 2 discusses literature and our predictions about top managers' trading patterns. Section 3 describes data and research design. Section 4 presents empirical results. Section 5 summarizes and concludes.

2. Literature Review and Predictions

Several studies have shown that insiders possess information advantage over other market participants by documenting significant abnormal returns after insiders traded (e.g., Jaffe, 1974; Seyhun, 1986; Rozeff and Zaman, 1998; Lakonishok and Lee, 2001, among others). However, these studies do not specifically identify the type of information insiders trade on. Other studies link insider trading to specific information events such as new issue announcements (Karpov and Lee, 1991), stock repurchase announcements (Lee, Mikkleson, and Partch, 1992), bankruptcy news (Seyhun and Bradley, 1997), or dividend announcements (John and Lang, 1991). Evidence in these studies is consistent with managers having private knowledge of such information and capitalizing on it through trading prior to its public disclosure.

Penman (1982) studies insider trading around managers' voluntary earnings forecast disclosure and finds that managers opportunistically trade around earnings forecast. Noe (1999) also examines the relation between management forecast and insider trading. He finds evidence of insiders taking advantage of the long term prospects of the firm but finds no evidence of opportunistic trading in the short window before voluntary disclosures.

A more frequent, and arguably more important form of information event is the quarterly earnings announcement. Sivakumar and Waymire (1994) and Ke et al. (2003) examine the relation between insider trading and mandatory quarterly earnings news, which is also the subject of our study. Sivakumar and Waymire (1994) find no correlation between insider trading in one quarter and next quarter's

forecast errors. Ke et al. (2003) study a particular type of earnings news: an earnings decrease (“break”) after a long string of consecutive increases in quarterly earnings. They find no evidence of insider selling in the short window prior to the break, although they find significant insider selling in the long window (trading occurs three to nine month before the bad news is released). Our study is different from theirs in that we not only examine insider trades around earnings announcements but also examine them in conjunction with firms’ future earnings prospects. We consider specific timing patterns of insider trades (both buying and selling). Our sample is also more general and not restricted to a particular type of earnings news.

Our first set of predictions considers the question whether top executives act opportunistically in their trading of company shares before quarterly earnings reports. We predict that if top managers capitalize on private information about forthcoming quarterly earnings, they will (1) purchase more shares in advance of a good earnings report (Prediction 1, P1), and (2) sell more shares in advance of a bad earnings report (Prediction 2, P2).

Figure 1
Optimal/Opportunistic Timing for Insider Trading with respect to Current Earnings Report and Future Earnings Prospects (Optimal Trading Action in Bold.)

Pre-Announcement Period (30 days)	Current Quarter Earnings Announcement	Post-Announcement Period (30 days)		Future Earnings Prospects
	Good report	SELL⁽³⁾ (Less Buying)		Bad
BUY⁽¹⁾ (Less Selling)	Good report			Good
SELL⁽⁴⁾ (Less Buying)	Bad report			Bad
	Bad report	BUY⁽²⁾ (Less Selling)		Good

(1): Prediction 1a; (2): Prediction 2a; (3): Prediction 3a; (4): Prediction 4a.

Our second set of predictions considers the question whether managers take advantage of their superior knowledge of companies’ earnings prospects beyond the current quarter. Insider trades on impending earnings news entail a high likelihood that they will be discovered, therefore subject managers to increased risk of regulator enforcement and litigation. However, if managers have private

information about the firm's future earnings prospects and act on it, insider trading will be harder to detect and wrongdoing will be harder to prove. Another reason for managers to trade on such information is that in many cases future prospects are not reflected in or even contradicted by current earnings reports. If the managers expect the market to be ignorant about future earnings prospects and react only to current earnings news, they could make extra profits by timing their trades conditional on both current earnings report and future earnings prospects. Figure 1 illustrates the optimal/opportunistic timing of insider trades that exploit information in both current earnings report and future earnings prospects.

Based on the timing pattern as illustrated in Figure 1, we predict that managers will:

(Prediction 1a, P1a) purchase more shares before good earnings report, in anticipation of good future earnings prospects,

(Prediction 2a, P2a) purchase more shares after bad earnings report, in anticipation of good future earnings prospects,

(Prediction 3a, P3a) sell more shares after good earnings report, in anticipation of bad future earnings prospects, and

(Prediction 4a, P4a) sell more shares before bad earnings report, in anticipation of bad future earnings prospects.

The above predictions assume that managers will act on their private information about current earnings and future prospects. However, managers may also profit from such information without actively trading on it. For example, under the same circumstance as in P2a, i.e., current earnings report is bad but future earnings prospect is good, managers could refrain from or postpone selling shares instead of buying more shares. It is safe for managers to utilize their private information in this non-active manner because wrongdoing cannot be proven by non-action. So consistent with managers having prior knowledge of both current earnings news and future earnings prospects, we will observe that managers:

(Prediction 1b, P1b) sell fewer shares before good earnings report, in anticipation of good future earnings prospects,

(Prediction 2b, P2b) sell fewer shares after bad earnings report, in anticipation of good future earnings prospects,

(Prediction 3b, P3b) buy less shares after good earnings report, in anticipation of bad future earnings prospects, and

(Prediction 4b, P4b) buy less shares before bad earnings report, in anticipation of bad future earnings prospects.

It should be noted that even though the predictions P1b through P4b allow managers to profit from inside information, they do not constitute evidence of opportunistic trading because no trading takes place. Therefore, our analysis will focus on predictions P1a through P4a.

3. Data and Research Design

3.1 Data

Analysts' forecasts data are obtained from I/B/E/S. For the purpose of this study, the published consensus forecasts closest to quarterly earnings announcement dates were used. Company financial data are from COMPUSTAT. Insider trading data are obtained from the Insider Trading Database (Table One Data File) by Thomson Financial. Our sample covers the period from 1992 to 2001, inclusive. We stop our sample period at 2001 because the Sarbanes Oxley Act of 2002 (SOX) significantly changed the disclosure practice of insider trades.⁷ Such changes could deter top executives from trading on private information because their trades are more easily scrutinized after SOX. A pre-SOX sample increases the power of our tests.

Insider trades are defined as open market purchases or sales made by CEOs, CFOs, and COOs. We examine insider purchases and sales separately in this study. Most other studies use some measure of net sales (total sales minus total purchases) or net purchases. But treating purchases and sales separately is preferable in this study for two reasons. First, we make specific predictions about the timing of

⁷ For example, prior to SOX, insiders had until the tenth day of the following month to disclose their trades. So a trade that took place on March 1st could be filed with the SEC by April 10th with a reporting lag as long as 40 days. After SOX, insiders must disclose their trades within two days of the transactions.

purchases as well as sales. Second, we also examine the trading behavior of CEOs, CFOs, and COOs separately. Netting sales with purchases makes little sense since it is unlikely that a particular executive (e.g., CFO) will make a purchase transaction and a sale transaction on the same day. We use the dollar amount of transactions scaled by total market value of the firm to measure insider trades. Because insider trading incentives are strictly monetary, dollar value of transactions should be the appropriate measure of the magnitude of insider trades. Scaling by market value of the firm is also appropriate because small cap firms typically pay their managers less. So a small amount of insider trades in a small firm has the same impact on its managers (and investors) as a large amount of insider trades in a large firm. We also use total book value as a scaling variable. The results are similar. Alternatively, we also measure insider trades by the percentage of insider shares traded to total shares outstanding. We do not find material differences in our results, either.

Table 1 provides summary statistics for the resulting sample of insider trades. Panel A provides mean and median statistics for the combined sample. Panels B and C provide statistics for the separate samples of CEOs, CFOs, and COOs.

The mean insider purchase is \$199,455. The mean insider sale is \$824,048. The mean sale amount is larger than purchase amount, which is consistent with prior studies that insiders are net sellers⁸. The median purchase and sale amounts are \$16,250 and \$187,975, respectively. The distribution is skewed. The median market value of the firm is \$635 million. So the typical company is a small cap firm. Median total asset is \$355 million.

Among the top executives, CEOs trade most frequently and COOs least frequently. CEOs' mean trading amount as a percentage of the total market value of the firm is also the highest. This is perhaps due to the fact that they are the most highly compensated officers in the companies. However, median insider sale amounts are not much different among CEOs, CFOs, and COOs. On average, each purchase transaction is 0.06%, 0.02%, and 0.03% of firm's market value for trades by CEO, CFO, and COO, respectively. The median purchase amount is 0.01%, 0.006%, and 0.005%, respectively. On average, each sale transaction is 0.11%, 0.04%, and 0.05% of firm's market value for trades by CEO, CFO, and COO,

⁸ Top executives typically receive a large number of shares through option grants, not through open market purchases. So they need to be net sellers to finance consumption or rebalance their portfolio.

respectively. The median purchase amount is 0.02%, 0.01%, and 0.02%, respectively. Each subgroup is net seller of stocks.

Table 1
Descriptive Statistics

Panel A Descriptive Statistics

	Mean	S.D.	25%	Median	75%
Insider Purchase Amount (\$)	199,455.4	2,313,766.4	4,940.0	16,250.0	58,427.4
Insider Sale Amount (\$)	824,048.8	4,152,995.3	59,200.0	187,975.0	550,000.0
Market Value of Firm (MM\$)	4,448.2	13,125.4	185.5	635.1	2,521.5
Total Assets of Firm (MM\$)	4,239.5	15,768.6	131.0	355.1	1,649.9

Panel B Insider Purchase Amount Scaled by Market Value (1/1000) by Position

	Frequency	Mean	S.D.	25%	Median	75%
CEO	6,213	0.617	6.509	0.032	0.102	0.330
CFO	2,395	0.192	0.860	0.020	0.058	0.166
COO	821	0.299	1.358	0.016	0.054	0.183
All	9,382	0.478	5.324	0.025	0.084	0.265

Panel C Insider Sale Amount Scaled by Market Value (1/1000) by Position

	Frequency	Mean	S.D.	25%	Median	75%
CEO	10,917	1.127	16.446	0.039	0.174	0.561
CFO	5,848	0.388	1.190	0.044	0.143	0.369
COO	2,593	0.534	1.432	0.049	0.166	0.472
All	19,167	0.829	12.445	0.042	0.162	0.485

Table 2 shows the frequency and amount of insider trades around earnings announcement date. About half (51%) of all insider trades occur during the 30-day window after earnings announcements, with the rest occur in the 30-day pre-announcement window (18%) and 31% in the middle 30 days of the quarter. This is consistent with the finding in other studies. Also many firms have blackout days prior to earnings announcement. Insiders who want to avoid the suspicious of opportunistic trading may also want to trade after earnings announcement when information asymmetry is the lowest and avoid trading in the pre-announcement window when information asymmetry is the highest. Given that, it is remarkable to

still find 18% of trades that take place in the pre-announcement window. It is also interesting to note that the mean dollar amount of trades as a percentage of total market value of the firm is much larger in the pre-announcement window than in other windows. In purchase trades, the mean dollar amount is more than twice as large as the magnitude of trades in the other two windows. In sale trades, the mean dollar amount in the pre-announcement window is also more than twice the amount of post announcement window trades and is significantly larger than the amount in the middle window.

Table 2

Insider Trading Activities around the Earnings Announcement by Date and Position

		Pre-Announcement (30 days)	Post-Announcement (30 days)	Other Days in-between (30 days)
Insider Purchase Frequency	CEO	1,128 (18.87%)	3,170 (50.21%)	2,016 (31.93%)
	CFO	443 (18.16%)	1,271 (52.11%)	725 (29.73%)
	COO	153 (18.15%)	446 (52.91%)	244 (28.94%)
	All	1,719 (18.00%)	4,876 (51.06%)	2,954 (30.94%)
Mean Purchase Amount Scaled by Market Value (1/1000)	CEO	1.239	0.444	0.543
	CFO	0.199	0.204	0.160
	COO	0.402	0.192	0.420
	All	0.900	0.358	0.430
Insider Sale Frequency	CEO	1,029 (9.38%)	6,973 (63.58%)	2,966 (27.04%)
	CFO	512 (8.68%)	3,728 (63.17%)	1,662 (28.16%)
	COO	210 (8.05%)	1,644 (63.04%)	754 (28.91%)
	All	1,747 (9.06%)	12,230 (63.41%)	5,309 (27.53%)
Mean Sale Amount Scaled by Market Value (1/1000)	CEO	1.915	0.846	1.528
	CFO	0.444	0.373	0.417
	COO	0.604	0.513	0.552
	All	1.326	0.661	1.061

3.2 Research Design

Our primary interest is in two questions. The first question is whether top managers act opportunistically upon current period earnings information by (1)

buying shares before good earnings report (P1), and (2) selling shares before bad earnings report (P2).

We define bad earning report as earnings missing analysts' consensus forecasts because both the literature and popular press have indicated that missing analysts' forecasts is costly to firms' share price (Bartov, Givoly and Hayn, 2002; Kasznik and McNichols, 2002). Similarly, we define good reports as earnings meeting or beating consensus forecasts. The following equations are estimated:

$$\text{PURCHASE} = a_0 + a_1 \text{PRE} + a_2 \text{PRE} * \text{MISS} + a_3 \text{POST} + a_4 \text{POST} * \text{MISS} + \varepsilon \quad (1.1)$$

$$\text{SALE} = b_0 + b_1 \text{PRE} + b_2 \text{PRE} * \text{MISS} + b_3 \text{POST} + b_4 \text{POST} * \text{MISS} + \varepsilon \quad (1.2)$$

where PURCHASE is the dollar amount of an insider purchase scaled by total market value of the company and SALE is the dollar amount of an insider sale scaled by total market value of the company. The insiders are top three executives: CEOs, CFOs, and COOs. PRE is a dummy variable that takes the value of one if the trading date falls 30 days before earnings announcement date, zero otherwise. POST is a dummy variable that takes the value of one if the trading date falls 30 days after earnings announcement date, zero otherwise. MISS is a dummy variable that takes the value of one if earnings in the current quarter miss consensus analysts' forecast (bad earnings report), zero otherwise (good earnings report).

If managers purchase shares before good earnings report, a_1 will be positive. If they sell shares ahead of bad earnings report, b_2 will be positive. We also include dummies variables for post earnings release days to be consistent with subsequent analyses.

The second question we are interested in is whether top managers take advantage of their superior knowledge of the company's future earnings prospects. To test our predictions, we estimate the following equations:

$$\text{PURCHASE} = c_0 + c_1 \text{PRE} + c_2 \text{PRE} * \text{MISS} + c_3 \text{PRE} * \text{FUTURE_BAD} + c_4 \text{POST} + c_5 \text{POST} * \text{MISS} + c_6 \text{POST} * \text{FUTURE_BAD} + \varepsilon \quad (2.1)$$

$$\text{SALE} = d_0 + d_1 \text{PRE} + d_2 \text{PRE} * \text{MISS} + d_3 \text{PRE} * \text{FUTURE_BAD} + d_4 \text{POST} + d_5 \text{POST} * \text{MISS} + d_6 \text{POST} * \text{FUTURE_BAD} + \varepsilon, \quad (2.2)$$

$$\text{PURCHASE} = f_0 + f_1 \text{PRE} + f_2 \text{PRE} * \text{MISS} + f_3 \text{PRE} * \text{MISS} * \text{FUTURE_BAD} \\ + f_4 \text{POST} + f_5 \text{POST} * \text{MISS} + f_6 \text{POST} * \text{MISS} * \text{FUTURE_BAD} + \varepsilon \quad (3.1)$$

$$\text{SALE} = g_0 + g_1 \text{PRE} + g_2 \text{PRE} * \text{MISS} + g_3 \text{PRE} * \text{MISS} * \text{FUTURE_BAD} \\ + g_4 \text{POST} + b_5 \text{POST} * \text{MISS} + g_6 \text{POST} * \text{MISS} * \text{FUTURE_BAD} + \varepsilon \quad (3.2)$$

where SALE, PURCHASE, PRE, POST and MISS are the same as previously defined. FUTURE_BAD is a proxy for future earnings prospect. In this paper, we define it as a dummy variable that takes the value of one if earnings miss consensus earnings forecast in the next quarter (future prospect bad), zero otherwise (future prospect good). We use analysts' forecasts as benchmark for future earnings prospects because analysts' forecasts are a good measure of the market expectation of earnings (Brown, Richardson, and Schwager, 1987). Missing analysts' forecasts generally causes price drop and reduces the value of managers' holdings.

All the equations are necessary because they enable us to examine the timing of insider trading activities under different combinations of events. For example, in equation (3.2), a positive coefficient on PRE*MISS*FUTURE_BAD indicates that *before* current quarter earnings release, top executives make significantly more sales when current earnings report is bad and future earnings prospect is bad than when current earnings report is bad but future earnings prospect is good. For another example, in equation (2.1), a positive coefficient on POST*MISS indicates that *after* current earnings release, top executives make significantly more purchases when current earnings report is bad but future prospect is good than when current report is good and future prospect is good.

4. Empirical Results

4.1 Do managers capitalize on information about current period earnings?

Results for estimating equations (1.1) and (1.2) are shown in table 3. We present results for the full sample (CEO, CFO, and COO combined), the CEO/COO subsample, and the CFO subsample⁹. P-values are presented in the parentheses and significant coefficients are in bold type. In the full sample, the coefficient on PRE is positive and significant at 1% level in the panel A for the

⁹ We originally estimated the CEO and COO samples separately. But since the results for these two groups are very similar, we only report the results of the combined sample.

PURCHASE equation (1.1). This shows that top managers as a whole engage in more buying one month before the release of a good earnings report. Our first prediction (P1) is confirmed. However, the results are mixed in the subgroups. While CEOs and COOs are making significantly more purchases before a good earnings report, CFOs are not (the coefficient has a positive sign but is insignificant). In fact, the coefficient on POST*MISS of CFO in the panel A is significantly positive, which shows that the CFOs engage in significantly more purchase after a bad earnings report, an apparently puzzling result. We later show that CFOs' purchases after a bad report are in fact conditional on good future earnings prospects.

Turning to the results in the panel B for the SALE equation (1.2), we find mixed evidence for our second prediction (P2) – insider selling of company stocks before a bad earnings report. For the full sample of top managers and for the subsample of CEOs and COOs, the coefficients on PRE*MISS are not significant, i.e., no evidence of opportunistic selling before bad news. However, the coefficient is significant in the CFO sample indicating that CFOs make significantly more sales during the month prior to a bad earnings report.

The other significant coefficients are on POST (negative) for all groups, and on POST*MISS (positive) for the CFO group in the panel B. They suggest that top managers sell significantly less after a good earnings report and CFOs sell more after a bad earnings report.

Table 3 provides mixed results for opportunistic behavior by top executives' trading on current earnings information. On the one hand, managers especially CEOs and COOs make more insider purchases before good earnings report. On the other hand, only CFOs, but not CEOs or COOs, sell shares before a bad earnings report. These results suggest that if CEOs and COOs have prior knowledge of the impending earnings news, they take advantage of them through a rather subtle manner by buying shares in advance of good news but refraining from selling shares before bad news. Popular press coverage usually focuses on insiders' selling of shares before imminent bad news, but less on purchase before good news. This may be the reason why we find evidence of opportunistic buying but not selling (except for CFOs). Of interest is the result that CFOs seem to be acting in a different manner than his colleagues in top management. In later analysis, we examine the trading activities of CFOs separately from the other top managers.

Table 3**Insider Trading Activities around Earnings Announcement of Current Missing Forecasts Quarter****Panel A Insider Purchase Activity**

	Full Sample	CEO & COO	CFO
Intercept	0.00045 (<0.0001)	0.00054 (<0.0001)	0.00017 (<0.0001)
Pre	0.00054 (0.0035)	0.00075 (0.0026)	0.00001 (0.8932)
Pre*Miss	-0.00021 (0.4185)	-0.00035 (0.3249)	0.00005 (0.5315)
Post	-0.00017 (0.1934)	-0.00021 (0.2351)	-0.00002 (0.5824)
Post*Miss	0.00019 (0.2418)	0.00019 (0.3822)	0.00017 (0.0008)
R²	0.0017	0.0017	0.0036
N	9,381	7,016	2,394

Panel B Insider Sale Activity

	Full Sample	CEO & COO	CFO
Intercept	0.00106 (<0.0001)	0.00133 (<0.0001)	0.00041 (<0.0001)
Pre	0.00035 (0.3520)	0.00050 (0.3505)	-0.00004 (0.5321)
Pre*Miss	-0.00022 (0.7513)	-0.00045 (0.6569)	0.00032 (0.0087)
Post	-0.00042 (0.0462)	-0.00057 (0.0579)	-0.00007 (0.0616)
Post*Miss	0.00011 (0.7075)	0.00009 (0.8239)	0.00015 (0.0023)
R²	0.0002	0.0002	0.0026
N	19,166	13,477	5,847

Variables:

The dependent variable in the model is the insider trading \$ amount scaled by market value of the firm.

PRE: a dummy variable that takes the value of one if the trading date falls 30 days before earnings announcement date, zero otherwise.

POST: a dummy variable that takes the value of one if the trading date falls 30 days after earnings announcement date, zero otherwise.

MISS: a dummy variable that takes the value of one if earnings in the current quarter miss consensus analysts' forecast (bad earnings report), zero otherwise (good earnings report).

The limitation of the above analysis is that it investigates insider trading behavior based on forthcoming current period earnings news alone. We have shown (in Figure 1) that conditional on the firm's future earnings prospect, optimal trading pattern could differ from the simple predictions P1 and P2.

4.2 Do managers capitalize on information about future earnings prospects?

Table 4 and table 5 provide evidence of top managers' trading behavior around quarterly earnings report conditional on advance knowledge of future earnings prospects. The estimation is done on the separate CEO/COO and CFO samples as well as the combined sample of top executives. Since CFOs' trading behavior is different from that of his management colleagues, we will discuss the results of the CEO/COO and CFO subgroups separately instead of making inferences about the combined sample.

Results for estimating equations (2.1) and (2.2) are shown in table 4. In the purchase equation in panel A of table 4, the coefficient on PRE is positive and significant for the CEO/COO sample. It shows that there is significant insider buying in anticipation of a good earnings report and also good future earnings prospects since the coefficient on PRE is significantly positive (P1a). In contrast, the coefficient on PRE*FUTURE_BAD is significantly negative, indicating that even though current earnings report will be good, CEOs/COOs will refrain from buying if they foresee bad future earnings. The coefficient on POST*MISS is not significant for the CEO/COO group, i.e., no insider buying after a bad earnings report in anticipation of good future earnings. However, the coefficient is significant for the CFO group, suggesting that CFOs optimally (opportunistically) time their trades by buying after bad news in anticipation of good future earnings (P2a).

Turning to the sale equation in panel B of table 4, we find that the coefficient on POST*FUTURE_BAD is significant for the CFO group only, i.e., CFOs sell more shares after a good earnings report in anticipation of bad future earnings (P3a). However, there is no evidence of CEOs or COOs being engaged in such opportunistic timing. There is also significantly less selling after good earnings report when future prospect is good (i.e., the coefficients on POST are significantly negative).

The evidence in table 4 shows that CEOs/COOs benefit from their private knowledge of future earnings by more purchase of the company shares. In contrast to their colleagues, CFOs seem to exploit the information about future earnings by opportunistically timing their trades after the current earnings report. They do more selling after a good report when future earnings news is likely to be bad and more buying after a bad report when future earnings news are likely to be good.

Table 4**Insider Trading Activities around Earnings Announcement of Current Missing Forecasts Quarter and Future Earnings Prospects****Panel A Insider Purchase Activity**

	Prediction	Predicted Sign	Full Sample	CEO & COO	CFO
Intercept			0.00044 (<0.0001)	0.00054 (0.0003)	0.00017 (<0.0001)
Pre	1a	+	0.00075 (0.0007)	0.00102 (0.0007)	0.00000 (0.9937)
Pre*Miss			0.00002 (0.9502)	-0.00005 (0.9056)	0.00006 (0.5575)
Pre* Future_Bad			-0.00069 (0.0360)	-0.00089 (0.0428)	-0.00001 (0.9206)
Post			-0.00015 (0.3576)	-0.00018 (0.4066)	-0.00000 (0.9177)
Post*Miss	2a	+	0.00016 (0.4178)	0.00013 (0.6294)	0.00021 (0.0003)
Post* Future_Bad			0.00001 (0.9733)	0.00004 (0.8631)	-0.00010 (0.0822)
R²			0.0015	0.0020	0.0041
N			8,148	5,978	2,191

Panel B Insider Sale Activity

	Prediction	Predicted Sign	Full Sample	CEO & COO	CFO
Intercept			0.00110 (<0.0001)	0.00140 (<0.0001)	0.00041 (<0.0001)
Pre			0.00053 (0.2360)	0.00080 (0.2121)	-0.00008 (0.2697)
Pre*Miss			-0.00017 (0.8431)	-0.00027 (0.8352)	0.00023 (0.0879)
Pre* Future_Bad			-0.00043 (0.6014)	-0.00071 (0.5493)	0.00014 (0.3215)
Post			-0.00051 (0.0287)	-0.00069 (0.0399)	-0.00011 (0.0062)
Post*Miss			0.00000 (0.9999)	-0.00003 (0.9441)	0.00010 (0.0750)
Post* Future_Bad	3a	+	0.00035 (0.2772)	0.00040 (0.3830)	0.00023 (<0.0001)
R²			0.0002	0.0002	0.0055
N			17,382	12,128	5,405

Variables:

The dependent variable in the model is the insider trading \$ amount scaled by market value of the firm.
 PRE: a dummy variable that takes the value of one if the trading date falls 30 days before earnings announcement date, zero otherwise.

POST: a dummy variable that takes the value of one if the trading date falls 30 days after earnings announcement date, zero otherwise.

MISS: a dummy variable that takes the value of one if earnings in the current quarter miss consensus analysts' forecast (bad earnings report), zero otherwise (good earnings report).

FUTURE_BAD: a dummy variable that takes the value of one if earnings miss consensus earnings forecast in the next quarter (future prospect bad), zero otherwise (future prospect good).

Table 5**Insider Trading Activities around Earnings Announcement of Current Missing Forecasts Quarter and Future Earnings Prospects (2)****Panel A Insider Purchase Activity**

	Prediction	Predicted Sign	Full Sample	CEO & COO	CFO
Intercept			0.00045 (<0.0001)	0.00054 (0.0003)	0.00017 (<0.0001)
Pre	1a	+	0.00060 (0.0042)	0.00082 (0.0037)	-0.00000 (0.9582)
Pre*Miss			0.00028 (0.4921)	0.00023 (0.6700)	0.00014 (0.3084)
Pre*Miss* Future_Bad			-0.00088 (0.0689)	-0.00105 (0.1055)	-0.00013 (0.4133)
Post			-0.00015 (0.3187)	-0.00018 (0.3963)	-0.00003 (0.4684)
Post*Miss	2a	+	0.00015 (0.5337)	0.00009 (0.7889)	0.00032 (<0.0001)
Post*Miss*Future_ Bad			0.00001 (0.9644)	0.00010 (0.8075)	-0.00025 (0.0069)
R²			0.0014	0.0017	0.0065
N			8,148	5,978	2,191

Panel B Insider Sale Activity

	Prediction	Predicted Sign	Full Sample	CEO & COO	CFO
Intercept			0.00110 (<0.0001)	0.00140 (<0.0001)	0.00041 (<0.0001)
Pre			0.00045 (0.2844)	0.00067 (0.2679)	-0.00006 (0.4155)
Pre*Miss			-0.00020 (0.8585)	-0.00030 (0.8579)	0.00031 (0.0682)
Pre*Miss* Future_Bad	4a	+	-0.00024 (0.8690)	-0.00043 (0.8417)	-0.00008 (0.7179)
Post			-0.00046 (0.0448)	-0.00063 (0.0554)	-0.00007 (0.0654)
Post*Miss			-0.00015 (0.6958)	-0.00021 (0.7022)	-0.00002 (0.7508)
Post*Miss*Future_ Bad			0.00061 (0.3040)	0.00072 (0.4028)	0.00043 (<0.0001)
R²			0.0002	0.0002	0.0055
N			17,382	12,128	5,405

Variables:

The dependent variable in the model is the insider trading \$ amount scaled by market value of the firm.
 PRE: a dummy variable that takes the value of one if the trading date falls 30 days before earnings announcement date, zero otherwise.

POST: a dummy variable that takes the value of one if the trading date falls 30 days after earnings announcement date, zero otherwise.

MISS: a dummy variable that takes the value of one if earnings in the current quarter miss consensus analysts' forecast (bad earnings report), zero otherwise (good earnings report).

FUTURE_BAD: a dummy variable that takes the value of one if earnings miss consensus earnings forecast in the next quarter (future prospect bad), zero otherwise (future prospect good).

Results for estimating equations (3.1) and (3.2) are shown in table 5. Table 5 presents additional evidence that bears on Prediction 4a (P4a) in the sale equation. In panel A for the purchase equation, the coefficient is significantly positive on PRE for the CEO/COO group. It confirms the result in table 4 that CEOs and COOs are buying more shares before good earnings report and good future earnings news. Again, CFOs are found to time their trading by buying after bad report in anticipation of good future earnings. In contrast, they buy significantly less shares after a bad earnings report when future earnings prospect is bad.

In panel B for the sale equation, the coefficient on PRE*MISS*FUTURE_BAD is insignificant for all three groups, i.e., there is no evidence of managers selling more shares before bad earnings report and bad future earnings prospects. So Prediction 4a is not confirmed. Similar to the argument made previously, failure to confirm Prediction 4a is perhaps due to the fact that it entails a higher risk of being discovered and prosecuted for managers to sell shares in anticipation of future bad news. In fact, there is still weak evidence that managers purchase less shares under such a scenario (the coefficient on PRE*MISS*FUTURE_BAD is negative and weakly significant in the purchase equation). So managers still benefit from their knowledge of short term and future earnings even though they use it in a more subtle and safe manner by non-purchasing instead of selling.

In summary, the results in table 4 and table 5 show the following regularities in insider trading by top executives:

CEO/COO:

- more buying before good earnings report and in anticipation of good future prospects (Prediction 1a),
- less buying before good earnings report when future earnings prospect is bad (Prediction 3b),
- less buying before bad earnings report and bad future prospect (Prediction 4b).

CFO:

- more selling after good earnings report in anticipation of bad future prospect (Prediction 3a),
- more buying after a bad earnings report in anticipation of good future earnings prospect (Prediction 2a).

There is no evidence supporting Prediction 4a.

Overall, the results provide support for our predictions that managers capitalize on information about future earnings prospects. We find opportunistic trading by top managers in some (but not all) scenarios. Of the above, CFOs' trading behavior seems to be the most opportunistic in that they seem to time the release of earnings report for trading gain and take advantage of both the result of current earnings report and private knowledge of future earnings prospects. In contrast, CEOs' and COOs' trading behavior seems more subtle in their exploitation of earnings information. Although they buy more in anticipation of good earnings report and good future prospects, they refrain from active trading when there is bad news either about the impending earnings report or about future earnings.

5. Summary and Discussions

In this paper we investigate top executives' insider trading behavior around earnings announcements. We predict that top managers would take advantage of their superior knowledge of future earnings prospects and opportunistically time their trades to exploit information in both current earnings report and future earnings. We predict that when current quarter earnings report contradicts future earnings prospect, managers would buy more shares after a bad earnings report in anticipation of good future earnings and sell more shares after a good earnings report in anticipation of bad future earnings. Our evidence confirms the predictions in the CFO sample but not in the CEO/COO sample. We also predict that when current earnings report is consistent with future earnings prospects, managers would buy more shares before good earnings news and sell more shares before bad earnings news. We find evidence consistent with the buying prediction but not with the selling prediction.

Overall our results are consistent with opportunistic trading by some managers in the short window around earnings announcements. Two aspects of our results are of interest. The first is the finding that some managers opportunistically time their trades to exploit information about future earnings. By doing so, they could realize trading gains that are above simple trade on the good/bad news. This is especially true when current earnings report contradicts future earnings prospects because it allows managers to buy (sell) shares at depressed (elevated) levels and realize an "extra" abnormal return. The finding of such timing should alert regulators and investors alike.

Second, we find that CFOs' trading patterns are different from CEOs' and COOs'. They tend to be more opportunistic than their colleagues in trading. Our conjecture is that since CFOs are in charge of financial reporting and are more intimate with the financial situation of the firm, they are in a better position to exploit information in future as well as current period earnings. CFOs tend to be in the center of accounting scandals (e.g., Worldcom and Enron) and play an active role in "engineering" the financial numbers of those firms. Regulator should look at the possibility that CFOs manipulate accounting numbers for personal gains.

References

- Bartov, E., Givoly, D. and Hayn, C. (2002), "The rewards to meeting or beating earnings expectations", *Journal of Accounting and Economics* 33, 174-204.
- Bloomenthal, H. (1995), *Securities Law Handbook*, Clark, Boardman, and Callaghan, Deerfield.
- Brown, L. D., Richardson, G. D. and Schwager, S. J. (1987), "An information interpretation of financial analyst superiority in forecasting earnings", *Journal of Accounting Research* 22, 49-67.
- Finnerty, J. (1976), "Insiders and Market Efficiency." *The Journal of Finance*, 31, 1141-1148.
- Jaffe, J. (1974), Special information and insider trading. *Journal of Business* 47, 410-428.
- Jeng, L.; A. Metrick; and Zeckhauser, R. (2003), "Estimating the Returns to Insider Trading: A Performance-Evaluation Perspective." *The Review of Economics and Statistics*, 85, 453-471.
- Jiang, J.; K. Petroni; and Wang. I. (2010) "CFOs and CEOs: Who Has the Most Influence on Earnings Management?" *Journal of Financial Economics*, 96, 513-526.
- John, K. and Lang, L. (1991), "Strategic insider trading around dividend announcements: Theory and evidence", *Journal of Finance* 44, 971-980.
- Karpov, J. and Lee, D. (1991), "Insider trading before new issue announcements", *Financial Management* 20 (Spring), 18-26.

- Kasznik, R. and McNichols, M.F. (2002), “Does meeting expectations matter? Evidence from analyst forecast revisions and share prices”, *Journal of Accounting Research* 40, 727-759.
- Ke, B., Huddart, S. and Petroni, K. (2003), “Why insiders know about future earnings and how they use it: evidence from insider trades”, *Journal of Accounting and Economics* 35: 315-346.
- Lakonishok, J. and Lee, I. (2001), “Are insider trades informative?”, *Review of Financial Studies* 14: 79-111.
- Lee, D. S., Mikkleson, W. and Partch, M. M. (1992), “Managers’ trading around stock repurchases”, *Journal of Finance* 47, 1947-1961.
- Lin, J., and Howe. J. (1990), “Insider Trading in the OTC Market.” *The Journal of Finance*, 45, 1273-1284.
- Noe, C. F. (1999), “Voluntary disclosures and insider transactions”, *Journal of Accounting and Economics* 27, 305-326.
- Penman, S. (1982), “Insider trading and the dissemination of firms’ forecast information”, *Journal of Business* 55, 479-503.
- Rozeff, M., and Zaman, M. (1988), “Market Efficiency and Insider Trading: New Evidence.” *Journal of Business*, 61, 25-44.
- Rozeff, M. and Zaman, M. (1998), “Overreaction and insider trading: evidence form growth and value portfolios”, *Journal of Finance* 53, 701-716.
- Seyhun, N. (1986), “Insiders’ profits, costs of trading, and market efficiency”, *Journal of Financial Economics* 16: 189-212.
- Seyhun, N. and Bradley, M. (1997), “Corporate bankruptcy and insider trading”, *Journal of Business* 70: 189-216.
- Seyhun, H. N. (1998), *Investment Intelligence from Insider Trading*. Cambridge, MA: MIT Press.
- Sivakumar, K. and Waymire, G. (1994), “Insider trading following material news events: Evidence from earnings”, *Financial Management* 23 (Spring), 23-32.

Tuna, C. (2008), "Executives are grim on economy", The Wall Street Journal, December 11, 2008.

Wang, W., Shin, Y. and Francis, B. (2011), "Are CFOs' trades more informative than CEOs' trades?" Journal of Financial and Quantitative Analysis, forthcoming.