

What Motivates CEO and CFO Trading – Contrarian Beliefs or Superior Information?

Abu Chowdhury
Stockholm Business School
Stockholm University
abu.chowdhury@sbs.su.se
+46 760068440

Sabur Mollah¹
School of Management
Swansea University
sabur.mollah@swansea.ac.uk
+44 (0)1792602677

Mir A. Zaman
College of Business Administration
University of Northern Iowa
mir.zaman@uni.edu
+1 319 273 2579

ABSTRACT

This paper examines whether trading by CEOs and CFOs is motivated by contrarian beliefs or superior information about future cash flow realizations. Although both CEOs and CFOs earn significant abnormal returns following their trades, we find that CFO trades are associated with higher abnormal returns than CEO trades. Initial analysis suggests that these abnormal returns are related to both contrarian beliefs and superior information about future cash flow realizations. However, when we analyze the trading behavior in terms of routine trading and opportunistic trading, we find that both CEOs and CFOs earn abnormal returns from opportunistic trading and these trades are motivated solely by contrarian beliefs. Our results have important implications for insider trading in the US.

JEL Classification: G14

Keywords: Insider trading; CEO; CFO; Contrarian beliefs; Superior information; Opportunistic and routine trading

¹ Corresponding author. Email address: sabur.mollah@swansea.ac.uk

1. Introduction

Do Chief Executive Officers (CEOs) and Chief Financial Officers (CFOs) earn abnormal returns when they trade in stocks of their companies? If so, are these abnormal returns similar across these two groups of insiders or are the returns significantly different? In this paper, we examine whether trades made by CFOs are more informative than CEO trades by using cumulative abnormal returns as a measure of information content of the trades. We also examine whether these trades reflect contrarian beliefs or superior knowledge about future cash flow realizations or both. Finally, we disentangle opportunistic trades from routine trades made by CEOs and CFOs and use these trades to substantiate the motivation and information content of insider trading.

Prior research that examines insider trading behavior focuses on insiders as a group or classifies top executives as a homogenized group (for example, Jaffe, 1974; Finnerty, 1976; Givoly and Palmon, 1985; Rozeff and Zaman, 1988; Lakonishok and Lee, 2001; Seyhun, 1986; Lin and Howe, 1990; Gregory et al., 1997; Chang and Suk, 1998; Zeng, Metrick and Zeckhauser, 2003). These studies provide overwhelming evidence of earning abnormal returns by insiders on their trades. Insiders could be earning excess returns because they recognize pricing errors made by outsiders or they possess superior knowledge about the firm's future cash flow prospects. In case of mispricing by outsiders, insiders are trading against current investor sentiment (contrarian beliefs). Alternatively, they may have private information about the firm's future cash flow and are trading because of this superior knowledge. Since prices respond to unexpected changes, insiders trade when their private information is different from the market's expectations about future cash flows. It is important to note that in both settings insider trading aids the market in determining the fundamental values of the traded stocks.

Findings by Seyhun (1992) and Rozeff and Zaman (1998) are consistent with the contrarian beliefs hypothesis. Seyhun (1992) finds that insiders are more likely to buy shares following

periods of significant price declines and sell shares when price increases. Lakonishok, Shleifer and Vishny (1994) find consistent evidence that insiders purchase securities with greatest amount of undervaluation. Rozeff and Zaman (1998) find that insiders buy shares as stocks change from growth to value categories and interpret this as evidence of trading against the market's overreaction to past performance. However, Piotroski and Roulstone (2005) find evidence that insider trading is based on both contrarian beliefs and superior information of firm's future earnings innovation.

Past research also examines whether insiders trade on the basis of superior information of future cash flow realizations. Elliott et al. (1984) look at trading behavior of insiders prior to unexpected changes in earnings, dividends and bond ratings. They find that insiders increase (decrease) buys (sales) in the 12 months prior to extreme earnings. However, their paper fails to provide evidence of insiders selling prior to extreme earnings decreases, dividends changes or bond rating changes. Ke et al. (2003) examine insider trading patterns in advance of a break in quarterly earnings increases and find an increase in the frequency of net insider sales in the ninth through third quarters before the break. They conclude that insiders do not trade immediately before the break to avoid the appearance of exploiting inside information and the costs arising from litigation or adverse publicity. Jiang and Zaman (2010) find evidence that aggregate insider trading is positively related to unexpected cash flow news and hence conclude that insiders trade on the basis of superior information. Udpa (1996) compares between earnings response coefficients and stock return variability around quarterly earnings announcements for firms-quarters with insider trading to firms-quarters without insider trading. He finds that insider trading prior to an earnings announcement results in a greater amount of pre-disclosure information available to develop inferences about forthcoming earnings.

Moreover, by examining CFOs' and CEOs' trades, Wang et al. (2012) show that CFOs earn significantly higher abnormal returns than the CEOs, especially for their purchases, due to superior information about future earnings. Cohen, Malloy and Pomorski (2012) separate the trading pattern of insiders as routine and opportunistic and find that opportunistic insider trades yield abnormal return while routine trades do not. Geiger and North (2006) and Jiang, Petroni and Wang (2010) report that chief financial officers have unique influence on reported financial numbers since they are in charge of financial reporting process and they are more acquainted with the financial details of the firm. However, since chief executive officer sits at the top of the organization, his/her information domain may be superior to other executives (Graham and Harvey, 2001).

Our motivation is twofold: First motivation is to determine whether abnormal returns earned by the CEOs and CFOs from the trades of their company stocks are reflective of contrarian beliefs or are based on superior information about future cash flow realizations or both. If CFOs possess superior information than CEOs because of their involvement in implementing financial strategies of the firm, we expect to find CFOs earning higher CARs than CEOs. Over the 2004-2012 sample period, we find that CFOs earn higher abnormal returns than CEOs in the months following their open market purchases and sales of shares of company's stocks. Analyses of cumulative abnormal returns (CARs) may suffer from cross-sectional correlations and inflated standard errors (Fama, 1998). Also Lakonishok and Lee (2001) find that abnormal returns earned by insiders are concentrated in smaller firms.² To alleviate such concerns, we use both the Fama-French three-factor model and the Market model to measure abnormal returns same as Wang et al. (2012). Both measures give us similar results – CFOs earn higher abnormal returns than CEOs in both purchases and sales. Thus, our results are consistent with Wang et al. (2012). However, these excess returns

² See also Rozeff and Zaman (1988) and Lin and Howe (1990).

could be a manifestation of better ability of CFOs to identify mispriced stocks in the market. Hence these excess returns could simply be due to trading based on contrarian beliefs as opposed to better information. If this is true, then we should find evidence of CFO trades based on contrarian beliefs. Consistent with Rozeff and Zaman (1998) and Piotroski and Roulstone (2005) we measure investor sentiment/contrarian beliefs using two variables: the firm's book-to-market ratio and the cumulative returns for the recent twelve months. For superior information we use future earnings innovation as measured by change in return on assets, ΔROA_{t+1} . For our sample period, consistent with Piotroski and Roulstone (2005), we find that abnormal returns are related to both contrarian beliefs and superior information.

Second, since there is some evidence of CEO and CFO trading being motivated by both contrarian beliefs and superior information we separate trades into opportunistic trades and routine trades. We expect that opportunistic trades are more likely to be motivated by superior information or by contrarian beliefs while routine trades are likely due to other reasons (portfolio rebalancing, liquidity etc.). Furthermore, if CFOs have better information than CEOs then trading by CFOs are more likely to be opportunistic. Given that CEOs have a larger portion of their compensation in the form of stock options they are more likely to be routine traders. Our results indicate that both CFOs and CEOs are likely to engage in opportunistic buys and sales, and these trades are solely motivated by contrarian beliefs. We find no evidence of opportunistic trades being motivated by superior information about future cash flow realization.

Our study also extends prior work of Wang et al. (2012) by looking at the information content of trades by various insiders (e.g. Chief Executive Officers (CEOs), Chief Financial Officers (CFOs), Chief Operating Officers (COOs), President, Vice President, Chairman of the Board, Directors and Officers)) instead of CFOs and CEOs. In particular, Wang et al. (2012) examine informativeness of CEOs' and CFOs' trades by using 58,421 purchases and sales trades in the US

over the period of 1992-2002, but used 96,070 insider transactions by CEOs, CFOs and other insiders in the US over the period of 2004-2012. Thus, our study offers a general conclusion for wider insiders rather than only for CEOs and CFOs. Finally, our primary contribution to the literature is that we provide evidence that trades by different corporate insiders are more likely to be motivated by contrarian beliefs as opposed to superior information. We also show that insiders are likely to engage in opportunistic trades when they are able to identify mispriced stocks.

The remainder of the paper is organized as follows. Section 2 describes the data, sample selection and summary statistics. Section 3 provides the results of performance by insiders on their trades. Section 4 presents the characteristics of the insider trading (routine and opportunistic) and whether abnormal returns earned by the CEOs and CFOs are based on these specific characteristics of their trading. Section 5 summarizes and concludes the paper.

2. Data Description, Sample Selection and Descriptive Statistics

Our primary database for insider trading is 2iQ research database. This database includes purchases and sales made by different insiders. The database also includes the date of the transaction, filing date, price of the transaction, size of the transaction, type of the transaction and insider relationship to the firm. We extract the trades of Chief Executive Officers, Chief Financial Officers, Chief Operating Officers, President, Vice President, Chairman of the Board, Directors and Officers over the period of 2004-2012 for this paper. We classify insiders into three categories: CEO, CFO and other insiders. The database includes 2,107,358 insider trades for the sample period, of which 1,355,538 trades are made by our selected insiders. We use several criteria to select our final sample of insider transactions. We choose only open market buy and sale transactions in common stock and transactions made in NYSE, NASDAQ or AMEX. We exclude the insider trades of nonfinancial firms, transactions of missing firms, trades for firms having less than four

years of transaction for the entire sample period, transactions of less than 100 shares, transactions of penny stocks in which the trading stock price is less than \$2 to avoid unnecessary noise in estimating returns, stocks that do not have market data from Center for Research in Security Prices (CRSP). We consider multiple same-day buy or sale transactions by the same insider as a single buy or sale transaction due to the assumption that these trades are motivated by the same information and therefore these trades are combined into a single data point. Initially, we choose only the last trade in a month for each of our insider categories (CEO, CFO and other insiders) under the assumption that trades made by the insiders of the same firm in the same month are based on the same information. Based on the above criteria, our sample consists of 96,070 insider transactions of which 20,773 transactions made by CEO, 19,997 transactions made by CFO and 55,300 transactions made by other insiders. The total number of firms in our sample is 1,739. Summary statistics of insider trades by position is reported in Panel A of Table 1.

Table 1 about here

Similar to prior research, most insider transactions are sales rather than purchases both in dollar terms and as a percentage of the firm's market capitalization. In our sample insider sales is 91% of total insider transaction. Prior research has also documented a propensity of insiders to sell more than buy. This is because top executives are net sellers of their companies' stocks as their compensation package consists of stock options and restricted shares. CEO transactions dominate CFO transactions (both in number and in dollar amount) because CEO's compensations are much larger than CFO's.

We collect stock return data from CRSP to calculate the CAR and company specific variables such as return on assets, book-to-market and market value of equity from Worldscope and Bureau Van Dijk Orbis. In Panel B of Table 1 we report descriptive statistics for key variables used in this

study. The mean and median one-year ahead earnings innovations are 0.00% suggesting approximately half of the firms in our sample experienced decline in next year's ROA. The mean and the median BM ratio of 0.528 and 0.437 are compatible to prior research. The median market value of equity of \$1,113.70 million which is significantly higher than that of Wang et al. (2012) (median market value of the firm's equity is \$310.7 million). A plausible explanation for this difference is the sample period. During our sample period the equity market experienced an increase of approximately 250%.

3. Empirical Results

3.1. Performance of Insider Trading

If insiders trade on the basis of their superior private information about future cash flows of the firm or on contrarian beliefs (i.e. utilizing the potential mispricing of stocks, or by trading with less bias and/or better models than outsiders), then they should earn abnormal returns. We measure the insider trading performance by cumulative abnormal returns (CARs) during 1-3 months, 1-6 months and 1-9 months after an insider trade takes place. We calculate CARs by the Fama-French three-factor model using a two-step process and the Market model. A brief discussion of these two models is as follows.

Fama and French (1993) present a time series model of the evolution of excess security returns as a function of excess market returns, market-to-book ratio factor and market capitalization factor. In the two-step approach, model parameters are estimated using data for five years outside our event period and risk-free rate is not deducted from stock and market returns nor otherwise included in the model. The model is:

$$R_{jt} = \alpha_j + \beta_j R_{mt} + s_j SMB_t + h_j HML_t + \epsilon_{jt} \quad (1)$$

where R_{jt} is the rate of return of the common stock of the j th firm on day t , R_{mt} is the rate of return of a market index on day t , SMB_t is the average return on small market-capitalization portfolios minus the average return on three large market-capitalization portfolios, HML_t is the average return on two high book-to-market equity portfolios minus the average return on two low book-to-market equity portfolios. Abnormal return (or prediction error) for the common stock of the j th firm on day t is:

$$A_{jt} = R_{jt} - (\hat{\alpha}_j + \hat{\beta}_j R_{mt} + \hat{s}_j SMB_t + \hat{h}_j HML_t) \quad (2)$$

where the coefficients $\hat{\alpha}_j$, $\hat{\beta}_j$, $\hat{s}_j$ and $\hat{h}_j$ are ordinary least squares estimates of α_j , β_j , s_j and h_j . The Market model is:

$$R_{jt} = \alpha_j + \beta_j R_{mt} + \epsilon_{jt} \quad (3)$$

Abnormal return (or prediction error) for the common stock of the j th firm on day t using the Market model is:

$$A_{jt} = R_{jt} - (\hat{\alpha}_j + \hat{\beta}_j \hat{R}_{mt}) \quad (4)$$

where the coefficients $\hat{\alpha}_j$ and $\hat{\beta}_j$ are ordinary least squares estimates of α_j and β_j .

Table 2 presents performance of insiders (CEOs, CFOs and other insiders) measured by the cumulative abnormal returns (CARs) using both the Fama-French three-factor model and the Market model for insiders after they purchase or sell stocks between January 2004 and December 2012. In Panel A of Table 2, we report the results of CARs estimated from the Fama-French three-factor model. All insiders earn significant positive excess returns in the 3-month and 6-month periods following their purchases. CFOs earn 2.55%, CEOs earn 1.06% and other insiders earn 1.50% CARs in the 3-month period. For the 6-month period, CFOs, CEOs and other insiders earn 3.16%, 1.45% and 1.95% CARs respectively. For the 9-month period, only the CFOs earn a

significant 2.26%. These results clearly demonstrate that CFOs outperform CEOs and other insiders in their purchase transactions. Regarding sales, note that the negative (positive) abnormal returns represent losses avoided (incurred) by insiders. Similar to insider trading performance after purchases, all insiders avoid losses in the 3-month, 6-month and 9-month periods subsequent to sales. Here, again we notice CFOs outperforming other insiders. In the 3-month period, CFOs avoid -2.47% loss, CEOs avoid -2.32% loss and other insiders avoid -2.23% loss. In the 6-month period, the losses avoided are -4.84%, -4.64% and -4.36% respectively. Finally, for the 9-month period, the losses avoided are -7.13%, -6.83% and -6.45% respectively. In general, CFOs avoid a slightly higher loss in their trades compared to CEOs.³

Table 2 about here

We also estimate the CARs using Market model and find results consistent with Fama-French three-factor model. Panel B of Table 2 reports the CARs of different windows after insider purchases and sales. However, the magnitude of the returns after purchases in the Market model is lower than that in the Fama-French three-factor model but higher after sales in the Market model. For example, for the 3-month period, CFOs, CEOs and other insiders earn 2.27%, 1.03% and 1.15% respectively after their purchases and avoid losses by -2.80%, -2.76% and -2.61% respectively after their sales.

³ Our results are consistent with Wang et al. (2012) and other prior research. The magnitude of the cumulative abnormal returns is different. A possible explanation for this difference could be the methodology used to estimate the CAR. Also our sample has a higher proportion of sales when compared to prior research.

Our overall findings of insider trades imply that CFOs outperform CEOs and other insiders for both purchase and sale transactions. Also, other insiders as a group earn higher abnormal returns than CEOs during the first 6 months after their purchases but CEOs avoid more losses than other insiders from their sale transactions.

3.2. Relations of Insider Trading with Contrarian Beliefs and Superior Information

Our results so far indicate that insiders earn abnormal returns from their purchases and avoid losses by their sales. We also show that CFOs earn higher abnormal returns than CEOs for both purchase and sale transactions. To further investigate the information content and the motivation of these trades we use multivariate cross-sectional regression analysis. Our dependent variable is the 3-month CAR (using the Fama-French three-factor model) and the independent variables are different proxies of contrarian beliefs and superior information.

Since changes in firm's unexpected earnings performance influence stock prices (Ball and Brown, 1968), insiders have tendency to trade on the basis of the superior information about firm's future earnings information. Following Piotroski and Roulstone (2005), we use year $t+1$'s annual earnings innovation as the proxy for superior information. We measure annual earnings innovation as:

$$\Delta ROA_{t+1} = ROA_{t+1} - ROA_t \quad (5)$$

where ROA_t is the return on assets measured by the net income before extraordinary and discontinued items at year t scaled by the average of total assets in years t and $t-1$. If CFOs have better information than CEOs because of their involvement with the implementation of firm's financial strategies, one should expect a positive relationship between CFO trades and the measure of earnings innovation.

To measure the impact of contrarian beliefs, following Rozeff and Zaman (1998) and Piotroski and Roulstone (2005), we use the natural logarithm of firm's book-to-market ratios (log BM). BM is calculated as the book value of common equity plus balance sheet deferred taxes divided by market value of equity (Fama and French, 1992). Firms with low book-to-market are considered growth firms while high book-to-market firms are considered value firms. In addition to using log BM as a proxy for contrarian beliefs, we look at the cumulative returns for the previous 12 months to measure investor sentiment. For each firm in our sample we collect monthly returns for 12 months prior to the trade-month and then cumulate those returns. For example, if an insider of a firm trades in January of year t then we sum the monthly returns of that firm from January to December of $t-1$. The cumulative returns of all firms over our sample period are pooled and divided into three categories: high return, medium return and low return.

In Table 3 we provide results from different regression models using 3-month CARs, estimated from the Fama-French three-factor model, as the dependent variable. In Panel A we report results from regressing CARs on CEO. Here CEO is a dummy variable which takes the value one if the insider is CEO and zero otherwise. The intercept of the model measures excess returns earned by CFOs. On purchase transactions, CEOs earn 2.1% less than CFOs and on sale transactions they avoid 0.40% less losses than CFOs. This further confirms that CFOs outperform CEOs in both types of trades.

Table 3 about here

Panel B and Panel C of Table 3 report whether cumulative abnormal returns earned by these two types of insiders are related to measures of superior information of future cash flow realizations or to contrarian beliefs. Separate regressions are run to capture the individual effect of these two characteristics. In models 1 through 3 we regress cumulative excess returns from CFO purchases on different variables that proxy for superior information and contrarian beliefs/investor sentiment

and in model 4 we regress CARs from CFO purchases on all variables of interest. In model 1, the estimated intercept term of approximately 3% represents the mean CAR earned by CFOs on their purchases. The coefficient for ΔROA_{t+1} ($= 0.244$, $t = 2.86$) is positive and highly significant implying a direct relation between measures of superior information and CFO excess returns. Model 2 relates CAR to log BM. Again the coefficient of log BM ($= 0.045$, $t = 3.83$) is positive and significant suggesting that as BM ratio increases, CFOs earn increasing excess returns. More importantly, in terms of contrarian beliefs insiders earn higher excess returns from purchasing value stocks and low returns from buying growth stocks. Rozeff and Zaman (1998) show that insider buying increases as firms change from growth to value categories. Our result extends Rozeff and Zaman (1998) in the sense that we analyze excess returns as opposed to the ratio of insider buys to the total number of trades. In model 3, we regress CARs on two dummy variables, $SRET_2$ and $SRET_3$. If the stock's previous 12-month cumulative returns are medium, the $SRET_2$ is equal to one, zero otherwise. If the stock's previous 12-month returns are in the high category, $SRET_3$ is one, zero otherwise. The estimated intercept term represents the CARs earned from the stocks that are in the low return category. Note that high returns in the previous 12 months imply that prices have been increasing while low (negative) returns imply that prices have been decreasing. The coefficient for the intercept is positive and significant. However, the coefficients for $SRET_2$ ($= -0.053$, $t = -2.34$) and $SRET_3$ ($= -0.070$, $t = -2.83$) are negative and significant. When CFOs purchase stocks in the low return category, they earn 5.5% excess returns. If they purchase stocks in the high return category they earn -1.5% ($-0.070 + 0.055$) excess returns. These results imply that they may be trading on contrarian beliefs as they earn the highest excess return when buying stocks in the low return category. In model 4, we include all the variables that proxy for the superior information and contrarian beliefs/investor sentiment and also include an additional variable of log of market value of equity. In prior research, Rozeff and Zaman (1988) and Seyhun (1986) report significant

relationship between firm size and abnormal returns earned by insiders. They find that abnormal returns earned by insiders are negatively related to firm size. It is for this reason that we include a firm size proxy in Model 4. The coefficient of log of market value of equity ($= -0.015$, $t = -2.24$) is negative and significant suggesting that the larger the firm is the lower the abnormal return is. This result is similar to what others have previously documented. The coefficients of other variables in the model are similar to those of previous regressions. Our results show that when CFOs purchase shares in the company stock, it is likely that their transactions are motivated by superior information and contrarian beliefs.

Models 5 through 8 examine CEO purchases. In model 5, the insignificant coefficient for ΔROA_{t+1} ($= 0.062$, $t = 0.99$) suggests that, unlike CFO's, CEO's excess returns are not directly related to superior information. Model 6 shows, like CFOs, CEOs earn higher excess returns from purchasing value stocks and earn lower excess returns from purchasing growth stocks. Model 8 includes all the variables and shows that CEO purchases are more likely to be motivated by contrarian beliefs.

In Panel C, we focus on CFO and CEO sale transactions. For CFO sales, excess returns are directly related to ΔROA_{t+1} ($= 0.111$, $t = 5.28$) and log BM ($= 0.026$, $t = 10.93$). Model 3 shows that if CFOs sell stocks in the low return category they avoid losses of 2.2% and when they sell stocks in the high return category they avoid losses of 3.4% ($-0.022 + (-0.012)$). Similar to purchase sample, CFO sales are motivated by superior information and contrarian beliefs. However, past return dummies become insignificant in the full model. For CEOs, unlike their purchases, their sales are motivated by the superior information of cash flow realizations and past returns in addition to the contrarian beliefs.

So far we have shown that abnormal returns earned by CEOs and CFOs are related to variables that measure superior information of future cash flow realizations and contrarian beliefs. Next, we examine the predictability of CEO and CFO trading based on these measures. In Table 4, we present results from various logistic regressions predicting CEO and CFO trades. The independent variables are ΔROA_{t+1} , log BM, $SRET_2$, $SRET_3$ and log MV. Regression results predicting the CFO purchases are presented in models 1 to 4, and those predicting CEO purchases are reported in models 5 to 8. The dependent variable for models 1 to 4 is a dummy variable equal to one if the CFOs purchase and zero if they sell, and for models 5 to 8 the dependent variable is a dummy variable equal to one if the CEOs purchase and zero if they sell.

Table 4 about here

Results from logistic regressions indicate that CFO purchases are based on contrarian beliefs/investor sentiment. In Model 1, the coefficient of ΔROA_{t+1} is insignificant; the coefficient of log BM in Model 2 is positive and significant. The coefficients of $SRET_2$ and $SRET_3$ in Model 3 are negative and significant. The reported odds ratio of 1.549 associated with the coefficient of log BM indicates that an increase in book-to-market ratio increases the odds of CFOs purchasing stocks by 55%.⁴ Model 3 results indicate that CFOs are less likely to purchase the shares of the firms that are in the high return group.⁵ Odds for CFOs purchasing stocks in the $SRET_3$ group are 69% lower than the odds for purchasing the stocks in the low return group ($SRET_1$). Odds for CFOs purchasing stocks in the $SRET_2$ group are 57.5% lower than the odds for purchasing the stocks in

⁴ The marginal effect of this coefficient also suggests that the probability of purchases by CFOs increases by 2.1% when they identify mispriced stocks.

⁵ The predicted probability is lesser by 5.7% when purchasing the shares of the high return group.

the low return group ($SRET_1$). Model 4 includes all variables of interest and results are similar. In summary, it is evident from logistic regressions that contrarian beliefs/investor sentiment better predicts CFO trades.

Models 5 to 8 are logistic regressions predicting CEO trades. The results clearly indicate that the CEO purchases are more likely to be based on both the superior information of future cash flow realizations and contrarian beliefs. The odds ratio of 3.997 associated with the coefficient of ΔROA_{t+1} in model 5 indicates an increase in ΔROA_{t+1} increases the odds of CEOs purchasing stocks by 300%.⁶ The coefficients of $\log BM$, $SRET_2$ and $SRET_3$ are all significant. Taken together, these results suggest that CEO trades of stocks are motivated by superior information and contrarian beliefs/investor sentiment.

4. Insider Trading Characteristics and Performance

4.1. Insider Trading Characteristics

Cohen et al. (2012) categorize insider trades as routine and opportunistic and show that routine insider trading is not informative about firms' future since these trades are predictable and identifiable whereas opportunistic trading contains all of the predictive power of insider trading. Ozkan and Trzeciakiewicz (2014) also report that opportunistic trades of insiders (CEO and CFO) are more informative than routine trades in the longer term and in the post-crisis period. If opportunistic trades are more informative then CEOs and CFOs are more likely to be opportunistic traders. In this section we test this proposition about CEO and CFO trading.

⁶ The marginal effect also points that CEOs are 10.4% more likely to purchase stocks when they have future superior information of cash flows.

We use different approaches to classify insider trades as routine and opportunistic. We consider three ex ante (following Cohen et al., 2012) and one ex post measures of classifying trades as opportunistic and routine. For the ex-ante measures, we analyze the past trading history of an insider and look for consistent patterns in the timing of trades. A routine trader is defined as an insider who placed a trade in the same calendar month for the first two consecutive years of her/his trades in our sample. For those insiders for whom we cannot detect an obvious discernible pattern in the past timing of their trades we classify them as opportunistic traders. In the first measure of ex ante approach, all subsequent trades of the routine traders are defined as routine trades and all subsequent trades of the opportunistic traders are defined as opportunistic trades. In the second measure of ex ante approach, trades made in the same month of the subsequent years are classified as routine trades whereas trades made in different months of the subsequent years are classified as opportunistic trades. The third measure of ex ante approach is based on a rolling-window method. Instead of defining insiders as routine and opportunistic only in the first two years of the trades in our sample, we classify insiders as routine and opportunistic in the beginning of each calendar year so that each insider can be reclassified each year based on the last two rolling years of data. Trades in the same month based on the last two years are classified as routine and trades in other months are classified as opportunistic. In the ex post approach of classifying insider trades as routine and opportunistic, we also look at the timing of her/his trades. If an insider traded a stock in the same calendar month for any two consecutive years over our sample period, then all trades he or she made in the same month for his or her entire trading history are labeled as routine and trades made in different months are labeled as opportunistic.

Table 5 presents the summary statistics of our classification of insider trades as routine and opportunistic based on the first measure of ex ante approach. Table 5 shows, CEOs trade more opportunistically than CFOs do. 51.36% of the overall trades (both purchase and sell) of the CEOs

are opportunistic whereas this is 48.35% for CFOs. Purchase trades are more opportunistic than sale trades for both CEOs and CFOs. Roughly 66% of CFO purchases and 68% of CEO purchases are opportunistic. On the other hand, roughly 48% of CFO sales and 50% of CEO sales are opportunistic.

Table 5 about here

4.2. Insider Trading Performance and Opportunistic vs. Routine Trading

In this section we investigate whether abnormal returns earned by the insiders are driven by their trading characteristics i.e. routine and opportunistic trades. We specifically focus on the routine and opportunistic trading behavior of the CEOs and CFOs. Table 6 presents the regression results. Models 1 and 2 illustrate the opportunistic and routine purchases and sales results of the CFOs, and models 3 and 4 for CEOs. Both CFOs and CEOs earn significant excess returns from their opportunistic purchase trades but not from their routine purchase trades. The coefficients of opportunistic buy are significant and positive ($t = 5.33$ for CFO and $t = 4.34$ for CEO) while the coefficients of routine buy are insignificant ($t = 0.50$ for CFO and $t = 0.15$ for CEO). However, although CFOs and CEOs earn excess returns of 6.0% and 3.3% respectively, the difference of these excess returns between CFOs and CEOs is not statistically significant. In terms of sales we find that both CFOs and CEOs avoid losses by making opportunistic sale trades but not from their routine sale trades. We also find that abnormal returns earned by CFOs and CEOs on opportunistic trades are significantly related to ΔROA_{t+1} , and log BM. Past return dummies are not significant. From these results we can conclude that CEOs and CFOs earn abnormal returns on opportunistic trades only and these trades are manifestations of both contrarian beliefs and superior information.

Table 6 about here

4.3. Determinants of Opportunistic Trades

We next focus on the predictability of opportunistic trades of the CEOs and CFOs based on the measures of contrarian beliefs and superior information. We perform logistic regression analysis with opportunistic buy and opportunistic sell as dependent variables and ΔROA_{t+1} , log BM, SRET₂, SRET₃ and log MV of Equity as independent variables for CEO and CFO trades. Results are reported in Table 7. The coefficient of ΔROA_{t+1} is insignificant in all models suggesting that CEOs and CFOs do not engage in opportunistic trading based on superior information about future cash flow realizations. Models 1 and 2 indicate that CFOs are more likely to trade opportunistically based on past return categories. The odds ratio of 0.353 associated with the coefficient of SRET₃ implies that if the stock is in the high return group the odds of CFO buying opportunistically are approximately 65% lower than the odds in the low return group. Alternatively, if the stock is in the high return category the odds of opportunistically selling the stock are 55.5% higher than the odds in the low return category. We see similar results for CEOs in terms of past returns predicting opportunistic trades. For CEOs the odds of opportunistic buying of stocks in the high return category are 72% lower than the odds of buying in the low return category. Odds of selling stocks in the high return category are 98.7% higher than the odds of selling stocks in the low return category. For CEO opportunistic trading, the variable “log BM” is significant suggesting that an increase in the book-to-market ratio significantly increases (decreases) the odds for opportunistic buying (selling).

In summary, our results from logistic regressions provide evidence of CEO and CFO opportunistic trades to be motivated only by contrarian beliefs/investor sentiment.

Table 7 about here

5. Summary and Conclusions

An extensive body of research demonstrates that corporate insider trading predicts abnormal returns. Since insiders are privy to information before it is disclosed to the public, it is natural to conclude that these abnormal returns reflect trading decisions based on private information. This information could be used by insiders to identify currently mispriced stocks to trade against current investor sentiment (contrarian beliefs) or it could reflect the firm's future cash flow prospects. Evidence from recent research based on this line of reasoning has shown that insiders are able to predict abnormal returns either on the basis of contrarian beliefs (e.g., Rozeff and Zaman, 1998; Chowdhury, Howe and Lin, 1993; Lakonishok and Lee, 2001) or on the basis of superior knowledge about future cash flow news (e.g., Ke et al., 2003; Seyhun, 1988). Piotroski and Roulstone (2005) document that insiders trade on the basis of both contrarian beliefs and superior knowledge.

In this study we analyze insider trading in a comprehensive framework by focusing on trades made by Chief Executive Officers (CEOs) and Chief Financial Officers (CFOs) as opposed to looking at corporate insiders as a homogenized group. Our primary objective is to determine whether abnormal returns earned by the CEOs and CFOs from their trades are reflective of contrarian beliefs or are based on superior knowledge about future cash flow realizations or both. If one assumes that CFOs possess superior information than CEOs because of their involvement in implementing financial strategies of the firm, then CFOs should earn higher abnormal returns than CEOs. Also, an analysis of CEO and CFO trading should provide evidence as to the motivation behind their trades. In other words, are they trading because of contrarian beliefs or is it because of superior knowledge about future cash flow prospects?

We find that in general CFOs earn higher abnormal returns than CEOs on their trades supporting the notion of superior information possessed by CFOs. We then examine whether the abnormal returns earned by CEOs and CFOs are based on contrarian beliefs or superior knowledge of future cash flow realizations or both. Our initial results provide evidence that abnormal returns are related to both of these reasons. Upon further analysis we document that CFO trades are more likely to be based on contrarian beliefs while CEO trades are motivated by superior information and contrarian beliefs.

To further substantiate our results we classify trades as either opportunistic or routine. We hypothesize that opportunistic trades are likely to be based on information while routine trades are for reasons unrelated to private information (portfolio rebalancing, liquidity etc.). We find that CEOs and CFOs earn abnormal returns only when they are engaged in opportunistic trading. Since these trades are hypothesized to be information-based we examine the motivation behind these trades. Our results indicate that CEO and CFO opportunistic trading is solely motivated by contrarian beliefs.

In conclusion, our analysis suggests that CFOs earn higher abnormal returns than CEOs when they trade in stocks of their companies. Contrary to some earlier research we find that they are more likely to exploit mispricing of their stocks by outsiders and they are trading against current investor sentiment. We also argue that insiders are likely to engage in opportunistic trades when they are able to identify mispriced stocks. Furthermore, such trading aids the market in determining the fundamental values of the traded stocks.

Acknowledgements: We thank Dallin M. Alldredge (Financial Management Association 2015 discussant) and Annie Triantafillou (European Financial Management Association 2015 discussant) for their helpful comments and suggestions. We acknowledge financial support from

Jan Wallenders and Tom Hedelius Stiftelse, Handelsbanken, Sweden (Project ID-P2011-0212:1) for this research.

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Table 1

Summary Statistics. This table presents summary statistics. Panel A reports summary statistics of insider trades by position (CEO, CFO and other insiders). Panel B reports the descriptive statistics for the sample of the firm-year observation between 2004 and 2012 with insider trading activity. ROA is the return on assets. ΔROA_{t+1} is 1-year ahead earnings innovation. BM is the book-to-market ratio calculated as book value of common equity plus balance sheet deferred taxes divided by market value of equity. MV is the market value of equity in terms of million dollars.

Panel A: Insider Trades

Variables	Insiders	N	Mean	SD	25%	Median	75%
Insider Trades by Position							
Insider purchase (shares)	CEO	1,594	22,109	219,723	1,000	3,000	10,000
	CFO	990	5,685	15,300	977	2,000	5,000
	Other Insiders	6,069	8,176	71,875	700	1,632	5,000
	All	8,653	10,458	112,117	800	2,000	5,000
Insider purchase amount	CEO	1,594	359,960	3,424,536	13,752	45,968	129,719
	CFO	990	91,399	536,144	10,140	27,500	69,750
	Other Insiders	6,069	149,483	1,230,447	12,780	31,790	85,000
	All	8,653	181,610	1,805,949	12,539	33,300	91,080
Insider purchase amount scaled by market capitalization	CEO	1,582	0.00046	0.00467	0.00002	0.00007	0.00023
	CFO	983	0.00028	0.00490	0.00002	0.00004	0.00011
	Other Insiders	6,013	0.00015	0.00111	0.00001	0.00003	0.00009
	All	8,578	0.00022	0.00277	0.00001	0.00004	0.00011
Insider sales (shares)	CEO	19,179	33,759	228,238	2,368	7,700	24,417
	CFO	19,007	11,235	80,007	1,000	3,000	9,681
	Other Insiders	49,231	15,532	135,131	1,000	3,141	10,000
	All	87,417	18,597	152,222	1,145	3,974	11,422
Insider sales amount	CEO	19,179	1,180,589	7,271,051	60,094	219,517	782,224
	CFO	19,007	399,258	1,954,967	26,612	90,133	301,826
	Other Insiders	49,231	519,538	4,652,571	28,000	96,432	314,370
	All	87,417	638,418	4,970,420	31,666	111,585	386,517
Insider sales amount scaled by market capitalization	CEO	19,111	0.00057	0.00354	0.00004	0.00013	0.00040
	CFO	18,945	0.00018	0.00053	0.00001	0.00005	0.00015
	Other Insiders	49,035	0.00025	0.00260	0.00001	0.00005	0.00016
	All	87,091	0.00030	0.00258	0.00002	0.00006	0.00020

Panel B: Firm-year Descriptive Statistics

Variables	Mean	SD	25%	Median	75%
ROA	0.044	0.156	0.017	0.051	0.093
ΔROA_{t+1}	0.000	0.141	-0.021	0.000	0.019
BM	0.528	0.570	0.255	0.437	0.702
MV (million)	5,720.26	19,198.08	375.78	1,113.70	3,457.38

Table 2

Average Cumulative Abnormal Returns after Insider Trades. This table presents average cumulative abnormal returns (CAR) for CEOs, CFOs and other insiders after they purchase and sell stocks during January 2004 and December 2012. CARs are reported for different windows (1-3 months, 1-6 months and 1-9 months) after insiders purchase and sell. In Panel A, we calculate mean CARs by Fama-French three-factor model (1993) using two-step process. Panel B reports mean CARs using Market model. ***, ** and * indicate significance at 1%, 5% and 10% respectively.

Insiders	Average CARs of		
	CFO	CEO	Other Insiders
<i><u>Panel A: Fama-French Three Factor Model</u></i>			
<i>Purchases</i>			
Months (1-3)	2.55%***	1.06%*	1.50%***
Months (1-6)	3.16%***	1.45%*	1.95%***
Months (1-9)	2.26%*	0.95%	0.58%
<i>Sales</i>			
Months (1-3)	-2.47%***	-2.32%***	-2.23%***
Months (1-6)	-4.84%***	-4.64%***	-4.36%***
Months (1-9)	-7.13%***	-6.83%***	-6.45%***
<i><u>Panel B: Market Model</u></i>			
<i>Purchases</i>			
Months (1-3)	2.27%***	1.03%*	1.15%***
Months (1-6)	2.23%**	1.36%*	1.32%***
Months (1-9)	0.81%*	1.19%	0.20%
<i>Sales</i>			
Months (1-3)	-2.80%***	-2.76%***	-2.61%***
Months (1-6)	-5.50%***	-5.46%***	-5.12%***
Months (1-9)	-8.01%***	-8.07%***	-7.42%***

Table 3

Performance of CFO and CEO Trading. This table presents the regression results of cumulative abnormal returns (CARs) from the purchase and sale transactions of the CEOs and CFOs on the superior information of firm's earnings innovation and contrarian beliefs. The dependent variable is the 3-month CARs estimated by the Fama-French three-factor model (1993) using two-step process. In Panel A, there is only one independent variable, CEO, which is a dummy variable equal to one if the transaction is made by the CEO of the firm, zero otherwise. In this setting, intercept represents the mean CARs of the CFO. Panel B and Panel C show the results for CFO and CEO purchase and sell samples respectively. If there are same types of trades of both CEO and CFO in a month, then we choose one trade for each type in that month. The description of the independent variables is as follows. ΔROA_{t+1} , the proxy for superior information of the firm's earnings, is the one-year ahead future earnings innovation measured by the change in return-on-assets. $\log BM$, book-to-market ratio then taking the natural log, is the proxy for the contrarian beliefs. Other proxies of contrarian beliefs are $SRET_2$ and $SRET_3$. For each firm in our sample, we cumulate the monthly returns for 12 months prior to the trade-month. We then pool those cumulative returns of all firms over our sample period and divide into three groups: high return, medium return and low return. $SRET_2$ is the dummy variable equal to one if the firm is in the medium return group, zero otherwise. $SRET_3$ is the dummy variable equal to one if the firm is in the high return group, zero otherwise. $\log MV$ is the natural logarithm of market value of equity. t -statistics are shown below the estimates in parentheses. ***, ** and * indicate significance at 1%, 5% and 10% respectively.

Panel A: Purchase and Sell Samples

	Trades	
	Purchase	Sell
	(1)	(2)
Intercept	0.028*** (3.02)	-0.026*** (-14.37)
CEO	-0.021* (-1.81)	0.004* (1.75)
Adj R-sq	0.0011	0.0001
Number of Obs	2,092	28,754

Panel B: Purchase Sample

	Purchase							
	CFO Purchase				CEO Purchase			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	0.029*** (3.06)	0.061*** (4.84)	0.055*** (4.40)	0.173*** (3.91)	0.007 (0.94)	0.038*** (3.84)	0.015 (1.58)	0.074** (2.19)
ΔROA_{t+1}	0.244*** (2.86)			0.196** (2.30)	0.062 (0.99)			0.032 (0.51)
log BM		0.045*** (3.83)		0.029** (2.31)		0.041*** (4.43)		0.039*** (4.18)
SRET ₂			-0.053** (-2.34)	-0.044** (-2.00)			-0.035* (-1.96)	-0.030* (-1.69)
SRET ₃			-0.070*** (-2.83)	-0.066*** (-2.67)			-0.000 (-0.02)	0.009 (0.49)
log MV				-0.015** (-2.24)				-0.005 (-0.98)
Adj R-sq	0.0093	0.0176	0.0111	0.0370	0.0000	0.0138	0.0016	0.0149
Number of Obs	762	762	762	762	1,330	1,330	1,330	1,330

Panel C: Sell Sample

	Sell							
	CFO Sell				CEO Sell			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	-0.025*** (-13.51)	-0.001 (-0.31)	-0.022*** (-6.45)	0.008 (0.78)	-0.021*** (-12.47)	-0.002 (-0.75)	-0.014*** (-4.65)	0.028*** (3.11)
ΔROA_{t+1}	0.111*** (5.28)			0.094*** (4.48)	0.132*** (7.04)			0.121*** (6.46)
log BM		0.026*** (10.93)		0.024*** (9.76)		0.020*** (9.13)		0.016*** (7.25)
SRET ₂			0.000 (0.04)	0.005 (0.99)			-0.004 (-1.08)	-0.002 (-0.54)
SRET ₃			-0.012** (-2.56)	-0.005 (-1.04)			-0.017*** (-4.20)	-0.014*** (-3.35)
log MV				-0.001 (-1.03)				-0.004*** (-3.14)
Adj R-sq	0.0019	0.0085	0.0005	0.0099	0.0033	0.0055	0.0012	0.0093
Number of Obs	13,891	13,891	13,891	13,891	14,863	14,863	14,863	14,863

Table 4

Determinants of Insider Trades. This table reports the logistic regressions of whether CEOs and CFOs purchase based on the superior information of future cash flow realizations or the contrarian beliefs. The dependent variable for models 1 to 4 is a dummy variable equal to one if the CFOs purchase and zero if they sell, and for models 5 to 8 the dependent variable is a dummy variable equal to one if the CEOs purchase and zero if they sell. Independent variables are as in Table 3. Chi-square statistics are shown below the estimates in parentheses. Odds ratios and the marginal effects are reported in the third and the fourth rows, respectively, for each variable. ***, ** and * indicate significance at 1%, 5% and 10% respectively.

	CFO				CEO			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	-2.902*** (6083.58)	-2.534*** (2310.8)	-2.330*** (2087.26)	0.693*** (12.82)	-2.414*** (7084.39)	-2.080*** (2341.21)	-1.772*** (2068.27)	1.062*** (47.71)
ΔROA_{t+1}	0.370 (0.82)			-0.126 (0.11)	1.386*** (22.57)			0.879*** (9.35)
	1.448			0.882	3.997			2.408
	0.018			-0.006	0.104			0.062
log BM		0.437*** (74.09)		0.109** (4.43)		0.384*** (88.73)		0.105** (6.63)
		1.549		1.115		1.468		1.111
		0.021		0.005		0.029		0.007
SRET ₂			-0.856*** (91.36)	-0.738*** (65.83)			-1.132*** (246.19)	-1.024*** (195.45)
			0.425	0.478			0.322	0.359
			-0.042	-0.035			-0.083	-0.073
SRET ₃			-1.172*** (143.76)	-1.195*** (142.95)			-1.158*** (249.54)	-1.194*** (251.36)
			0.310	0.303			0.314	0.303
			-0.057	-0.057			-0.085	-0.085
log MV				-0.417*** (207.85)				-0.394*** (301.67)
				0.659				0.674
				-0.020				-0.028
Pseudo R-sq	0.0001	0.0131	0.0312	0.0776	0.0023	0.0101	0.0424	0.0859
No of obs	14,653	14,653	14,653	14,653	16,193	16,193	16,193	16,193

Table 5

Insider Trading Characteristics. This table presents insider trading characteristics. Following Cohen et al. (2012), we classify the insider traders (CEOs and CFOs) as routine and opportunistic. For each insider, we analyze his/her trading history and look for consistent patterns in the timing of trades. If an insider traded a stock in the same calendar month for at least two consecutive years in the beginning of his trades in our sample, then he is identified as a routine trader. Everyone else is defined as opportunistic trader. All subsequent trades of the routine (opportunistic) traders are labeled as routine (opportunistic).

CFO		CEO	
Average number of buys per CFO	1.76	Average number of buys per CEO	2.35
% all CFO buys that are routine	34.10%	% all CEO buys that are routine	32.49%
% all CFO buys that are opportunistic	65.90%	% all CEO buys that are opportunistic	67.51%
Average number of sells per CFO	8.03	Average number of sells per CEO	9.31
% all CFO sells that are routine	52.21%	% all CEO sells that are routine	49.70%
% all CFO sells that are opportunistic	47.79%	% all CEO sells that are opportunistic	50.30%
Average number of trades per CFO	8.06	Average number of trades per CEO	9.52
% all CFO trades that are routine	51.65%	% all CEO trades that are routine	48.64%
% all CFO trades that are opportunistic	48.35%	% all CEO trades that are opportunistic	51.36%

Table 6

Opportunistic vs. Routine Trading of CFOs and CEOs. This table presents the regression results of cumulative abnormal returns (CARs) on the trading characteristics of the insiders. The dependent variable is the 3-month CARs estimated by the Fama-French three-factor model (1993) using two-step process. At first we define an insider as an opportunistic or a routine trader. A routine trader is defined as an insider who placed a trade in the same calendar month for the first two consecutive years of his/her trades in our sample. Everyone else is defined as opportunistic trader, that is, those insiders for whom we cannot detect an obvious discernible pattern in the past timing of their trades. Trades made in the same month of the subsequent years are classified as routine trades whereas trades in different months of the subsequent years are classified as opportunistic trades. The description of the independent variables is as follows. Opportunistic Buy is a dummy variable equal to one if the purchase trade of the insider is opportunistic, and zero otherwise. Routine Buy is a dummy variable equal to one if the purchase trade of the insider is routine, and zero otherwise. Opportunistic Sell and Routine Sell are defined analogously for insider sales. Other independent variables are as in Table 3. *t*-statistics are shown below the estimates in parentheses. ***, ** and * indicate significance at 1%, 5% and 10% respectively.

	CFO		CEO	
	(1)	(2)	(3)	(4)
Opportunistic Buy	0.060*** (5.33)		0.033*** (4.34)	
Routine Buy	0.022 (0.50)		0.005 (0.15)	
Opportunistic Sell		-0.015* (-1.80)		-0.012* (-1.73)
Routine Sell		-0.006 (-0.56)		-0.002 (-0.28)
ΔROA_{t+1}	0.086*** (3.84)	0.087*** (3.87)	0.084*** (3.95)	0.085*** (4.00)
log BM	0.021*** (8.03)	0.021*** (8.15)	0.011*** (4.24)	0.011*** (4.35)
SRET ₂	0.000 (0.07)	0.001 (0.14)	-0.002 (-0.39)	-0.002 (-0.52)
SRET ₃	-0.009* (-1.92)	-0.008 (-1.63)	-0.017*** (-3.49)	-0.016*** (-3.37)
log MV	-0.000 (-0.54)	0.002 (1.49)	-0.001 (-1.00)	0.001 (1.21)
Adj R-sq	0.0270	0.0246	0.0143	0.0131
Number of Obs	9,626	9,626	11,491	11,491

Table 7

Determinants of Opportunistic Trades. This table reports the logistic regressions of whether opportunistic purchase and sale trades of CEOs and CFOs are based on the superior information of future cash flow realizations or the contrarian beliefs. The dependent variable for model 1 (2) is a dummy variable equal to one if the purchase (sale) trades of CFOs are classified as opportunistic and zero otherwise. Models 3 and 4 are analogously for CEOs. Independent variables are as in Table 3. Chi-square statistics are shown below the estimates in parentheses. Odds ratios and the marginal effects are reported in the third and the fourth rows, respectively, for each variable. ***, ** and * indicate significance at 1%, 5% and 10% respectively.

	CFO		CEO	
	Opp buy	Opp sell	Opp buy	Opp sell
	(1)	(2)	(3)	(4)
Intercept	0.545*	1.243***	0.728***	0.515***
	(3.31)	(74.99)	(12.79)	(16.54)
ΔROA_{t+1}	-0.448	0.141	0.313	0.198
	(0.62)	(0.22)	(0.61)	(0.55)
	0.639	1.152	1.367	1.219
	-0.014	0.019	0.018	0.030
log BM	0.111	-0.080**	0.208***	-0.107***
	(2.01)	(4.84)	(14.90)	(10.36)
	1.117	0.923	1.231	0.899
	0.003	-0.011	0.012	-0.020
SRET ₂	-0.848***	0.403***	-1.012***	0.392***
	(34.49)	(37.02)	(114.26)	(48.51)
	0.428	1.496	0.364	1.479
	-0.027	0.055	-0.060	0.059
SRET ₃	-1.042***	0.442***	-1.288***	0.687***
	(48.69)	(42.26)	(145.37)	(121.06)
	0.353	1.555	0.276	1.987
	-0.033	0.061	-0.076	0.103
log MV	-0.463***	0.004	-0.367***	0.073***
	(105.35)	(0.05)	(148.15)	(18.09)
	0.629	1.004	0.693	1.076
	-0.015	0.001	-0.022	0.011
Pseudo R-sq	0.0782	0.0077	0.0861	0.0169
No of obs	9,626	9,626	11,491	11,491