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Continuous overreaction, insiders trading activities and momentum strategies

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Abstract

The paper investigates the influence and explanatory power of aggregate insiders trading activities on momentum trading strategies. We find that insiders trading activities can predict cross-sectional returns and can strengthen the naïve momentum effects. The risk factors such as size and BM cannot explain the strong momentum effects in our refined momentum strategies. We interpret our findings as that the continuous overreaction causes the mediate term momentum effects and over pricing. In the long term, these overly priced stocks will be corrected with passing time. The correction of over pricing causes long-term reversals.

JEL classification: G14; G12

Keywords: Trading strategies; Momentum; Contrarian; Irrational reaction

1. Introduction

A number of papers have provided evidence that the trading strategies based on past securities returns can beat the market. Jegadeesh and Titman (1993) show that the strategies by buying stocks with high returns over the previous 3–12 months and selling stocks with poor returns over the same time period can generate significant abnormal returns over a medium holding period of 3–12 months. A lot of explanations have been provided. Jegadeesh and Titman (1993) suggest that a

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more sophisticated model based on investor behaviour is needed to explain the anomaly, while some others as Conrad and Kaul (1998) attribute the source of the profits as the cross-sectional difference of mean stock returns. Grinblatt and Moskowitz (1999) proposed that the industry momentum is the key element in explaining the return persistence anomalies. However, we find that the industry factor does not sound that good in explaining our insiders trading activities refined momentum strategies. Grundy and Martin (2001) also document that industry momentum alone does not explain the profitability of momentum strategies.

Nowadays, more and more people don't believe that the investors act rationally as assumed in the classical asset pricing theory. Some researchers turn to look for the irrational explaining of the momentum effects. Most of these behavioural studies are based on the experimental cognitive psychology findings. Daniel, Hirshleifer and Subramanyam (Daniel et al., 1998) propose a continuous overreaction model based on two psychological findings: people are overconfident on the private signals and attribution bias. They attribute the momentum effects to the overreaction to the private signals and underreaction to the public signals and the eventual correction by public signals is the cause of long-term reversals. On the other hand, Barberis, Shleifer and Vishny (Barberis et al., 1998) propose that the short-term momentum effects and long-term contrarian effects are caused by the investors' falsely perceiving that there are two earning regimes. Hong and Stein (1999) propose another irrational model that does not rely on psychology findings. In their model, there are 'two boundedly rational agents': newswatchers and momentum traders. The underreaction of newswatchers causes short-term momentum effects. The early momentum traders will take the chance and profit by trend-chasing and push up/down the winner/loser's price further and attract more momentum traders enter in. These later entered momentum traders will push up/down the winner/loser's price too high and cause overreaction.

The motivation of the study is that if the momentum effects are the results of investors irrational reaction, how will they react on the insiders trading activities? The paper investigates the influence of insiders trading and explanatory power of these trading activities on the momentum effects. As described in some literatures, the insiders, such as executives and managers, should know much more about their own company than any outsiders. Many previous literatures have provided evidence that insiders trading activities can predict the cross-sectional returns. Seyhun (1992) shows that the aggregate insiders trading activity predicts cross-sectional future stock returns during the period 1975–1989. He attributes his findings as 'both the changes in business conditions as well as movements away from fundamentals contribute to the information content of aggregate insider trading'. Lakonishok and Lee (1998) also provide evidence that the aggregate insiders trading can predict the market movements over the period from 1975 to 1995. Consistency, we also find that the aggregate insiders trading activities contain valuable information in predicting cross-sectional stock returns during the period from 1985 to 1997. Hence, the insiders trading should be a good indication of how prospective the company is. In the study, we introduce the insiders trading activities in the naïve momentum strategy portfolio selection process to refine the naïve momentum

strategies. All stocks are sorted by two standards: past return performance and insiders trading activities in the previous period. We then form portfolios on the intersections of the sorted groups on the two standards. The performance of these intersectional portfolios is studied. The stocks performed good (bad) and bought (sold) by insiders in the past falls into the trend regime of Barberis et al. (1998) and stocks performed good (bad) and sold (bought) by insiders in the past falls into mean-reverting regime of Barberis et al. (1998). As predicted by Barberis et al. (1998), we may observe that the momentum effects are negative among stocks in the trend regime because of overreaction and positive among stocks in the mean-reverting regime because of underreaction. As stated above, Daniel et al. (1998) tells a different story. The story of Daniel et al. (1998) is that the short-term momentum effects and long-run reversals are caused by the self-attribution bias. Specifically, Daniel et al. (1998) predicts that stocks performed good (bad) and bought (sold) by insiders in the past will show a very strong momentum effect and long-run reversal.

The contribution of the paper lays on the follows: First, The insiders trading activities have the ability to predict cross-sectional stock returns in US market during the period January 1985–November 1996. We find that it can earn positive profit as long as 36 months after the portfolio formation. Second, the momentum effects exist among stocks in US markets during our study period. We repeated the methods of Jegadeesh and Titman (1993). The results are similar with their findings. Third, the risk factors cannot explain the insiders trading activities refined momentum effects. The momentum effects are still obvious after we control the size and BM factors. Forth, the industry factor has weak influence on our refined momentum effects. Fifth, we attribute the continuous overreaction as the source of momentum effects. Our results supports the prediction made by the model of Daniel et al. (1998).

The remainder of the paper is organized as follows. Section 2 describes the databases and the insiders trading activity measurement methods used in the study. Section 3 reports the empirical findings are discussions. Section 4 concludes the paper.

2. Databases and measurement methods of insiders trading activities

Our sample includes all non-financial common shares listed in CRSP and COMPUSTAT files. Because of data availability of insiders trading data record, our research only covers the period from January 1985 to November 1996. Section 16 of Securities and Exchange Act of 1934 (SEA) requires all insiders report any transactions with the SEC by 10th of the month following their transaction. SEA defines an insider as an officer, director, an individual in policy-making position or a beneficial owner (holder of 10% or more). We drew our data from the First Call Insider Research (First Call). In our research, we only consider open market transaction of common shares.

In the study, we choose the aggregate insiders trading ratio (AITR) as the measurement method. Seyhun (1992) used the net trading numbers as the measurement methods of aggregate insiders trading, while Lakonishok and Lee (1998) use the net trading ratio as the measurement of insiders trading activities. The reason we choose the method is that the method makes the balance between the quality and quantity of insiders trading information. When the Net Trading Number method is used, an insider-buy is recognized when we observe more buy transactions executed by insiders during the forming period, i.e. we pay more attention to the quality of these transactions, and less to the quantity of these transactions. On the other hand, when we use the Net Trading Shares method, we pay more attention to the transaction quantity and less to the transaction quality. By using the AITR, we can quantify the strength of these trading signals. The aggregate insiders trading ratio is defined as:

$$\mathrm{AITR} = \frac{B - S}{B + S} \tag{1}$$

where B is dollar value of shares bought by insiders during the forming period, S is the dollar value of shares sold by insiders in the forming period. If the ratio is greater than 0, we treat this as an insiders-buy, and if the ratio is less than 0, we treat it as an insiders-sell.

3. Empirical findings and discussions

3.1. The naïve momentum effects

The naïve momentum strategies are formed following Jegadeesh and Titman (1993). As stated in Section 1, the SEC requires all insiders to fill the Form 4 no later than the 10th of the month following their transactions, the 1-month gap can guarantee that the outsiders can receive the insiders transaction information when they form their portfolios. At the beginning of each month t, all stocks are ranked by ascending order based on their performance during the period from $t - F$ to t, then five quintiles are formed based on the order. The momentum strategies are formed then by short the first quintile and use the result to buy the last quintile. The zero-position is then held for H months from month $t + 1$.

Table 1 reports the profits earned by the above method. We examined the profits of the strategies in different forming and holding time horizon. In abbreviation, we call it a Forming/Holding Strategy in the following. The profits of zero-position, the profits earned by the winners and loser portfolios are listed separately in the third to fifth columns. All of these profits are on a per-month base. The results in Table 1 show that the momentum strategies can earn a positive profit in the time horizon by holding 3–12 months. The 9/6 Strategy, as an example, can earn 1% statistical significant per month profit, compared with JT's 0.65% (no 1-month gap).

3.2. Insiders trading based momentum strategies

In this section, we examined the ability of insiders trading to predict the cross-sectional returns. The Insiders Trading Based Momentum Strategies (IBMS) is to trade by imitating the insiders trading activities. At the beginning of each month t, all the stocks' aggregate insiders trading information in the past period is calculated and we buy what insiders bought and sold in the previous period.

Table 2 reports the empirical results of insiders trading based momentum strategies using AITR method. At the beginning of each month t, each stock's AITR is calculated with the formula given in Eq. (1). Then, three portfolios are formed based on the AITR values. If AITR is greater than 0, we treat the stock as an insider-buy and set a dummy variable 1 with the stock. If AITR is less than 0, it is an insider-sell and a dummy variable -1 is set with the stock. Others are set with dummy variable 0, which represent there is no insider trading information with the stock, we call this kind of stock as insider-zero. We then form the zero-position with the processes:

Table 1
Naïve momentum strategies—1-month gap

H	F	Winner–Loser	Winner	Loser
3	3	0.0056 (3.67)	0.0112 (3.92)	0.0056 (1.58)
3	6	0.0070 (3.80)	0.0129 (4.51)	0.0059 (1.59)
3	9	0.0097 (5.17)	0.0153 (5.04)	0.0056 (1.47)
3	12	0.0089 (4.35)	0.0143 (4.80)	0.0054 (1.38)
6	3	0.0062 (5.78)	0.0114 (5.78)	0.0052 (2.30)
6	6	0.0093 (7.85)	0.0139 (6.70)	0.0047 (2.00)
6	9	0.0100 (8.36)	0.0145 (6.94)	0.0045 (1.87)
6	12	0.0076 (5.83)	0.0128 (6.47)	0.0052 (2.08)
9	3	0.0075 (9.94)	0.0121 (8.05)	0.0047 (2.89)
9	6	0.0093 (11.23)	0.0134 (8.70)	0.0041 (2.53)
9	9	0.0085 (10.45)	0.0131 (8.65)	0.0046 (2.67)
9	12	0.0061 (7.01)	0.0118 (8.07)	0.0057 (3.16)
12	3	0.0067 (10.84)	0.0118 (9.41)	0.0050 (3.71)
12	6	0.0072 (10.61)	0.0121 (9.64)	0.0050 (3.59)
12	9	0.0064 (9.50)	0.0120 (9.26)	0.0056 (3.91)
12	12	0.0047 (6.75)	0.0112 (8.94)	0.0066 (4.38)

The naive momentum strategies are formed based on F months from month $t-F$ to month t lagged returns and held for the period from month $t+1$ to $t+H+1$. There is a 1-month gap between the formation and holding period. The first two columns are values of H and F for different forming-holding strategies. In any given month, all stocks are ranked in ascending order by their returns in past F months, then five equally weighted portfolios are formed based on the order. The first quintile contains stocks that have lowest returns in past F months and the fifth quintile contains those have highest returns in past F months. In each month, we buy the fifth quintile portfolio, which we call the winner, and short the first quintile, which we call a loser. The numbers in the parentheses are t-statistics. The zero-cost position is then hold for the period from month $t+1$ to $t+H+1$. The sample period is from January 1985 to November 1996.

Table 2
Insider-based momentum trading strategies—AITR

H	F	Buy–Sell	Insider-buy	Insider-sell
3	3	0.0057 (7.43)	0.0159 (5.91)	0.0102 (3.68)
3	6	0.0046 (6.47)	0.0151 (5.51)	0.0104 (3.71)
3	9	0.0038 (5.30)	0.0144 (5.26)	0.0106 (3.71)
3	12	0.0037 (4.48)	0.0135 (4.84)	0.0098 (3.44)
6	3	0.0044 (7.74)	0.0148 (7.91)	0.0104 (5.64)
6	6	0.0037 (6.95)	0.0142 (7.52)	0.0105 (5.60)
6	9	0.0033 (5.83)	0.0135 (7.10)	0.0102 (5.37)
6	12	0.0030 (4.82)	0.0126 (6.67)	0.0096 (5.06)
9	3	0.0039 (8.22)	0.0143 (9.90)	0.0105 (7.75)
9	6	0.0034 (7.64)	0.0136 (9.38)	0.0102 (7.44)
9	9	0.0030 (6.50)	0.0128 (8.93)	0.0098 (7.14)
9	12	0.0029 (5.95)	0.0125 (8.53)	0.0095 (6.88)
12	3	0.0037 (8.00)	0.0140 (11.42)	0.0104 (9.35)
12	6	0.0031 (7.38)	0.0132 (10.87)	0.0100 (8.92)
12	9	0.0029 (6.44)	0.0127 (10.37)	0.0099 (8.62)
12	12	0.0028 (6.21)	0.0126 (9.97)	0.0097 (8.46)

An insiders trading based momentum strategy is formed by the following process: At the beginning of a given month t, we long insider-buy stocks and short the insider-sell stocks during past F months from month $t-F$ to month t. The position is held then for H month from $t+1$ to $t+H+1$. An insider-buy is defined as the stock whose aggregate insiders trading ratio is greater than 0. An insider-sell is defined as the stock whose aggregate insiders trading ratio is less than 0. The aggregate insiders trading ratio is the ratio of the net dollar value of insiders trading (dollar value of aggregate insiders purchasing-dollar value of aggregate insiders selling) in past F months and the total dollar value of insiders trading (dollar value of aggregate insiders purchasing + dollar value of aggregate insiders selling) in past F months. All the results are reported on a per month base. The t-statistics are reported in parentheses.

$$R_t = R_{bt} - R_{st} \qquad R_{bt} = \frac{1}{B}\sum_{i=1}^{B} r_{it}; \qquad R_{st} = \frac{1}{S}\sum_{i=1}^{S} r_{it}; \tag{2}$$

where R_t is the zero-position return; R_{bt} is the average return of insider-buyer portfolio; B is the number of stocks which are insider-buy in the forming period; R_{st} is the average return of insider-sell portfolio; S is the number of stocks which are insider-sell in the forming period.

The position is then kept in the following H months from month $t+1$. Again, to make sure the outsiders can get the insiders trading information when we form the portfolio, a 1-month gap is used between the portfolio forming and holding period. The third column to fifth column of Table 2 list the average profits of zero-position, insider-buy portfolio and insider-sell portfolio and their corresponding t-statistics respectively. The results show that all these insider based momentum strategies can earn statistically significant positive return. This finding is consistent with those of Seyhun (1998). The results show us that the insiders trading activities contain valuable information and can be used to predict future cross-sectional returns in USA market during the period January 1985–November 1996.

3.3. Insider trading refined momentum strategies

In this section, we introduce the insider trading information in the processes of momentum portfolio forming to study the influence of insider trading activities on naïve momentum effects. The insider trading refined momentum strategies are formed as the following processes. First, five quintiles are formed based on the past return performance order in the same procedure described in Section 3.1. Each stock is then assigned a dummy variable, 1, −1 or 0, based on their AITR in past F months. Six portfolios are then formed based on past return performance quintiles and insider trading dummy variables. Winner and insider-buy (WB) contains those stocks are both winners and insider-buy. The WZ, WS, LB, LZ, and LS are defined in the same way. These positions are then held for H months. Again, 1-month gap is left between forming and holding period. The zero-positions are then formed by:

$$R_t^{WBLS} = R_t^{WB} - R_t^{LS} \qquad R_t^{WB} = \frac{1}{WB}\sum_{i=1}^{WB} r_{it}^{WB}; \qquad R_t^{LS} = \frac{1}{LS_i}\sum_{1}^{LS} r_{it}^{LS}; \tag{3}$$

where WB(LS) is the number of stocks in the WB(LS) portfolio; $R_t^{WB}(R_t^{LS})$ is the average equally weighted return of portfolio WB(LS); R_t^{WBLS} is the zero-position return.

The zero-position, WBLS, is our refined momentum strategy. All other zero-positions are defined in the same way.

Table 3 reports the average/expected profits earned by these portfolios and positions and their corresponding t-statistics. The third to ninth columns report the portfolio returns of WB, WZ, WS, LB, LZ and LS, respectively. The last two columns report the profits earned by WBLS, insiders trading refined momentum strategies, and WZLZ, the momentum strategies among stocks that contain no insiders trading information. Compare the profits earned by the refined momentum strategy with the profits earned by naïve momentum strategy and insider trading based momentum strategy, the refined strategy has a much higher profit earning ability than the other two. The 6/6 strategy as an example, the insiders trading refined momentum strategy can earn an average profit of 1.66% per month, while the naïve momentum strategy can only earn 0.93% per month and insider trading based momentum strategy can earn 0.37% per month. Secondly, let's compare the results column by column in Table 3. As stated above, we separate both the winner and loser quintile into three portfolios based on insiders trading activities, insider-buy, insider-zero and insider-sell. The insider-buy portfolios earn highest return in both winner and loser group. Here, again we take the 6/6 strategy as an example. The insider-buy portfolio in the winner-group of the 6/6 strategy can earn 1.85% per month, while the insider-zero and insider-sell in the winner-group of the same forming and holding period can only earn 1.24 and 1.41% respectively. A similar thing happened in the loser-group, the per month returns earned by the 6/6 insider-buy, insider-zero and insider-sell portfolios are 0.77, 0.45 and 0.19% respectively. The insider-sell in the loser-group earns the lowest return among the six portfolios in all different time-horizon strategies. The analysis of the returns of the

Table 3
Insiders trading refined momentum strategies

H	F	Winner			Losers			WBLS	WZLZ
		Insider-buy	Insider-zero	Insider-sell	Insider-buy	Insider-zero	Insider-sell		
3	3	0.0187 (6.48)	0.0099 (3.46)	0.0110 (3.69)	0.0113 (3.18)	0.0054 (1.51)	0.0010 (0.29)	0.0177 (10.91)	0.0044 (2.95)
3	6	0.0181 (6.44)	0.0113 (3.99)	0.0131 (4.28)	0.0102 (2.67)	0.0062 (1.62)	0.0009 (0.25)	0.0172 (9.64)	0.0052 (2.74)
3	9	0.0198 (6.73)	0.0134 (4.48)	0.0153 (4.77)	0.0080 (2.07)	0.0066 (1.69)	0.0010 (0.27)	0.0188 (9.33)	0.0067 (3.37)
3	12	0.0186 (6.37)	0.0121 (4.19)	0.0144 (4.52)	0.0078 (1.90)	0.0063 (1.55)	0.0020 (0.51)	0.0166 (7.96)	0.0058 (2.65)
6	3	0.0174 (8.54)	0.0102 (5.11)	0.0116 (5.73)	0.0098 (4.07)	0.0050 (2.17)	0.0017 (0.76)	0.0159 (12.63)	0.0051 (4.94)
6	6	0.0185 (8.95)	0.0124 (5.94)	0.0141 (6.46)	0.0077 (3.22)	0.0045 (1.90)	0.0019 (0.83)	0.0166 (13.26)	0.0078 (6.38)
6	9	0.0192 (8.95)	0.0127 (6.11)	0.0145 (6.63)	0.0065 (2.64)	0.0047 (1.89)	0.0024 (0.97)	0.0168 (11.86)	0.0080 (6.26)
6	12	0.0167 (8.50)	0.0107 (5.37)	0.0129 (6.30)	0.0070 (2.70)	0.0053 (2.09)	0.0034 (1.33)	0.0132 (9.17)	0.0053 (3.97)
9	3	0.0179 (10.99)	0.0110 (7.25)	0.0121 (7.94)	0.0087 (5.02)	0.0042 (2.57)	0.0028 (1.75)	0.0151 (14.5)	0.0068 (9.35)
9	6	0.0179 (11.37)	0.0121 (7.65)	0.0133 (8.54)	0.0067 (3.94)	0.0039 (2.30)	0.0026 (1.54)	0.0153 (15.34)	0.0082 (9.59)
9	9	0.0174 (11.19)	0.0116 (7.32)	0.0128 (8.50)	0.0067 (3.76)	0.0044 (2.48)	0.0034 (1.88)	0.0134 (13.65)	0.0072 (8.56)
9	12	0.0155 (10.45)	0.0099 (6.51)	0.0118 (8.03)	0.0082 (4.21)	0.0053 (2.90)	0.0044 (2.38)	0.0111) (10.5)	0.0046 (5.30)
12	3	0.0174 (11.94)	0.0107 (8.51)	0.0117 (9.54)	0.0088 (6.12)	0.0044 (3.24)	0.0042 (2.94)	0.0132 (13.04)	0.0063 (10.69)
12	6	0.0162 (12.52)	0.0109 (8.37)	0.0121 (9.61)	0.0075 (5.28)	0.0045 (3.18)	0.0041 (2.82)	0.0121 (14.02)	0.0064 (9.71)
12	9	0.0160 (11.86)	0.0104 (7.75)	0.0120 (9.25)	0.0079 (5.23)	0.0050 (3.43)	0.0052 (3.31)	0.0108 (11.7)	0.0054 (8.04)
12	12	0.015 (11.22)	0.0093 (7.22)	0.0114 (8.96)	0.0091 (5.44)	0.0058 (3.88)	0.0059 (3.75)	0.0088 (9.74)	0.0036 (5.22)

At the beginning of each month t, all stocks are ranked in ascending order by their returns in part F months from month $t-F$ to t. Five quintile equally weighted portfolios are formed based on the order. The aggregate insiders trading ratios are also measured in the same period. Four portfolios are formed then: the intersection of winners and insider-buy, the intersection of winners and insider-sell or no-insider trading, the intersection of losers and insider-sell, the intersection of losers and insider-buy or no insiders trading. Then hold these positions for the period from $t+1$ to $t+H+1$. The t-statistics are reported in parentheses. All results are reported on a per month base.

zero-positions or the spread between the return of these portfolios can draw a clearer picture for us. The WBLS, insiders trading refined momentum strategy, earns higher return than WZLZ. The 6/6 WBLS earns 1.66% per month, compared with WZLZ's 0.78%. As designed, the WBLS captures the effects of both the naïve return momentum and insiders trading based momentum. The WZLZ captures the effects of the return momentum among those stocks that don't have insider trading information. The WBLS can earn as much as two times the profits earned by the naïve momentum strategies and five times as much as the profits earned by insiders trading based momentum strategies. We also compared the WZLZ, the momentum strategy among stocks that don't have clear insider trading information, with the naïve momentum strategies. We find that the WZLZ's returns are always less than the naïve momentum strategies in any time horizon. It is reasonable to believe that part of profits earned by naïve momentum strategies is captured by WBLS, the refined momentum strategies.

We would like to interpret our findings as follows. The investors overreact on the stock when they observe insiders are buying (selling) a stock. If the public information can confirm their findings, they will overreact continuously. The continuous overreaction is the cause of momentum effects. Based on the above argument, investor will overreact on WB and LS continuously and underreact on WZ and LZ. The theory will predict that: the WB earns the highest return, while the LS earn the lowest return. The results in Table 4 confirmed the prediction. However, we still cannot reject the possibility that these portfolios capture different risk groups. The WB may be composed by higher risk stocks, while the LS may be composed by the lower risk stocks. The insider may intend to buy small growth company to obtain abnormal returns and to sell bigger matured value companies for liquidating or other non-abnormal reasons. The profits earned by these WBLS reflect the return spread among different risk level stocks. To study whether the risk dispersion is the source of the profits earned by these zero-positions, we will study the performance of these strategies by adjusting risk factors.

Table 4 reports the average number of stocks in each of portfolios formed above. The table shows that there is at least 100 more firms in each portfolios we studied.

Table 4
Average number of stocks in each portfolio

Portfolio forming	WB	WZ	WS	LB	LZ	LS
3	154	737	306	153	855	191
6	199	554	412	201	703	261
9	211	454	468	229	605	299
12	212	387	503	246	534	322
18	202	308	533	262	439	344
24	192	261	535	258	375	356
30	179	226	533	250	331	357
36	166	199	525	241	299	350

3.4. Adjust the size and BM factors

To study the risk dispersion between the WB and LS, we first considered two widely accepted factors: size and BM (book equity/market equity ratio). We first rank all the New York Stock Exchange stocks in the Center for Research in Stock Prices (CRSP) database on size (share price multiply shares outstanding in June of each year t from 1985 to 1996). Five quintiles are then formed by the rank and determine four breakpoints. The stocks in the American Stock Exchange (AMEX) and NASDAQ are then allocated to the five groups based on the four breakpoints. All stocks are also broken into five BM groups based on the breakpoints determined by stocks in NYSE. We obtain the book value of each company from COMPUSTAT and match it with the stock market information such as price and shares outstanding from CRSP. To guarantee the arrival of annual report, the year t's BM breakpoints are determined by the BM ratio in December of year $t-1$. We rank all NYSE stocks into five quintiles on BM ratio and determine four BM breakpoints. All the stocks in NYSE, AMEX and NASDAQ are then allocated into five groups based on these four BM breakpoints. Twenty five equal-weighted size-BM portfolios are then formed as the intersection of these five size-sorted groups and five BM sorted groups. The monthly returns of these portfolios are calculated from July of year t to June of year $t+1$. Each stock is then matched with its corresponding size-BM portfolios and its return is adjusted by the matched size-BM portfolio return. The refined momentum portfolios are formed following the same processes described in Section 3.3. At the beginning of each month t, six portfolios: WB, WZ, WS, LB, LZ, LS are formed based on past F month return performance and AITR dummies. These positions are held for H months from $t+1$ and the equal-weighted adjusted returns of these portfolios are calculated.

Table 5 reports the adjusted returns of individual portfolios and refined momentum strategies. Compare the size and BM adjusted profits with the unadjusted profits in Section 3.3, we can find that the WBLS can still earn significant profits, while the WZLZ can only earn a very low profit. The adjusted profit earned by WBLS is 0.32% per month now. The 6/6 WZLZ can earn 0.1% per month. If we consider the transaction cost, the WZLZ cannot earn profit any more. The findings show that the profits earned by our refined strategies cannot be explained by risk factors. However, momentum effects disappeared among those stocks without clear insider trading information. After controlling the insiders trading information and the risk factors, the momentum effects disappeared. We argue that the naïve momentum effects may come from two sources: the risk dispersion effects and the effects caused by irrational reaction of investors.

3.5. Adjust the industry factor

Grinblatt and Moskowitz (1999) state that the industry component of stock returns accounts for much of the individual stock momentum anomaly. In this section, we study influence of industry factor in our refined strategies. In each month, the stocks in NYSE, AMEX and NASDAQ in CRSP database are sorted

Table 5
Insiders trading refined momentum strategies-adjusted by size and BM

H	F	Winner			Loser			WBLS	WZLZ
		Insider-buy	Insider-zero	Insider-sell	Insider-buy	Insider-zero	Insider-sell		
3	3	0.0011 (3.82)	−0.0002 (−1.52)	−0.0001 (−0.53)	0.0006 (1.60)	−0.0006 (−3.08)	−0.0012 (−2.97)	0.0023 (4.46)	0.0004 (1.39)
3	6	0.0016 (6.07)	−0.0002 (−1.34)	0.0005 (2.04)	0.0007 (1.89)	−0.0006 (−2.61)	−0.0020 (−4.79)	0.0036 (6.31)	0.0004 (1.18)
3	9	0.0015 (6.10)	0.0001 (0.60)	0.0010 (3.80)	−0.0001 (−0.40)	−0.0006 (−2.01)	−0.0020 (−4.60)	0.0034 (6.01)	0.0007 (1.84)
3	12	0.0017 (5.93)	0.0000 (−0.02)	0.0007 (2.78)	−0.0004 (−1.01)	−0.0003 (−0.94)	−0.0020 (−3.91)	0.0037 (5.42)	0.0003 (0.75)
6	3	0.0010 (4.50)	−0.0001 (−1.23)	0.0003 (1.25)	0.0001 (0.55)	−0.0009 (−6.38)	−0.0017 (−6.06)	0.0027 (6.61)	0.0007 (3.45)
6	6	0.0013 (7.31)	−0.0001 (−0.65)	0.0008 (3.90)	−0.0002 (−0.96)	−0.0011 (−6.90)	−0.0019 (−7.00)	0.0032 (8.66)	0.0010 (4.75)
6	9	0.0015 (8.12)	0.0001 (0.82)	0.0009 (4.52)	−0.0006 (−2.76)	−0.0009 (−4.20)	−0.0020 (−6.50)	0.0035 (8.30)	0.0010 (3.63)
6	12	0.0014 (6.94)	0.0000 (−0.32)	0.0007 (3.78)	−0.0005 (−2.03)	−0.0005 (−2.19)	−0.0020 (−6.01)	0.0033 (7.23)	0.0005 (1.69)
9	3	0.0009 (5.26)	0.0001 (0.96)	0.0004 (2.08)	−0.0001 (−0.58)	−0.0010 (−10.28	−0.0016 (−7.34)	0.0025 (8.03)	0.0011 (7.50)
9	6	0.0012 (7.42)	0.0001 (0.66)	0.0006 (3.77)	−0.0005 (−2.68)	−0.0011 (−9.04)	−0.0018 (−8.38)	0.0030 (9.63)	0.0012 (6.80)
9	9	0.0013 (8.08)	0.0001 (1.17)	0.0006 (3.84)	−0.0006 (−3.34)	−0.0009 (−5.17)	−0.0017 (−7.42)	0.0029 (8.91)	0.0011 (4.66)
9	12	0.0012 (6.70)	0.0001 (0.42)	0.0005 (3.23)	−0.0004 (−1.86)	−0.0007 (−3.99)	−0.0017 (−7.28)	0.0028 (8.18)	0.0008 (3.77)
12	3	0.0009 (5.23)	0.0001 (1.09)	0.0003 (2.02)	−0.0002 (−0.97)	−0.0011 (−12.13)	−0.0014 (−7.59)	0.0023 (8.04)	0.0011 (8.51)
12	6	0.0010 (6.63)	0.0000 (0.32)	0.0004 (2.99)	−0.0004 (−2.08)	−0.0011 (−10.33)	−0.0014 (−7.78)	0.0024 (8.95)	0.0011 (7.30)

Table 5 *(continued)*

H	*F*	Winner			Loser			WBLS	WZLZ
		Insider-buy	Insider-zero	Insider-sell	Insider-buy	Insider-zero	Insider-sell		
12	9	0.0010 (6.89)	0.0001 (0.51)	0.0004 (3.06)	−0.0004 (−2.42)	−0.0010 (−8.77)	−0.0014 (−7.23)	0.0023 (8.31)	0.0011 (6.55)
12	12	0.0010 (5.65)	−0.0001 (−0.67)	0.0004 (2.90)	−0.0003 (−1.82)	−0.0008 (−6.40)	−0.0015 (−7.91)	0.0024 (8.44)	0.0008 (4.67)

The table reports the insiders trading momentum strategy profits after size (price times shares outstanding) and book to market ratio (BM, book value/market value) effects are adjusted. In each year t, the breakpoints for the size quintiles are determined in June using all stocks in NYSE. All the stocks in NYSE, AMEX and NASDAQ are then allocated into the five size-sorted groups based on the breakpoints. The breakpoints for the five BM sorted quintiles are determined in December of year $t-1$ using all NYSE stocks on CRSP, and then all stocks in NYSE, AMEX and NASDAQ are allocated into five BM sorted groups based on these BM breakpoints. The intersections of the five size sorted and five BM sorted groups are the Size-BM portfolios. Every month, the stock returns are then adjusted by its matched Size-BM portfolios returns. These adjusted returns are then used to in the insiders trading refined strategies following the processes described in Section 3.3.

into 20 industry groups based on Standard Industry Code (SIC). The equal-weighted monthly returns of the 20 groups are then calculated. Each stock is then matched with its corresponding industry groups and the returns are deducted by the returns of industry portfolios. We then form portfolios following the processes described in Section 3.3.

Table 6 reports the profits earned by refined momentum strategies after adjust industry factors. The results show that the momentum effects are not removed after the industry factor is adjusted. The 6/6 refined momentum strategy as an example, the strategy can earn 1.66% per month before we adjust the industry factors, while it still can earn 1.60% per month after adjusting the industry factor. This should support our belief that the industry factor cannot capture the momentum effects of our refined strategy. We further studied the influence of industry factor by combining it with the size and BM factors together.

To do so, we first set up the equal-weighted Size-BM portfolios using the method described in Section 3.4. Each stock is then matched with its corresponding Size-BM portfolios. All stocks in NYSE, AMEX and NASDAQ are then sorted into 20 industry groups on SIC code and the equal-weighted monthly return of these industry portfolios are then matched with each stock. The monthly return of each stock is then adjusted by the return of its corresponding of Size-BM and industry portfolios. Table 7 reports the size, BM and industry adjusted returns of the individual portfolios, and refined momentum strategies. Not surprising, the results reported in Table 7 are similar with the results in Table 5. As before, we use the 6/6 strategies as an example, the size, BM and industry earned by WBLS, WBLB, WBWS, WSLS, LBLS and WZLZ are 0.32, 0.15, 0.07, 0.25, 0.17, and 0.09% per month respectively, while size and adjusted profits earned by the same strategies are 0.32, 0.15, 0.06, 0.27, 0.17 and 0.1% per month, the momentum effects still exist. The findings again reject the assumption that the risk factors or industry factor can explain the momentum effects. Our interpretation is an improvement of the irrational models in previous literatures and based on the experimental psychology findings. There are at least two widely accepted psychology findings: First, people are slow to renew their beliefs when they get the new information. Second, self-attribution bias, people do not judge outcomes on an absolute scale, but compare outcomes with an initial reference point. When the coming signal is consistent with their initial observations, they will overreact, but when the coming signal is not consistent with their initial observation, they will be slow to change their initial beliefs and only react modestly. The self-attribution bias may provide us the possibility of the continuous overreaction. When the coming signals are consistent with initial observations, investor will overreact continuously. This is consistent with the argument of Daniel et al. (1998). The continuous overreaction is the source of mediate term momentum effects. In long run, the overly price will be corrected and induce long-term reversals.

The story has the following implications: First, investors overreact on WB and LS continuously. Second, they only react modestly on WS, LB, WZ and LZ. These implications will predict that the WBLS will capture the widest spread and WSLB has the narrowest spread. The spreads of WSLS, WZLZ, WBLB, LBLS and

Table 6
Insiders trading refined momentum strategies-adjust industry factors

H	F	Winner			Loser			WBLS	WZLZ
		Insider-buy	Insider-zero	Insider-sell	Insider-buy	Insider-zero	Insider-sell		
3	3	0.0080 (10.68)	−0.0006 (−0.93)	0.0002 (0.18)	0.0012 (1.08)	−0.0046 (−3.88)	−0.0093 (−8.99)	0.0173 (12.74)	0.0040 (2.97)
3	6	0.0073 (9.84)	0.0006 (0.96)	0.0020 (2.01)	−0.0001 (−0.08)	−0.0041 (−2.80)	−0.0098 (−9.15)	0.0172 (11.17)	0.0047 (2.76)
3	9	0.0086 (11.41)	0.0021 (2.88)	0.0035 (3.79)	−0.0021 (−1.53)	−0.0036 (−2.22)	−0.0094 (−7.34)	0.0180 (10.00)	0.0056 (3.01)
3	12	0.0082 (11.29)	0.0019 (2.84)	0.0035 (3.65)	−0.0018 (−1.19)	−0.0035 (−2.00)	−0.0076 (−5.74)	0.0158 (8.66)	0.0054 (2.58)
6	3	0.0070 (11.57)	−0.0001 (−0.31)	0.0009 (1.24)	−0.0002 (−0.24)	−0.0049 (−6.77)	−0.0086 (−11.87)	0.0156 (14.38)	0.0048 (5.32)
6	6	0.0077 (14.29)	0.0015 (2.95)	0.0028 (4.06)	−0.0021 (−2.75)	−0.0054 (−6.18)	−0.0083 (−10.58)	0.0160 (14.40)	0.0069 (6.39)
6	9	0.0084 (14.72)	0.0021 (4.00)	0.0034 (5.25)	−0.0029 (−3.60)	−0.0050 (−5.25)	−0.0073 (−7.88)	0.0157 (12.49)	0.0071 (6.05)
6	12	0.0069 (12.58)	0.0011 (2.18)	0.0028 (4.26)	−0.0021 (−2.32)	−0.0042 (−4.14)	−0.0057 (−6.38)	0.0125 (10.12)	0.0053 (4.27)
9	3	0.0074 (13.83)	0.0006 (1.93)	0.0014 (2.45)	−0.0008 (−1.18)	−0.0054 (−10.85)	−0.0069 (−11.49)	0.0143 (15.89)	0.0060 (9.93)
9	6	0.0074 (17.00)	0.0018 (4.50)	0.0025 (5.01)	−0.0026 (−4.68)	−0.0056 (−9.72)	−0.0070 (−11.44)	0.0144 (16.64)	0.0074 (10.14)
9	9	0.0072 (19.14)	0.0018 (4.07)	0.0024 (5.06)	−0.0023 (−3.89)	−0.0049 (−7.83)	−0.0057 (−8.51)	0.0129 (14.51)	0.0067 (8.91)
9	12	0.0058 (15.08)	0.0006 (1.50)	0.0019 (3.92)	−0.0011 (−1.52)	−0.0042 (−6.26)	−0.0048 (−7.01)	0.0106 (11.47)	0.0048 (6.11)
12	3	0.0070 (13.00)	0.0006 (2.16)	0.0012 (2.44)	−0.0006 (−1.05)	−0.0052 (−12.94)	−0.0055 (−9.73)	0.0125 (14.26)	0.0058 (11.40)
12	6	0.0061 (17.83)	0.0010 (3.47)	0.0018 (3.91)	−0.0018 (−3.76)	−0.0050 (−11.18)	−0.0054 (−9.75)	0.0115 (15.35)	0.0061 (10.81)
12	9	0.0059 (16.70)	0.0008 (2.28)	0.0018 (4.09)	−0.0014 (−2.76)	−0.0046 (−9.21)	−0.0043 (−6.85)	0.0101 (12.32)	0.0054 (8.74)
12	12	0.0049 (13.92)	−0.0001 (−0.17)	0.0015 (3.25)	−0.0005 (−0.87)	−0.0041 (−7.99)	−0.0036 (−5.86)	0.0085 (10.48)	0.0040 (6.35)

The table reports the insiders trading momentum strategy profits earned by insider trading refined momentum strategies after industry effects are adjusted. Twenty industry portfolios are formed by SIC code. The monthly returns of these industry portfolios are then calculated. Monthly return of each stock is then adjusted by the corresponding industry return. These adjusted returns are then used to in the insiders trading refined strategies.

Table 7
Insiders trading refined momentum strategies-adjusted size, BM and industry

H	F	Winner			Loser			WBLS	WZLZ
		Insider-buy	Insider-zero	Insider-sell	Insider-buy	Insider-zero	Insider-sell		
3	3	0.0010 (3.78)	−0.0002 (−1.44)	−0.0002 (−0.92)	0.0005 (1.54)	−0.0006 (−2.97)	−0.0012 (−3.13)	0.0022 (4.61)	0.0004 (1.36)
3	6	0.0015 (6.14)	−0.0002 (−1.50)	0.0003 (1.43)	0.0007 (1.82)	−0.0006 (−2.55)	−0.0021 (−5.12)	0.0036 (6.61)	0.0003 (1.10)
3	9	0.0014 (6.05)	0.0001 (0.48)	0.0007 (3.04)	−0.0001 (−0.27)	−0.0006 (−1.97)	−0.0019 (−4.70)	0.0033 (6.15)	0.0006 (1.77)
3	12	0.0016 (5.75)	0.0000 (0.24)	0.0006 (2.20)	−0.0004 (−1.03)	−0.0004 (−1.13)	−0.0018 (−3.91)	0.0035 (5.45)	0.0004 (1.01)
6	3	0.0009 (4.36)	−0.0002 (−1.59)	0.0002 (0.82)	0.0001 (0.49)	−0.0008 (−6.05)	−0.0017 (−6.62)	0.0027 (6.98)	0.0007 (3.29)
6	6	0.0013 (7.23)	−0.0001 (−1.00)	0.0006 (3.01)	−0.0002 (−0.81)	−0.0010 (−6.46)	−0.0019 (−7.39)	0.0032 (8.99)	0.0009 (4.45)
6	9	0.0014 (7.63)	0.0001 (1.10)	0.0007 (3.65)	−0.0006 (−2.54)	−0.0008 (−4.38)	−0.0019 (−6.55)	0.0033 (8.14)	0.0010 (3.92)
6	12	0.0013 (6.82)	0.0001 (0.49)	0.0006 (3.10)	−0.0006 (−2.24)	−0.0006 (−2.78)	−0.0018 (−6.13)	0.0031 (7.32)	0.0007 (2.55)
9	3	0.0008 (5.01)	0.0001 (0.74)	0.0002 (1.23)	−0.0001 (−0.43)	−0.0010 (−9.54)	−0.0015 (−7.64)	0.0024 (8.13)	0.0010 (7.07)
9	6	0.0011 (7.26)	0.0001 (0.79)	0.0004 (2.51)	−0.0005 (−2.47)	−0.0011 (−8.96)	−0.0017 (−8.51)	0.0029 (9.71)	0.0012 (6.88)
9	9	0.0012 (7.50)	0.0002 (1.85)	0.0004 (2.69)	−0.0005 (−3.20)	−0.0009 (−5.90)	−0.0016 (−7.52)	0.0028 (8.64)	0.0012 (5.56)
9	12	0.0011 (6.44)	0.0002 (1.61)	0.0003 (2.44)	−0.0004 (−2.04)	−0.0008 (−4.95)	−0.0016 (−7.61)	0.0027 (8.24)	0.0010 (5.30)
12	3	0.0008 (4.84)	0.0001 (1.19)	0.0001 (0.92)	−0.0002 (−0.85)	−0.0010 (−11.29)	−0.0014 (−7.89)	0.0022 (8.00)	0.0011 (8.20)
12	6	0.0009 (6.21)	0.0001 (0.89)	0.0002 (1.69)	−0.0003 (−1.98)	−0.0011 (−10.42)	−0.0014 (−8.15)	0.0023 (8.94)	0.0012 (7.60)

Table 7 *(continued)*

H	F	Winner			Loser			WBLS	WZLZ
		Insider-buy	Insider-zero	Insider-sell	Insider-buy	Insider-zero	Insider-sell		
12	9	0.0009 (6.16)	0.0001 (1.41)	0.0002 (1.96)	−0.0003 (−2.21)	−0.0010 (−9.75)	−0.0014 (−7.63)	0.0022 (8.10)	0.0012 (7.63)
12	12	0.0008 (5.22)	0.0001 (0.78)	0.0003 (2.15)	−0.0003 (−1.87)	−0.0009 (−7.39)	−0.0015 (−8.43)	0.0023 (8.41)	0.0009 (6.31)

The table reports profits earned by insider trading refined momentum strategies after size (price times shares outstanding), book to market ratio (BM, book value/market value) and industry effects are adjusted. Every year t, the breakpoints for the size quintiles are determined in June using all stocks in NYSE. All the stocks in NYSE, AMEX and NASDAQ are then allocated into the five size-sorted groups based on the breakpoints. The breakpoints for the five BM sorted quintiles are determined in December of year $t-1$ using all NYSE stocks on CRSP, and then all stocks in NYSE, AMEX and NASDAQ are allocated into five BM sorted groups based on these BM breakpoints. The intersections of the five size sorted and five BM sorted groups are the Size-BM portfolios. Every month, the stock returns are then adjusted by its matched Size-BM portfolio returns. Twenty industry portfolios are also formed on the SIC code and the monthly returns of these industry portfolios are then calculated. The monthly return of each stock is then adjusted by the return of its corresponding industry portfolios. These adjusted returns are then used in the insiders trading refined strategies.

WBWS should be narrower than WBLS and wider than WSLB. It may also predict these spread may be reversed in long run. Our findings show that WBLS does have a wider spread than any other zero-positions, while WSLB has the narrowest spread. 6/6 strategies as an example, the size, BM and industry adjusted return earned by WBLS, WBLB, WBWS, WSLS, LBLS and WZLZ are 0.32, 0.15, 0.07, 0.25, 0.17, and 0.09% per month respectively. In the following sections, we will study the long-term performance to test the long run prediction made by our explanations.

3.6. Long-term reversal

As we noted in Table 1, the strategies by buying past winners and selling past losers can only earn positive profits in the medium time horizon, about from 3 to 9 month holding periods. There will be a return reversal if we extend the time horizon to longer than 18 months. In reversing, the strategy by buying past losers and selling past winners can earn positive profits in the long time horizon. Jegadeesh and Titman (1993) and Conrad and Kaul (1998) also find similar phenomenon. In this section, we extended the time-horizons of all strategies we discussed above to 36 months. To make the contrarian strategies comparable with the medium term momentum strategies, we still use the same strategy forming processes except for the length of the forming and holding periods. Hence, the profits earned by these contrarian strategies are negative.

Table 8 reports the profits earned by different contrarian strategies. To simplify, we only report the equally forming and holding period strategies. There are six panels in Table 8. Panel A shows that the trading strategies of buying past winners and selling past losers earn negative profits during the period January 1985–November 1996 as suggested in previous literatures. However, we find a different style in Panel B, which reports the long-term profits earned by insiders trading based momentum strategies. It shows that the insiders trading based momentum strategies still can earn positive profits even the time horizon is extended to 36 months. This may be due to insiders trading their firms' stocks based on their long-term prospectus. Panel C shows that the momentum effects of WBLS can be extended to 18 months, while the naïve momentum strategy cannot earn statistically significant positive profits only within 12 months. The inverse of WBLS happened as late as 24 months after the position forming. Panel D shows that the negative profits earned by long-term WBLS still exist after the size and BM adjustment. In all 36/36 strategies, we observe the LBLS and WZLZ can obtain -0.03 and -0.05% per month contrarian profits. These results support the prediction made by our continuous overreaction story.

4. Conclusions

In this paper, we studied influence and explanatory power of insiders trading activities on momentum effects of stocks in USA market during the period January

Table 8
Long-term reversals of contrarian strategies

Panel A: Naïve contrarian strategies—JT's method

H/F	Winner–Loser	Winner	Loser
18	0.0007 (0.83)	0.0101 (11.31)	0.0095 (6.79)
24	−0.0011 (−1.18)	0.0100 (16.02)	0.0110 (8.68)
30	−0.0027 (−3.05)	0.0099 (17.62)	0.0125 (10.75)
36	−0.0035 (−4.19)	0.0100 (21.12)	0.0135 (12.64)

Panel B: Insiders trading based contrarian strategies

F/H	BMS	Insider−buy	Insider-sell
18	0.0029 (7.30)	0.0131 (11.75)	0.0102 (10.89)
24	0.0025 (6.89)	0.0135 (14.18)	0.0110 (14.19)
30	0.0017 (5.13)	0.0136 (15.19)	0.0119 (16.12)
36	0.0011 (4.00)	0.0138 (16.33)	0.0127 (18.28)

Panel C: Insiders trading refined contrarian strategies

H/F	WBLS	WZLZ	WBLB	WBWS	WSLS	LBLS	WSLB
18	0.0046 (5.32)	−0.0004 (−0.50)	0.0017 (1.93)	0.0013 (1.45)	0.0033 (6.81)	0.0029 (4.65)	−0.0016 (−1.57)
24	0.0010 (0.94)	−0.0013 (−1.68)	0.0002 (0.28)	0.0028 (6.43)	−0.0018 (−1.66)	0.0007 (1.11)	−0.0026 (−2.37)
30	−0.0017 (−2.04)	−0.0033 (−4.17)	−0.0013 (−1.54)	0.0015 (3.87)	−0.0032 (−3.24)	−0.0004 (−0.74)	−0.0028 (−2.61)
36	−0.0033 (−4.35)	−0.0044 (−5.30)	−0.0037 (−4.49)	0.0001 (0.46)	−0.0034 (−3.78)	0.0004 (1.01)	−0.0038 (−3.83)

Panel D: Insiders trading refined contrarian strategies—adjust size and BM

H/F	WBLS	WZLZ	WBLB	WBWS	WSLS	LBLS	WSLB
18	0.0019 (8.58)	0.0003 (1.50)	0.0009 (3.44)	0.0013 (6.13)	0.0005 (3.25)	0.0009 (3.52)	0.0004 (1.76)
24	0.0014 (6.88)	0.0003 (2.22)	0.0008 (3.24)	0.0004 (2.71)	0.0011 (5.66)	0.0006 (3.02)	0.0004 (2.03)
30	0.0006 (2.62)	−0.0001 (−0.70)	0.0010 (5.23)	0.0003 (2.09)	0.0003 (1.58)	−0.0004 (−1.91)	0.0007 (3.80)
36	0.0002 (1.21)	−0.0005 (−5.21)	0.0005 (4.25)	0.0003 (3.59)	−0.0001 (−0.61)	−0.0003 (−2.20)	0.0002 (1.57)

Table 8 *(continued)*

Panel E: Insiders trading refined contrarian strategies—adjust industry							
H/F	WBLS	WZLZ	WBLB	WBWS	WSLS	LBLS	WSLB
18	0.0045 (5.76)	0.0002 (0.31)	0.0018 (2.27)	0.0013 (1.54)	0.0032 (8.58)	0.0028 (4.78)	−0.0015 (−1.60)
24	0.0006 (0.58)	−0.0010 (−1.53)	0.0000 (0.06)	0.0024 (6.92)	−0.0018 (−1.79)	0.0005 (0.81)	−0.0023 (−2.52)
30	−0.0022 (−2.69)	−0.0030 (−4.36)	−0.0014 (−1.86)	0.0010 (3.08)	−0.0032 (−3.46)	−0.0008 (−1.57)	−0.0024 (−2.61)
36	−0.0037 (−5.17)	−0.0041 (−5.61)	−0.0036 (−5.10)	−0.0005 (−1.91)	−0.0032 (−3.89)	−0.0001 (−0.24)	−0.0031 (−3.72)
Panel F: Insiders trading refined contrarian strategies—adjust size, BM and industry							
H/F	WBLS	WZLZ	WBLB	WBWS	WSLS	LBLS	WSLB
18	0.0019 (9.00)	0.0004 (2.52)	0.0009 (3.34))	0.0013 (6.350)	0.0006 (3.73)	0.0010 (3.98)	0.0003 (1.41)
24	0.0013 (6.83)	0.0003 (2.37)	0.0006 (2.51)	0.0004 (3.11)	0.0009 (5.43)	0.0007 (3.29)	0.0002 (1.11)
30	0.0006 (2.68)	−0.0001 (−1.01)	0.0009 (4.86)	0.0003 (2.83)	0.0002 (1.13)	−0.0003 (−1.71)	0.0005 (3.10)
36	0.0003 (1.63)	−0.0005 (−5.78)	0.0005 (4.08)	0.0004 (4.77)	−0.0001 (−0.93)	−0.0002 (−1.56)	0.0001 (0.63)

The table reports the profits earned by different contrarian strategies. For simplify, we only report the equal forming and holding period strategies. The first panel reports the profit of naïve contrarian strategies. The second panel reports the profits earned by insider trading based contrarian strategies. The third panel reports the profits of insider refined contrarian strategies. The forth to sixth panel reports the size and BM adjusted, industry adjusted, size, BM and industry adjusted profits earned by refined momentum strategies respectively. There is a 1-month gap between the forming and holding period of every strategy.

1985–November 1996. We interpret our findings as that the continuous overreaction is the source of mediate term momentum effects and also the seed of long run reversals. Our explanation is based on previous irrational model and experimental psychology findings. Investors continuously overreact when they observe that the past return performance is consistent with their initial observations on insiders trading activities. The continuous overreaction is the source of momentum strategies and long-term reversals. Our results should be partially consistent with Daniel et al. (1998)'s model. Further study shows that the risk factors such as size and BM cannot explain the momentum effects. We also studied the explanatory power of industry factors on our refined momentum strategies. The results show that the industry factor also cannot explain the profits earned by the refined momentum strategies.

In summary, the paper contributes to the existing literatures in these aspects. First, momentum effects exist among stocks in NYSE, AMEX and NASDAQ during the period January 1985–November 1996. Second, the insiders trading activities contain valuable information and can predict the cross-sectional stock returns. The insiders trading based momentum strategies can even earn positive profits as long as holding for 36 months, which is different with naïve momentum strategies. Third, the insiders trading information can be used to strengthen naïve momentum effects. The refined momentum strategies can earn a much higher profit. The size and BM factors cannot explain the momentum effects. Further study shows that the industry factor cannot explain the refined momentum effects. We propose an irrational explanation on the momentum effects: continuous overreaction caused by self-attribution bias.

It is hard to use the rational asset pricing model to explain the findings in the paper. Although there is still not a widely accepted irrational model, we believe that the reactions of market participant may not be as rational as we assumed. Just as a simple psychology test showed, most people in the world believe that they are above average, but as we know, only half can be above average.

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