

Price Momentum and Institutional Ownership

Abstract

This paper tests whether momentum is related to the institutional holding level. The empirical evidence shows that when controlled for the effect of firm size, momentum profits are positively related to institutional holdings. Moreover, this relationship seems to be stronger in small-capitalization firms. The result is consistent with previous literature that institutional investors tend to herd and have positive feedback trading in smaller firms. My finding suggests that investors could choose smaller firms with higher institutional holdings to achieve higher momentum profits. Furthermore, I find that the change of institutional holding is positively related to next quarter's return, which is consistent with the hypothesis that institutional investors are better informed than individual investors.

Key word: momentum, institution holding

JEL Classification: G12, G14

I. Introduction

Numerous studies over the last two decades have demonstrated that momentum trading strategy is consistently profitable in the United States and most developed markets. For example, Jegadeesh and Titman (1993) documents that strategy, which buys stocks with better performance over the past 3-12 months and sells stocks with poorer performance in the same period, generates significant positive returns over the following 12 months. Rouwenhorst (1998) also reports that similar momentum strategies are profitable in the European markets. Since momentum is against the efficient market hypothesis, it has attracted substantial research.

Some behavioral models have tried to explain momentum by assuming that momentum-effect is caused by under-reaction to information of firms. These behavior models imply that stocks with different characteristics should have different levels of momentum. If under-reaction to firm specific information causes the momentum, it is reasonable to conjecture that momentum might be related to various proxies for the quality and type of information generated about the company; and to the relative amounts of information disclosed publicly and generated privately (Jegadeesh and Titman, 2001).

Recently, several empirical studies have tried to find the key characteristics of firms for momentum effect. For instance, Jegadeesh and Titman (1993) report that smaller firms have stronger momentum. Lesmond, Schill and Zhou (2001) show that the price level of stocks is the most important cross-sectional predictor of momentum. Hong, Lim and Stein (2000) indicate that after controlling for sizes, firms followed by fewer stock analysts have greater momentum. Although these findings are important, little research has considered the effect of institutional ownership.

Institutional investors play an important role in equity market. According to Gompers and Mertick (2001), institutional investors hold over half of the market value of common stocks in the United States. It is believed that institutional investors are more sophisticated than individual investors since institutions have superior access to information from companies. Therefore, stock prices of firms with higher institutional ownership should reflect these firms' information faster and momentum effect in these firms should be lower due to lower probability of under-reaction to information. From this point, momentum effect might be negatively related to the institutional ownership.

On the other hand, some studies have shown that institutional investors tend to have feedback trading and herding behaviors and that the post-herding return is positively related to the change of institutional holding (Nofsinger and Sias, 1999; Burch and Swaminathan, 2001; Sias 2004). These findings imply that firms with higher institutional ownership might have stronger momentum profits. Since institutional ownership may have two conflicting ways to affect momentum of stocks, this study tries to find out the dominant one empirically and to clarify the relationship between the price momentum and institutional ownership.

The paper is organized as followings: The next section presents relevant literature about momentum and relationship between institutional trading and equity returns. Section III explains the resource of data and methodology. Section IV reports the empirical evidence on the relation of momentum and institutional ownership. The last section summarizes the result.

II. Literature Review

In order to examine the relationship between institution holdings and momentum

profits, I need to review the previous research in the cross-sectional determinants of momentum in advance. Next, I summarize previous literatures to find out the relationship between institutional investors and equity returns.

A. Cross-Section Determinants of Momentum

Jegadeesh and Titman (1993) document that stocks have momentum profits in three to twelve months over the period from 1965 to 1989. Trading strategies buying past winners and selling past losers can realize significant abnormal returns. They find that momentum profits are not due to the systematic risk or delayed stock price reaction to common factors. They show that small firms have greater momentum.

Daniel and Titman (1999) report that momentum effects are stronger for growth stocks than value stocks. They attribute this phenomenon to the fact that it is easier to evaluate value stocks than to evaluate growth stocks. Since investors tend to be more overconfident about their ability to interpret ambiguous information, momentum effect is likely to be stronger in growth stocks.

Hong, Lim and Stein (2000) test the gradual-information-diffusion model of Hong and Stein (1999) and report three key results. First, the profitability of momentum strategies declines with firm size. Second, stocks with low analyst exhibit higher momentum profit after controlling for size. Third, the effect of analyst is greater for the past loser stocks than the past winner stocks. These findings are consistent with the hypothesis that firm-specific information only diffuses gradually across the investing public.

Lee and Swaminathan (2000) investigate the relation between momentum profits and stock turnover. According to their study, past trading volume could predict both the magnitude and persistence of price momentum. For instance, stocks with greater

turnover have higher momentum. Furthermore, price momentum reverses over the next five years and high volume winners experience faster reversals.

Lesmond, Schill and Zhou (2002) confirm that stocks with higher transaction cost tend to generate larger momentum profits. They contend that momentum strategies require frequent trading in high cost securities such that trading cost might prevent profitability of these strategies.

B. Institutional Investor and Equity Return

In financial literatures, institutional ownership of stocks has been widely used as a proxy for investor sophistication. Institutional investors usually have relative advantage in gathering and processing information than individual investors. Followings are several empirical studies supporting this view.

Badrinath, Kale and Noe (1995) show that returns on portfolios of stocks with higher institutional ownerships lead returns on portfolios of stocks with lower institutional ownerships. This effect is apparent at longer lags than the size-related lag effect and remains persistent even after firm sizes are controlled. They also find that institutions prefer to buy stocks that meet obvious prudence requirement.

Sias and Starks (1997) confirm that securities with higher institutional ownership reflect market-wide information prior to securities with lower institutional ownership. According to their study, institutional holding level could be seen as a proxy for institutional trading and institutional investors have a greater marginal influence on the price of high institutional holding firms. Furthermore, they propose that correlated trading pattern of institutional investors contributes to the serial correlation in daily returns. They conclude that both individual security and portfolio daily return autocorrelations are positively related to the degree of institutional holding.

Bartov, Radhakrishnan and Krinsky (2000) reported that the post-earning-announcement abnormal returns are negatively related to the proportion of institutional ownership. Their finding shows that firm size and traditional proxies for transaction costs (i.e. trading volume and stock price) have little power to explain post-announcement abnormal return if institutional holding is an explanatory variable.

In addition, previous research shows that investment behaviors of institutional investors might be different from those of individual investors. For example, investment behaviors of institutional portfolio managers are monitored by the common rule “prudent man”. Therefore, institutional investors may have special demand for stock characteristics.

Gompers and Metrick (2001) analyze institutional investor’s demand for stock characteristics and discuss implications of this demand for stock prices and returns. They estimated 68 separate cross-sectional regressions of quarter returns from 1980 to 1996 on proxies for prudence, liquidity and historical return. According to their result, institutional investors double their share of stock market from 1980 to 1996. Futhermore, institutional investors tend to increase demands for large companies. These demands contribute to increases in the prices of large firms relative to small firms. They also find that the level of institutional holding can help to forecast the future returns.

Nofsinger and Sias (1999) report a strong positive correlation between changes in institutional ownership and contemporaneous returns. They suggest that institutional herding might be not irrational since they find no evidence of return reversal in the two years following the herding period. Further analysis suggests that institutional investor engage in positive feedback trading which is largely restricted to smaller firms. Moreover, their analysis shows a positive relation between

subsequent returns and subsequent changes in institutional ownership for both past “losers” and “winners”.

Burch and Swaminathan (2001) investigate how institutions trade in response to momentum and whether they respond differently to price momentum and earnings momentum. They found that institutions engage on momentum trading over the subsequent three quarters in response to past returns but not past earning news. Furthermore, investment advisors are more active in momentum trading than banks and insurance companies. Their finding also shows that momentum is stronger when past returns are accompanied by earning news of the same sign.

Sias (2004) investigates the behavior of institution herding. Specifically, this research demonstrates that the fraction of institution buying this quarter is positively related to the fraction of institution buying last quarter. This correlation results from institutions’ following their own trade in last quarter and from institutions’ following each other’s trade in last quarter. Furthermore, he finds that institutional investors are more likely to herd in smaller firms. Since informational cascades are more likely in smaller firms, he concludes that institutional herding mainly results from institutions’ inferring information from each other’s trading. His research also shows that institutional investors accumulate and positions over time to reduce the price impact of their trading.

III. Data and Methodology

The sample used in this study consists of all firms on the New York Stock Exchange (NYSE) and American Stock Exchange (AMEX). I exclude NASDAQ firms because most of them are smaller than firms in NYSE and AMEX. I also eliminate prime, closed-end fund, real estate investment trust (REIT), American

Depository Receipt (ADR) and foreign companies. In addition, my sample is restricted to common stocks that have complete monthly return series in the CRSP database and institutional ownership in the CDA/Spectrum for the period 1980-2004. CDA/Spectrum contains information of quarterly institutional ownership. Positions greater than 10,000 shares or \$200,000 must be disclosed to the Securities and Exchange Commission (SEC) and CDA/Spectrum deals with these filings. CDA/Spectrum classifies all institutional investors into five types: (1) bank (2) insurance company (3) investment company (mutual fund) (4) investment advisor and (5) other institutional investor. At the end of each quarter, I sum the institutional holdings of each stock and divide the result with the number of shares outstanding to obtain the percentage of shares holding by institutions. The number of shares comes from the CRSP and other firm characteristic (the Book to Market ratio) comes from COMPUSTAT database.

Table I shows the average institutional ownership fraction and firm size of my sample each year. As Table I indicates, both the average institutional holding and firm size increase dramatically over the past 25 years. By December 2004, the average institutional fraction of the sample is 54.7% that highlights the important influence of institutional investors on the stock market. Table 1 also suggests that level of institution ownership is positively related to firm size because the correlation coefficients between institutional holding and natural log of firm size each year almost exceed 0.6. This high degree of correlation leads to a compounding problem. To focus on the role of institutional holding, I use the procedures in Badrinath and Noe (1995) to control for firm size.

[Insert Table I here]

At the beginning of each period, firms are first sorted into five portfolios based

on their sizes. The first portfolio consists of firms with the smallest size and the fifth consists with the biggest size. Within each of the five size-based portfolios, firms are sorted into ten portfolios again according to their institutional ownerships. Therefore, each of the five size portfolios is divided into ten institutional-holding-based portfolios. Then, firms of the lowest institutional holding portfolio from each of the five size-based portfolios are rearranged into a new portfolio (portfolio H1). Firms of the second lowest institutional holding portfolio in each size-based portfolio are recollected into the next portfolio (H2), and so on.

With this method, I can create ten portfolios (H1 to H10) that have similar firm size levels but different institutional holding levels. Specifically, the institutional holding level in portfolio H1 will be lower than that in portfolio H2 and portfolio H10 will have the highest institutional holding level.

As for the measurement of momentum, I basically follow the methodology of Jegadeesh and Titman (1993) to operate the relative-strength trading. I focus my research on the difference of monthly returns between the extreme winner and loser deciles over the three-, six-, nine- and twelve-month holding periods. However, there is little difference in the measure of momentum profit. Although they sort firms into ten deciles based on the past returns, I only sort my sample into three portfolios according to their past performance.

Since the purpose of this study is to investigate the relationship between momentum profits and institutional holding level, I plan to sort the sample by size or institutional holding into ten sub-samples respectively. If I also follow their ten-class classification in the past returns, the universe of my sample will be arranged into 100 portfolios. Thus, the number of firms in each portfolio might become too small and each portfolio will lack enough diversification.

IV. Empirical Results

A. Size-Based Price Momentum

Since institutional holding are related to the firm size, I begin my analysis of momentum in firm size. Hong, Lim and Stein (2000) suggest that investors can obtain more momentum profits with relative-strength trading strategies in small to mid-sized firms. I repeat a similar experiment to test these momentum strategies over the period from January 1980 to December 2004. Specifically, I construct relative-strength strategies with the past three-, six-, nine- and twelve-month returns and hold for one, two, three and four quarters. Each month, all firms are sorted into ten size-based portfolios on the base of their previous three-, six-, nine- and twelve-month size. Portfolio S1 contains the smallest firms and Portfolio S10 contains the largest firms. Within each decile, firms are grouped into three portfolio based on their monthly raw return over the past three, six, nine and twelve months respectively. Portfolio P1 contains the worst-performance firms and portfolio P3 contains the best-performance firms. Within each portfolio, stocks are equally weighted and held for three, six, nine and twelve months respectively. The average monthly returns for all these portfolios are calculated respectively with overlapping past portfolios and P3-P1 is used to measure the momentum profit.

Table II reports the relation between momentum and firm size for the three-, six-, nine- and twelve-month period respectively. As shown in the first columns of panel B and Panel C, there is significant momentum in the full sample for the 6-month and 9-month periods. The relative-strength strategy which buys past winner (P3) and shorts past loser (P1) generates 0.384% per month in the next six-month holding period and 0.403% per month in the next nine-month holding period. The next columns reveal the relation between momentum and firm size. Consistent with the

previous literature, Table II shows a negative relation between momentum profits and firm size except the smallest stocks whose momentum is actually negative. According to Hong, Lim and Stein (2000), this negative momentum is due to the fact that these smallest firms may have limited investor participation, which can cause more pronounced supply-shock-induced reversal.

In the three-month and six-month periods (Panel A and B), momentum profits reach peaks in the second size decile where firm size are around \$30 million and where the profits are 1.13% per month (three-month with t-statistics=4.50) and 1.21% per month (six-month with t-statistics=4.64). In the nine-month and twelve-month period, momentum profits reach peaks in the third size decile where the firm size are around \$65 million and where the profits are 1.05% per month (nine-month with t-statistics=4.75) and 0.68% per month (twelve-month with t-statistics=3.06). As shown in Figure 1, the inverted U shape suggests that momentum profits have decreased monotonically after the peaks in the second or third size deciles.

[Insert Table II and Figure 1 here]

B. Institutional Holding-Based Momentum

Next, I use similar method to measure institutional holding-based momentum. Each month, all samples are respectively sorted into ten portfolios based on the previous three-month, six-month, nine-month and twelve-month institutional holdings. Within each portfolio (H1 to H10), firms are then sorted into three portfolios (P1 to P3) based on their past three-, six-, nine- and twelve-month returns and held for the corresponding months to calculate the average monthly returns. Again, the average monthly returns of P3-P1 are used to measure the momentum profits.

Figure 2 presents the relation between institutional holdings and momentum

profits. As shown in this figure, momentum profits initially increase with institutional holdings and reach the top in fourth decile. After the fourth decile, momentum profits decline with institutional holding. Table III reports the detail of momentum profits for each period. According to P3-P1 profits in each Panel, momentum profits are more significant in the six-month and the nine-month period. Specifically, Panel B shows that the maximal momentum for the six-month period occurs in stock portfolio where the institutional holding level is around 24.4% and the profit is 0.697% per month (t-statistics=2.91). Panel C indicates that the maximal profit (0.72%) for holding nine months occurs in stock portfolio whose institutional holding is 24.8%.

[Insert Figure 2 and Table III here]

As discussed early in section III, there is a strongly positive relationship between institution ownership and firm size. Therefore, the inverted U-shape relationship in Figure 2 between momentum and institutional holding might be caused by the effect of firm size. We need to eliminate this effect before making any conclusion about the relationship between momentum and institutional holdings.

C. Institutional Holding-Based Price Momentum (Controlled for Size)

In order to control the effect of firm size on momentum, the method similar to Badrinath and Noe (1995) is utilized to create ten portfolios with different institutional holdings but similar firm sizes. Table IV reports momentum profits for these portfolios. Before I discuss the momentum of these portfolios, it is essential to check whether we have created appropriate portfolios with desired size and institutional holding characteristics. The last rows of each panel in Table IV report the median firm size in millions for each of the ten portfolios. As can be seen, this

method is effective since the median sizes across the ten portfolios in each panel remain almost unchanged respectively. For example, the last row of Panel A shows the level of firm size in the three-month period. Although the median institutional holding level ranges from 5.8% in the lowest decile to 69.4% in the highest decile, the range of firm size is just from 261 millions to 315 millions. Other panels have similar results.

Figure 3 plots the relation between the momentum and firm's institutional holding level (controlled for firm size). As shown in this figure, there is a positive relationship between momentum profits and institutional holding levels. In addition, the momentum profits are more significant in the six-month and nine-month holding periods. This relationship indicates that the previous positive relationship between momentums and institutional holding levels in Part B might be caused by firm size.

[Insert Table IV and Figure 3 here]

Table IV presents the detailed momentum profits. Since momentum is more significant in the six-month and nine-month periods, I focus on the Panel B and Panel C. As can be seen, the P3-P1 profits are more significant in portfolios with higher institutional holding level. Since I also confirm that smaller firms have higher momentums just as the previous researcher found, investors might use this relationship between momentums and institutional holdings to achieve higher momentum profits. For example, it is meaningful to conjecture that investors could choose stocks with small firm sizes but with high institutional holdings to obtain stronger momentum profits. I will test this hypothesis in Part D later.

D. Two-Way Sorting on Size and Institutional Holding

In order to test the above-mentioned hypothesis, I use a two-way sorting

procedure to cut the samples based on their past firm sizes and institutional holdings. I only conduct the six-month and nine-month period since their momentum profits are more significant. For instance, all firms are sorted into three portfolios each month based on their size over the past six month. Within each size-based portfolio (S1 to S3), firms are sorted into three portfolios (H1 to H3) according to their past six-month institutional holding level. Therefore, every firm in my sample is assigned to one of the nine portfolios formed by its firm size and institutional holding level. Within each of the nine portfolios, firms are ranked in ascending order and equally divided into three portfolios (P1 to P3) based on the past six-month raw return. Just as before, momentum profit is measured by the average monthly return of relative strength trading strategy (P3-P1) for holding six months. Similar procedure is also conducted with the nine-month period data.

Table V shows the results of these two-way sorting portfolios. As shown in the first columns in both panels (S1 portfolio), momentum profits are higher for stocks with higher institutional holdings. The differences of momentum profit between H1 and H3 are 0.748% per month (with t-statistics=2.45) for the six-month holding period and 0.794% (with t-statistics=2.63) for the nine-month holding period per month. However, this positive relationship between the momentum and institutional holding seems to be weaker in larger firms.

[Insert Table V here]

E. Return Autocorrelation and Institutional Holding

In Part C and Part D, I found an interesting phenomenon that after controlling firm size, stocks with higher institutional holding exhibit greater momentum profits. Also, this relationship seems to be stronger in small firms. In this part, I use a

regression method to examine this relationship again.

Each quarter, the two-way sorting procedures based on firm sizes and institutional holdings of six- and nine-month periods are performed respectively. For example, all firms are classified into three portfolios based on their sizes over the past six months. Within each of the three size-based portfolios (S1 to S3), firms are sorted into five subgroups (H1 to H5) based on their institutional holdings over the past six months. Therefore, each stock is assigned to one of the fifteen portfolios. I also use similar procedures to deal with the nine-month period data.

Next, I run cross-sectional regressions of returns on institutional holding level and some firm characteristics (past return, firm size and book to market ratio) for the fifteen portfolios respectively. These independent variables are selected because they are related to stock returns according to previous literature (Gompers and Metrick, 2001). After estimating each set of cross-sectional regression functions, I compute the time-series means for each coefficient and calculate t-statistics of these estimates.

Table VI only reports the average coefficient on one important independent variable (past return) in these regression functions. I focus on this coefficient because it could be used to measure the autocorrelation of stock returns. If the momentum effect is more apparent in stocks with higher institutional holdings, we should expect greater return autocorrelations in these firms. Thus, the average coefficient on past return in portfolio H5 should be greater than that in portfolio H1 in my experiment.

[Insert Table VI here]

According to Table VI, most of the average coefficients on past return are positive and significant. This result is consistent with my previous finding that the

momentum profit is significant in six-month and nine-month periods. Since I am interested in smaller firms, I focus on the first columns (S1 portfolio) of both Panels. As shown in Table VI, the differences of return autocorrelation coefficients between portfolio H1 and H5 are 0.05643 (with t-statistics=1.95) in the six-month period and 0.0609 (with t-statistics=2.15) in the nine-month period. This result consists with the hypothesis that there is positive relationship between return autocorrelation and institutional holding level in smaller firms.

Based on my finding, the positive relationship between momentum and institutional holding seems to be stronger in smaller firms. Now, I try to find the possible reason. Previous literatures show that there is strong positive correlation between changes in institutional ownership and contemporaneous stock return, especially for smaller firms (Nofsinger and Sias, 1999). Some researchers attribute this relation to the impact of institutional trading (Sias, Starks and Titman, 2001). Meanwhile, evidence shows that institutional investors herd in equity market and their herding is stronger in smaller capitalization firms (Sias, 2004). Also, institutional tend to have positive feedback trading in smaller firms (Nofsinger and Sias, 1999). Since herding and feedback trading both contribute to higher autocorrelations in stock returns, smaller capitalization firms with high institutional holding may have greater return autocorrelation due to these activities by institution investors. This reason may explain why smaller firms with high institution holdings exhibit greater momentum than corresponding securities with low institutional holdings

F. Institutional Change and Equity Returns

Since momentum might be related to the institutional herding and feedback trading, I plan to examine whether the quarterly change of institutional holding can

predict next quarter's stock return. Each quarter, I run a cross-sectional regression of quarterly stock return on some firm characteristics (past return, firm size and book to market ratio) and change of institutional holding (not institutional holding level). The result in Panel A of Table VII reveals a positive relationship between stock return and past quarter's change of institutional holding. This relationship indicates that the buying of institutional investors in the past quarter has positive impact on today's return. According to literatures, change of institutional holding in the past quarter is also positively related to the return in the same period. These two relationships suggest that the magnitude of momentum may be positively related to trading of institutional investors. Since institutional holding is a proxy for institutional trading, momentum would be positively related to the institutional holding.

[Insert Table VII here]

Since CDA/Spectrum classifies all institutional investors into five types, I use this classification to run the regression again. According to the result in Panel B, institutional holding change in independent advisors has the greatest power to predict next quarter's return.

Furthermore, I examine the positive feedback trading of institutional investors. Each quarter, changes of institutional holdings are regressed on last quarter's returns, firm sizes and book-to-market ratios. As shown in the second row of Table VIII, most of the coefficients on past return are significantly positive. This finding indicates that most institutional investors, except for those that Spectrum labels as "Other", have positive feedback trading behaviors. Moreover, Investment companies and independent investment advisors are more active in feedback trading since their coefficients are greater than those of banks and insurance companies.

[Insert Table VIII here]

V. Conclusion

Over the past two decades, momentum in stocks returns has attracted a lot of attentions by researchers and practitioners in financial markets. Various studies have tried to explain the reason of momentum or to find out cross-sectional determinants of momentum. Empirical evidence suggests that momentum is related to several firm characteristics (e.g. firm size, price level and book-to-market ratio). Although these factors are important, little research has considered the influence of institutional investors, who account for over half of the equity ownerships and who play an important role in US stock market.

This paper tries to investigate whether momentum is related to the institutional holdings. After controlling the effect of firm size on momentum, I find that momentum is positively related to institutional holdings. Moreover, this relationship seems to be stronger in small-capitalization firms. My finding is consistent with previous literature that institutional investors tend to herd and have positive feedback trading in smaller firms. The implication of this result is that investors might choose smaller firms with higher institutional holdings to achieve higher momentum profits.

Furthermore, I also find that the change of institutional holdings is positively related to next quarter's return. This result might suggest that institutional investors are somewhat smarter than individual investors, which is consistent with the hypothesis that institutional investors are better informed than individual investors.

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Table I
Descriptive Statistics for Sample

This table reports the descriptive statistics of institutional holding and firm size of my sample during 1980-2004. The correlation coefficient is calculated from institutional holding fraction and natural log of firm size. Mean sizes are in millions.

Year	No. of Firms	Mean Institutional Holding	Mean Size (millions)	Correlation Coefficient
1980	1879	0.210	629	0.656
1981	1908	0.216	570	0.641
1982	1928	0.228	646	0.673
1983	1991	0.240	751	0.653
1984	2000	0.264	731	0.660
1985	1952	0.289	918	0.663
1986	1920	0.300	1030	0.630
1987	1971	0.312	1005	0.642
1988	1953	0.310	1112	0.650
1989	1908	0.312	1388	0.614
1990	1920	0.337	1274	0.632
1991	1965	0.344	1635	0.633
1992	2054	0.358	1710	0.635
1993	2124	0.373	1839	0.615
1994	2175	0.386	1775	0.599
1995	2194	0.403	2323	0.597
1996	2297	0.398	2700	0.588
1997	2330	0.426	3487	0.614
1998	2362	0.426	3994	0.601
1999	2260	0.446	4733	0.592
2000	2093	0.437	5113	0.637
2001	1964	0.462	4945	0.646
2002	1920	0.502	4115	0.645
2003	1849	0.527	5297	0.638
2004	1832	0.547	5937	0.643

Table II**Momentum Strategies Based on Raw Returns and Sorted by Size (1980-2004)**

This table reports the average monthly returns of momentum portfolios formed based on the previous K months' raw returns and held for K months (K=3, 6, 9, and 12). Each month, NYSE and AMEX stocks are ranked in ascending order based on the lagged returns and divided into three equal-weighted portfolios. Portfolio P1 is formed by the loser stocks and P3 is formed by the winner stocks over the previous K months. This table presents the time-series average monthly returns of holding these portfolios for K months. On the other hand, stocks are sorted into ten portfolios each month based on their previous capitalizations. Portfolio S1 includes the smallest firms and S10 includes the largest firms. Within each decile, firms are equally sorted into three portfolios (P1 to P3) based on their lag raw returns. This table also reports the time-series average monthly return of holding these portfolios in each size class for K months. Median sizes are in millions and t-statistics are in parenthesis.

Panel A: 3 Month (K=3)											
Size Class											
Past	All	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
P1	0.01317 (3.71)	0.02774 (4.05)	0.00386 (0.89)	0.00888 (2.21)	0.01022 (2.72)	0.01164 (3.16)	0.01239 (3.57)	0.01419 (4.35)	0.01458 (4.42)	0.01401 (4.42)	0.01354 (4.69)
P2	0.01384 (5.51)	0.01771 (4.32)	0.01265 (4.24)	0.01318 (4.72)	0.01342 (4.73)	0.01479 (5.12)	0.01356 (4.93)	0.01427 (5.47)	0.01357 (5.17)	0.01306 (5.14)	0.01201 (4.84)
P3	0.01292 (4.68)	0.01496 (3.73)	0.01513 (4.68)	0.01537 (4.98)	0.01476 (4.62)	0.01352 (4.36)	0.01239 (4.11)	0.01240 (4.29)	0.01167 (4.23)	0.01108 (4.13)	0.01026 (3.94)
P3-P1	-0.00025 (-0.13)	-0.01278 (-3.01)***	0.01127 (4.59)***	0.00649 (2.88)***	0.00454 (2.31)**	0.00188 (0.99)	0.00000 (0.00)	-0.00180 (-1.04)	-0.00291 (-1.55)*	-0.00293 (-1.60)*	-0.00328 (-1.76)**
Median Size		10	29	60	110	203	368	672	1233	2540	8316
Median IH		5.9%	11.8%	19.4%	27.6%	35.6%	41.3%	45.3%	50.3%	54.3%	54.4%
Panel B: 6 Month (K=6)											
Size Class											
Past	All	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
P1	0.01072 (3.02)	0.02432 (3.65)	0.00416 (0.93)	0.00551 (1.38)	0.00728 (1.87)	0.00883 (2.38)	0.00955 (2.69)	0.01099 (3.42)	0.01191 (3.68)	0.01159 (3.61)	0.01197 (4.08)
P2	0.01354 (5.39)	0.01848 (4.71)	0.01258 (4.34)	0.01262 (4.53)	0.01332 (4.67)	0.01364 (4.76)	0.01390 (5.11)	0.01356 (5.26)	0.01355 (5.03)	0.01307 (5.09)	0.01191 (4.75)
P3	0.01456 (5.27)	0.01877 (4.96)	0.01627 (5.20)	0.01655 (5.43)	0.01561 (5.06)	0.01481 (4.72)	0.01408 (4.66)	0.01354 (4.68)	0.01361 (4.77)	0.01274 (4.63)	0.01149 (4.29)
P3-P1	0.00384 (1.85)**	-0.00555 (-1.32)*	0.01211 (4.64)***	0.01104 (4.77)***	0.00832 (3.72)***	0.00598 (2.99)***	0.00453 (2.41)***	0.00255 (1.46)*	0.00170 (0.89)	0.00115 (0.58)	-0.00048 (-0.25)
Median Size		10	30	61	111	203	370	672	1230	2521	8111
Median IH		6.0%	12.0%	20.0%	27.4%	35.2%	40.6%	44.6%	49.7%	53.7%	53.8%

Table II Continued.

Panel C: 9 Month (K=9)											
Size Class											
Past	All	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
P1	0.01087 (3.06)	0.02562 (3.89)	0.00684 (1.53)	0.00573 (1.44)	0.00728 (1.85)	0.00873 (2.30)	0.00916 (2.57)	0.01040 (3.19)	0.01229 (3.69)	0.01095 (3.34)	0.01113 (3.71)
P2	0.01326 (5.27)	0.01930 (5.09)	0.01275 (4.45)	0.01313 (4.62)	0.01283 (4.48)	0.01339 (4.70)	0.01345 (4.97)	0.01319 (5.14)	0.01316 (4.99)	0.01287 (5.03)	0.01166 (4.63)
P3	0.01490 (5.40)	0.01956 (5.17)	0.01650 (5.15)	0.01623 (5.32)	0.01564 (5.05)	0.01422 (4.52)	0.01493 (4.96)	0.01386 (4.83)	0.01263 (4.44)	0.01360 (4.91)	0.01192 (4.45)
P3-P1	0.00403 (2.03)**	-0.00606 (-1.46)*	0.00966 (3.81)***	0.01049 (4.75)***	0.00836 (3.59)***	0.00549 (2.66)***	0.00577 (3.06)***	0.00346 (1.93)**	0.00034 (0.18)	0.00265 (1.31)*	0.00079 (0.42)
Median Size		11	32	64	116	214	387	699	1275	2631	8566
Median IH		6.5%	12.7%	21.0%	28.9%	36.4%	42.5%	45.9%	51.1%	54.7%	54.6%

Panel D: 12 Month (K=12)											
Size Class											
Past	All	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
P1	0.01203 (3.36)	0.02806 (4.21)	0.00902 (1.96)	0.00755 (1.90)	0.00843 (2.14)	0.00985 (2.60)	0.00987 (2.77)	0.01061 (3.25)	0.01307 (3.93)	0.01194 (3.67)	0.01157 (3.85)
P2	0.01295 (5.14)	0.01890 (5.12)	0.01265 (4.38)	0.01277 (4.55)	0.01234 (4.30)	0.01317 (4.61)	0.01308 (4.87)	0.01307 (5.10)	0.01263 (4.80)	0.01243 (4.84)	0.01181 (4.67)
P3	0.01368 (4.94)	0.01710 (4.76)	0.01455 (4.68)	0.01438 (4.77)	0.01459 (4.66)	0.01307 (4.13)	0.01367 (4.53)	0.01276 (4.44)	0.01178 (4.10)	0.01320 (4.72)	0.01175 (4.31)
P3-P1	0.00165 (0.81)	-0.01096 (-2.48)***	0.00552 (1.96)**	0.00684 (3.06)***	0.00616 (2.69)***	0.00322 (1.62)*	0.00381 (2.02)**	0.00214 (1.24)	-0.00129 (-0.75)	0.00126 (0.66)	0.00018 (0.10)
Median Size		11	33	66	119	219	398	712	1299	2673	8683
Median IH		6.7%	13.2%	21.7%	29.4%	36.8%	42.7%	46.2%	51.4%	54.9%	54.5%

***, **, * are statistically significant at the 1, 5, and 10 % levels respectively. Since I focus on the momentum profit (P3-P1), I do not report the significance of P1, P2 and P3. However, most of these coefficients are significant.

Table III
Momentum Strategies Based on Raw Returns and Sorted by Institutional Holding

This table reports the average monthly returns of momentum portfolios formed based on the previous K months' raw returns and held for K months (K=3, 6, 9, and 12). Each month, all stocks are sorted into ten portfolios (H1 to H10) based on their previous institutional holdings. Then, firms in every decile are equally divided into three portfolios (P1 to P3) based on their lag raw returns. Portfolio P1 is formed by the losers and P3 is formed by the winners. This table presents the time-series average monthly returns of holding these portfolios for K months. Median sizes are in millions and t-statistics are in parenthesis.

Panel A: 3 Month (K=3)											
Institutional Holding Class											
Past	All Stocks	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10
P1	0.01317 (3.71)	0.01664 (2.95)	0.01393 (2.78)	0.01076 (2.79)	0.00971 (2.70)	0.01064 (3.14)	0.01260 (3.85)	0.01347 (4.04)	0.01466 (4.32)	0.01435 (4.11)	0.01409 (4.01)
P2	0.01384 (5.51)	0.01338 (4.21)	0.01391 (4.94)	0.01444 (5.74)	0.01358 (5.79)	0.01303 (5.40)	0.01408 (5.49)	0.01434 (5.45)	0.01433 (5.28)	0.01365 (4.81)	0.01268 (4.31)
P3	0.01292 (4.68)	0.01321 (3.73)	0.01450 (4.47)	0.01330 (4.51)	0.01500 (5.26)	0.01227 (4.37)	0.01178 (4.26)	0.01357 (4.96)	0.01328 (4.73)	0.01199 (4.08)	0.01239 (4.12)
P3-P1	-0.00025 (-0.13)	-0.00343 (-0.94)	0.00057 (0.18)	0.00254 (1.04)	0.00528 (2.33)***	0.00163 (0.79)	-0.00082 (-0.46)	0.00011 (0.06)	-0.00139 (-0.75)	-0.00236 (-1.36)*	-0.00170 (-0.97)
Median IH		2.4%	9.0%	16.3%	23.9%	31.8%	39.8%	47.6%	55.3%	63.1%	74.6%
Median Size		22	41	83	146	234	389	616	871	1161	1222

Panel B: 6 Month (K=6)											
Institutional Holding Class											
Past	All	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10
P1	0.01072 (3.02)	0.01455 (2.48)	0.01069 (2.15)	0.00882 (2.25)	0.00779 (2.18)	0.00853 (2.47)	0.01037 (3.15)	0.01131 (3.42)	0.01171 (3.49)	0.01206 (3.40)	0.01150 (3.28)
P2	0.01354 (5.39)	0.01433 (4.51)	0.01400 (5.07)	0.01362 (5.46)	0.01325 (5.57)	0.01291 (5.20)	0.01308 (5.17)	0.01381 (5.29)	0.01405 (5.24)	0.01300 (4.54)	0.01277 (4.36)
P3	0.01456 (5.27)	0.01450 (4.28)	0.01644 (5.44)	0.01570 (5.42)	0.01476 (5.33)	0.01438 (5.11)	0.01385 (4.98)	0.01482 (5.29)	0.01508 (5.33)	0.01321 (4.48)	0.01358 (4.46)
P3-P1	0.00384 (1.85)**	-0.00005 (-0.01)	0.00575 (1.68)**	0.00687 (2.65)***	0.00697 (2.91)***	0.00585 (2.64)***	0.00348 (1.83)**	0.00351 (1.99)**	0.00338 (1.90)**	0.00115 (0.60)	0.00208 (1.10)
Median IH		2.7%	9.5%	16.8%	24.4%	32.3%	40.2%	48.0%	55.4%	63.1%	74.3%
Median Size		23	42	87	150	242	400	631	888	1173	1250

Table III Continued.

Panel C: 9 Month (K=9)											
Institutional Holding Class											
Past	All	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10
P1	0.01087 (3.06)	0.01556 (2.77)	0.01209 (2.46)	0.00968 (2.43)	0.00761 (2.08)	0.00857 (2.47)	0.00996 (2.99)	0.01106 (3.29)	0.01152 (3.40)	0.01180 (3.27)	0.01060 (2.99)
P2	0.01326 (5.27)	0.01491 (4.72)	0.01419 (5.24)	0.01318 (5.31)	0.01337 (5.69)	0.01242 (5.01)	0.01267 (4.95)	0.01409 (5.41)	0.01370 (5.21)	0.01228 (4.28)	0.01303 (4.45)
P3	0.01490 (5.40)	0.01605 (4.58)	0.01531 (5.10)	0.01571 (5.51)	0.01481 (5.35)	0.01434 (5.16)	0.01441 (5.21)	0.01563 (5.48)	0.01560 (5.48)	0.01380 (4.68)	0.01313 (4.30)
P3-P1	0.00403 (2.03)**	0.00049 (0.14)	0.00322 (0.94)	0.00603 (2.32)**	0.00720 (3.01)***	0.00577 (2.72)***	0.00445 (2.30)**	0.00457 (2.52)***	0.00407 (2.27)**	0.00200 (1.03)	0.00253 (1.38)*
Median IH		2.9%	9.9%	17.2%	24.8%	32.7%	40.6%	48.2%	55.6%	63.2%	74.1%
Median Size		23	44	90	156	247	406	649	900	1187	1276

Panel D: 12 Month (K=12)											
Institutional Holding Class											
Past	All	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10
P1	0.01203 (3.36)	0.01833 (3.18)	0.01487 (3.11)	0.01145 (2.80)	0.00918 (2.44)	0.00926 (2.61)	0.01088 (3.23)	0.01087 (3.24)	0.01223 (3.60)	0.01237 (3.48)	0.01147 (3.23)
P2	0.01295 (5.14)	0.01459 (4.67)	0.01312 (4.97)	0.01313 (5.39)	0.01264 (5.34)	0.01206 (4.94)	0.01291 (5.08)	0.01353 (5.16)	0.01347 (5.04)	0.01260 (4.40)	0.01258 (4.27)
P3	0.01368 (4.94)	0.01343 (3.99)	0.01301 (4.48)	0.01371 (4.85)	0.01387 (5.08)	0.01298 (4.69)	0.01398 (4.95)	0.01563 (5.52)	0.01447 (5.01)	0.01261 (4.17)	0.01253 (4.07)
P3-P1	0.00165 (0.81)	-0.00490 (-1.30)*	-0.00187 (-0.55)	0.00226 (0.81)	0.00469 (1.88)**	0.00371 (1.73)**	0.00310 (1.60)*	0.00476 (2.64)***	0.00223 (1.23)	0.00024 (0.13)	0.00106 (0.59)
Median IH		3.1%	10.2%	17.5%	25.3%	33.1%	40.9%	48.4%	55.7%	63.2%	74.0%
Median Size		24	45	93	159	250	418	662	911	1204	1298

***, **, * are statistically significant at the 1, 5, and 10 % levels respectively. Since I focus on the momentum profit (P3-P1), I do not report the significance of P1, P2 and P3. However, most of these coefficients are significant.

Table IV**Momentum Strategies Sorted by Institutional Holding (Controlled for Size)**

This table reports the average monthly return of momentum portfolios formed based on the previous K months' raw returns and held for K months (K=3, 6, 9, and 12). Each month, all stocks are sorted into five portfolios based on their previous market capitalization. Within each quintile, firms are further sorted into ten portfolios based on their previous institutional holdings. Then, all firms are then reaggregated into ten portfolios based on their institutional holding decile rank. Thus, these new ten portfolios are different in terms of institutional holding but similar in size. Within each new portfolio, stocks are ranked in ascending order based on the lagged returns and equally divided into three subgroups (P1 to P3). Portfolio P1 is formed by the loser stocks and P3 is formed by the winner stocks. This table presents the time-series average monthly returns of holding these portfolios for K months. Median sizes are in millions and t-statistics are in parenthesis.

Panel A: 3 Month (K=3)											
Institutional Holding Class (controlled for size)											
Past	All	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10
P1	0.01317 (3.71)	0.01095 (2.73)	0.01157 (3.01)	0.01458 (3.92)	0.01420 (4.00)	0.01376 (3.82)	0.01506 (3.83)	0.01461 (4.10)	0.01235 (3.42)	0.01262 (3.42)	0.01220 (3.31)
P2	0.01384 (5.51)	0.01200 (5.90)	0.01281 (5.92)	0.01395 (5.88)	0.01551 (6.11)	0.01487 (5.76)	0.01463 (5.48)	0.01385 (5.18)	0.01331 (4.75)	0.01311 (4.47)	0.01299 (4.48)
P3	0.01292 (4.68)	0.01098 (3.86)	0.01272 (4.45)	0.01279 (4.35)	0.01322 (4.59)	0.01399 (5.06)	0.01331 (4.71)	0.01305 (4.57)	0.01367 (4.70)	0.01338 (4.54)	0.01282 (4.36)
P3-P1	-0.00025 (-0.13)	0.00003 (0.01)	0.00116 (0.42)	-0.00179 (-0.73)	-0.00097 (-0.45)	0.00023 (0.11)	-0.00175 (-0.70)	-0.00156 (-0.78)	0.00132 (0.65)	0.00076 (0.39)	0.00062 (0.32)
Median IH		5.8%	15.2%	21.8%	28.0%	34.2%	39.9%	45.4%	51.2%	57.4%	69.4%
Median Size		261	271	274	277	278	283	287	292	303	315
Panel B: 6 Month (K=6)											
Institutional Holding Class (controlled for size)											
Past	All	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10
P1	0.01072 (3.02)	0.00925 (2.33)	0.00925 (2.39)	0.01220 (3.28)	0.01188 (3.26)	0.01175 (3.29)	0.01248 (3.26)	0.01054 (2.92)	0.01057 (2.94)	0.01009 (2.69)	0.00986 (2.71)
P2	0.01354 (5.39)	0.01198 (5.45)	0.01265 (5.68)	0.01408 (5.75)	0.01437 (5.81)	0.01446 (5.62)	0.01309 (4.98)	0.01354 (5.02)	0.01323 (4.79)	0.01346 (4.70)	0.01292 (4.49)
P3	0.01456 (5.27)	0.01279 (4.62)	0.01337 (4.88)	0.01483 (5.18)	0.01466 (5.17)	0.01547 (5.49)	0.01520 (5.36)	0.01530 (5.25)	0.01513 (5.19)	0.01547 (5.27)	0.01405 (4.72)
P3-P1	0.00384 (1.85)**	0.00354 (1.25)	0.00412 (1.42)*	0.00262 (1.07)	0.00279 (1.21)	0.00372 (1.69)**	0.00272 (1.08)	0.00475 (2.33)***	0.00457 (2.22)**	0.00538 (2.47)***	0.00419 (2.10)**
Median IH		6.2%	15.8%	22.5%	28.7%	35.0%	40.7%	45.9%	51.5%	57.7%	69.2%
Median Size		271	279	284	282	289	292	294	301	311	322

Table IV Continued.

Panel C: 9 Month (K=9)											
Institutional Holding Class (controlled for size)											
Past	All	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10
P1	0.01087 (3.06)	0.01064 (2.75)	0.00907 (2.36)	0.01167 (3.12)	0.01170 (3.20)	0.01150 (3.24)	0.01157 (3.09)	0.01137 (3.13)	0.01088 (2.95)	0.01069 (2.86)	0.01001 (2.74)
P2	0.01326 (5.27)	0.01186 (5.41)	0.01261 (5.71)	0.01419 (5.82)	0.01387 (5.60)	0.01403 (5.38)	0.01312 (5.05)	0.01338 (4.89)	0.01316 (4.81)	0.01310 (4.59)	0.01284 (4.48)
P3	0.01490 (5.40)	0.01310 (4.82)	0.01391 (5.14)	0.01500 (5.37)	0.01462 (5.11)	0.01582 (5.63)	0.01546 (5.47)	0.01519 (5.21)	0.01630 (5.50)	0.01499 (5.01)	0.01444 (4.81)
P3-P1	0.00403 (2.03)**	0.00246 (0.95)	0.00484 (1.93)**	0.00333 (1.41)*	0.00292 (1.27)	0.00432 (1.99)**	0.00389 (1.69)**	0.00382 (1.78)**	0.00542 (2.56)***	0.00430 (1.96)**	0.00442 (2.27)**
Median IH		6.5%	16.3%	23.0%	29.4%	35.6%	41.3%	46.3%	51.7%	57.8%	69.1%
Median Size		281	287	291	288	300	300	303	308	318	329
Panel D: 12 Month (K=12)											
Institutional Holding Class (controlled for size)											
Past	All	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10
P1	0.01203 (3.36)	0.01239 (3.18)	0.01090 (2.86)	0.01229 (3.28)	0.01339 (3.54)	0.01159 (3.22)	0.01280 (3.47)	0.01198 (3.35)	0.01218 (3.34)	0.01170 (3.07)	0.01099 (2.96)
P2	0.01295 (5.14)	0.01177 (5.51)	0.01254 (5.75)	0.01335 (5.53)	0.01351 (5.44)	0.01308 (5.05)	0.01298 (4.96)	0.01298 (4.70)	0.01320 (4.72)	0.01311 (4.60)	0.01253 (4.34)
P3	0.01368 (4.94)	0.01115 (4.20)	0.01257 (4.65)	0.01422 (5.11)	0.01323 (4.69)	0.01475 (5.25)	0.01430 (5.01)	0.01443 (4.89)	0.01516 (5.12)	0.01350 (4.46)	0.01391 (4.57)
P3-P1	0.00165 (0.81)	-0.00125 (-0.48)	0.00166 (0.66)	0.00193 (0.82)	-0.00016 (-0.07)	0.00316 (1.45)*	0.00151 (0.65)	0.00245 (1.15)	0.00298 (1.39)*	0.00180 (0.79)	0.00292 (1.42)*
Median IH		6.9%	16.8%	23.5%	30.0%	36.0%	41.8%	46.7%	52.0%	58.0%	69.0%
Median Size		289	295	299	297	307	307	312	316	325	336

***, **, * are statistically significant at the 1, 5, and 10 % levels respectively. Since I focus on the momentum profit (P3-P1), I do not report the significance of P1, P2 and P3. However, most of these coefficients are significant.

Table V**Momentum Strategies Sorted by Size and Institutional Holding (1/1980-12/2004)**

This table reports the average monthly returns of momentum portfolios formed by sorts on size and institutional holding level. The relative momentum portfolios are constructed according to K month lag raw returns and held for K months (K=6 and 9). Each month, all stocks are sorted by their previous market capitalization and assigned to three groups. Size class S1 contains the smallest firms and S3 contains the largest firms. Within each class, firms are sorted by their previous institutional holding level and grouped into three sub-samples (H1 to H3). In each portfolio formed by size and institutional holding, stocks are ranked in ascending order on the lagged returns and equally divided into three portfolios. Portfolio P1 is formed by equally weighting the worst-performing stocks and portfolio P3 is formed by the best-performing stocks. P3-P1 momentum profits for holding six and nine months are presented in panel A and B respectively. t-statistics are in parenthesis.

Panel A: 6 Month			
Institutional Holding	Size Class		
	S1 (Small)	S2 (Median)	S3 (Large)
H1 (Low)	P3-P1=0.00102(0.27)	P3-P1=0.00572(2.55)***	P3-P1=0.00097(0.50)
H2 (Median)	P3-P1=0.00755(2.40)***	P3-P1=0.00547(2.91)***	P3-P1=0.00107(0.59)
H3 (High)	P3-P1=0.00850(3.63)***	P3-P1=0.00439(2.40)***	P3-P1=0.00091(0.47)
H3-H1	P3-P1=0.00748(2.45)***	P3-P1=-0.00134(-0.76)	P3-P1=-0.00006(-0.05)

Panel B: 9 Month			
Institutional Holding	Size Class		
	S1 (Small)	S2 (Median)	S3 (Large)
H1 (Low)	P3-P1=0.00010(0.03)	P3-P1=0.00673(3.02)***	P3-P1=0.00087(0.46)
H2 (Median)	P3-P1=0.00542(1.66)**	P3-P1=0.00522(2.72)***	P3-P1=0.00225(1.24)
H3 (High)	P3-P1=0.00803(3.29)***	P3-P1=0.00538(2.86)***	P3-P1=0.00139(0.76)
H3-H1	P3-P1=0.00794(2.63)***	P3-P1=-0.00135(-0.77)	P3-P1=0.00052(0.41)

***, **, * are statistically significant at the 1, 5, and 10 % levels respectively.

Table VI**Institutional Holding and Return Autocorrelation**

This table reports the time-series average coefficient of return autocorrelation from the cross-sectional regressions. Each quarter, all stocks are sorted by previous market capitalization and assigned to three classes. Within each class, firms are sorted by their previous institutional holdings and grouped into five portfolios. Within each of the 15 portfolios formed by size and institutional holding, quarterly returns are regressed on beginning institutional holding and other firm characteristics. Specifically, the estimated equation is $R_{t+1} = \alpha + \beta_1 I_{Ht} + \beta_2 R_t + \beta_3 \ln(\text{Size})_t + \beta_4 \text{BMt}$. R_{t+1} is stock return. I_{Ht} is firm's institutional holding at the beginning of each period. Size is market capitalization at the beginning of each period and is expressed in natural logarithm. The book to market ratio (BMt) is firm's book value at the beginning of each period divided by its price. The table reports the time-series average of coefficient β_2 , with t-statistics in the parenthesis.

Panel A: 6 Month			
Institutional Holding Class	Size Class		
	S1 (Small)	S2 (Median)	S3 (Large)
H1 (Low)	0.05799 (2.67)***	0.05567 (3.30)***	0.01981 (0.85)
H2	0.07677 (4.10)***	0.04298 (2.21)**	0.01377 (0.70)
H3 (Median)	0.07562 (3.09)***	0.04060 (2.62)***	0.06016 (3.04)***
H4	0.08023 (4.57)***	0.05554 (3.25)***	0.04364 (2.64)***
H5 (High)	0.11442 (5.65)***	0.03624 (2.16)**	0.03671 (1.77)**
H5-H1	0.05643(1.95)**	-0.01943(-1.03)	0.0169(0.73)

Panel B: 9 Month			
Institutional Holding Class	Size Class		
	S1 (Small)	S2 (Median)	S3 (Large)
H1 (Low)	0.05504 (2.49)***	0.05029 (3.11)***	0.02075 (0.78)
H2	0.09114 (3.79)***	0.06183 (3.51)***	0.04421 (1.92)**
H3 (Median)	0.08496 (4.89)***	0.03522 (1.55)*	0.09198 (3.95)***
H4	0.09668 (3.47)***	0.08565 (4.26)***	0.09381 (4.72)***
H5 (High)	0.11594 (5.21)***	0.06901 (3.47)***	0.07741 (2.91)***
H5-H1	0.06090(2.15)**	0.01872(0.90)	0.05666(2.14)**

***, **, * are statistically significant at the 1, 5, and 10 % levels respectively.

Table VII**Relationship of Past Institutional Holding's Change and Equity Return**

This table reports the time-series average coefficients for cross-sectional regressions of quarterly return on previous change of institutional holding and other firm characteristics. The estimated equation for Panel A is $R_{t+1} = \alpha + \beta_1 \Delta IH_t + \beta_2 R_t + \beta_3 \ln(\text{Size})_t + \beta_4 \text{BM}_t$

R_{t+1} is quarterly return. ΔIH_t is change of institutional holding in the past quarter. Size is firm's market capitalization at the beginning of each quarter and is expressed in natural logarithm. The book to market ratio (BM_t) is firm's book value at the beginning of each quarter divided by its price. The estimated equation for Panel B is

$$R_{t+1} = \alpha + \beta_1 \Delta IH_{1t} + \beta_2 \Delta IH_{2t} + \beta_3 \Delta IH_{3t} + \beta_4 \Delta IH_{4t} + \beta_5 \Delta IH_{5t} + \beta_6 R_t + \beta_7 \ln(\text{Size})_t + \beta_8 \text{BM}_t$$

where institutional investors are classified into five groups.

Panel A		
Explanatory Variable	Average coefficient	t-statistics
Constant	0.04595	1.69*
Change in all institutional holding (ΔIH_t)	0.02525	2.04**
Last quarter's return (R _t)	0.00453	0.43
Size (Ln St)	-0.00130	-0.78
Book-to-market (BM _t)	0.01110	3.34***
Panel B		
Explanatory Variable	Average coefficient	t-statistics
Constant	0.04746	1.75*
Change in Banks' holding	-0.03542	-1.19
Change in Insurance companies' holding	0.00412	0.09
Change in Investment companies' holding	0.02215	0.54
Change in Independent investment advisors' holding	0.05188	2.91***
Change in other institutional holding	0.04022	0.89
Last quarter's return (R _t)	0.00469	0.45
Size (Ln St)	-0.00143	-0.87
Book-to-market (BM _t)	0.01111	3.34***

***, **, * are statistically significant at the 1, 5, and 10 % levels respectively.

Table VIII**Positive Feedback Trading of Institutional Investors**

This table presents the time-series average coefficients for cross-sectional regressions of quarterly institutional holding's change on past returns and other firm characteristics. The estimated equation is

$$\Delta IHi_{i,t+1} = \alpha + \beta_1 Rt + \beta_2 \text{Ln}(\text{Size})_t + \beta_3 \text{BMt}$$

$\Delta IHi_{i,t+1}$ is change of institutional holdings for all institutions or that for banks, insurance companies, investment companies, independent advisors and other institutions respectively. Rt is return over the past quarter. Size is the firm's market capitalization at the beginning of each quarter and is expressed in natural logarithm. The book to market ratio (BMt) is firm's book value at the beginning of each quarter divided by its price.

Explanatory Variables	Dependent Variable					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	Changes in All institutional investors	Change in Banks' holding	Change in Insurance companies' holding	Change in Investment companies' holding	Change in Independent advisors' holding	Change in Other institutional holding
Constant	0.00863 (2.52)**	0.00195 (1.46)	0.00065 (1.04)	-0.00036 (-0.45)	0.00581 (2.09)**	0.00058 (0.49)
Last return (Rt)	0.01690 (14.13)***	0.00274 (6.71)***	0.00157 (5.28)***	0.00504 (11.38)***	0.00781 (9.82)***	-0.00028 (-1.19)
Size (Ln St)	-0.00213 (-3.58)***	-0.00014 (-1.12)	-0.00003 (-0.50)	0.00011 (1.48)	-0.00027 (-1.24)	0.00004 (0.38)
Book-to-market (BMt)	-0.00028 (-0.91)	-0.00041 (-2.44)**	-0.00028 (-2.60)***	-0.00034 (-2.61)***	-0.00076 (-1.51)*	-0.00034 (-3.57)***

***, **, * are statistically significant at the 1, 5, and 10 % levels respectively.

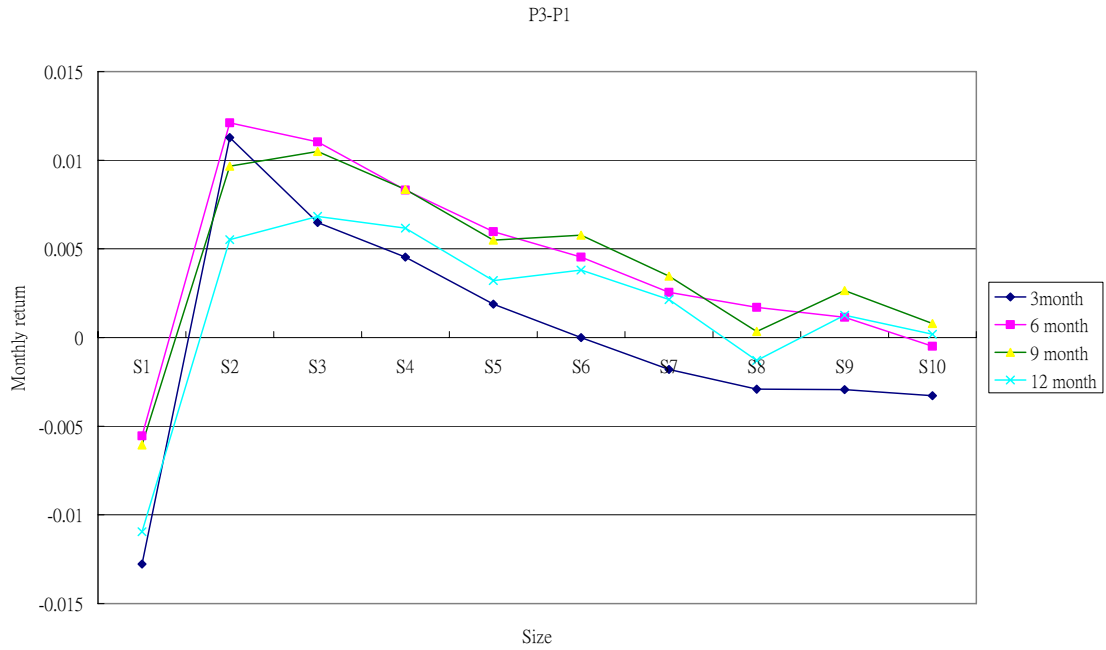


Figure 1. Momentum Profit and Firm Size

This figure reveals the relationship between momentum profits (P3-P1) and firm size. Portfolio S1 contains the smallest firms and S10 contains the largest firms.

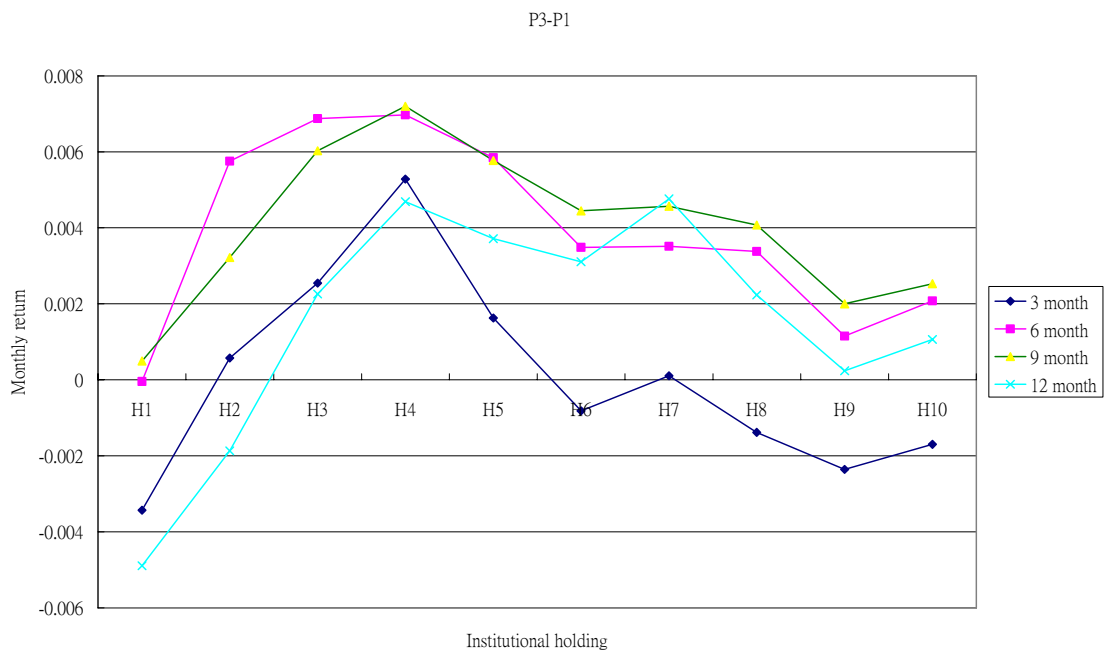


Figure 2. Momentum Profit and Institutional Holding

This figure reveals the relationship between momentum profits (P3-P1) and institutional holding. Portfolio H1 contains firms with the lowest institutional holding and H10 contains firms with the highest institutional holding.

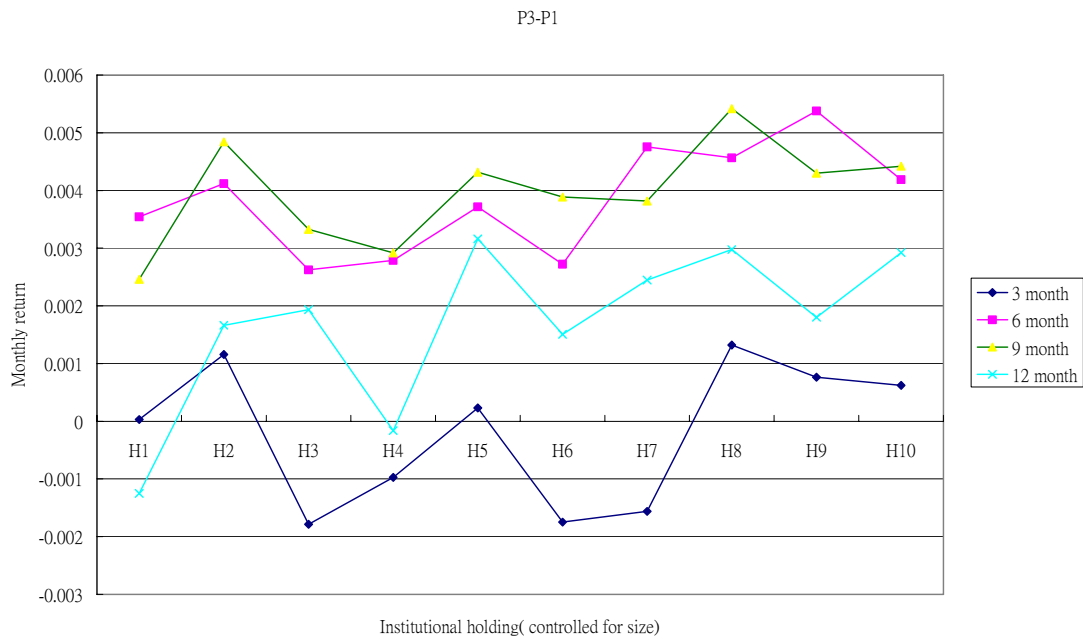


Figure 3. Momentum Profit and Institutional Holding (Controlled for Size)

This figure reveals the relationship between momentum profits, controlled for the effect of firm size, and institutional holding. Portfolio H1 contains firms with the lowest institutional holding and H10 contains firms with the highest institutional holding.