

## **Institutional Trading and Price Momentum**

### **Abstract**

This paper aims to explore the effect of institutional trading on the two asymmetric phenomena found by Lee and Swaminathan (2000): (1) asymmetric price momentum: price momentum is more pronounced among high turnover stocks; (2) asymmetric return phenomenon: low turnover stocks tend to outperform high turnover stocks. Lee and Swaminathan use a “momentum life cycle” to explain the asymmetric momentum effect while attributing the asymmetric return phenomenon to the analysts’ overestimating (underestimating) the future profitability of high (low) turnover firms. However, it essentially needs trading activity to induce both of the above asymmetric results. Since institutional investors exhibit momentum trading pattern (Chan, Jegadeesh and Lakonishok, 1996; Grinblatt, Titman and Wermers, 1995; Sias and Starks, 1997) and the trading behavior of institutional investors may have large impact on the movement of stock prices (Lakonishok, Shleifer and Vishny, 1992; Wermers, 1999), institutional trading may be one of the major driving forces leading to both of the above asymmetric patterns. The empirical results show that, first of all, after controlling for the turnover, the price momentum is still more pronounced among stocks with higher institutional ownership, while high turnover stocks no longer exhibit pronounced momentum effect after controlling for the institutional ownership. Furthermore, stocks with higher institutional ownership have better return performance in any of the turnover groups. While low turnover stocks still outperform high turnover stocks after controlling for the institutional ownership level, for some winner stocks this is no longer true. The results suggest that the asymmetric momentum effect is not induced by stock’s turnover, but rather it is driven by institutional trading. Turnover is only a proxy for institutional trading. That is, turnover per se has no economic significance in such a momentum phenomenon.

**Keywords:** institutional trading, asymmetric price momentum, asymmetric return phenomenon, turnover

## I. Background and Motivation

This study examines the effect of institutional trading on price momentum. Since Jegadeesh and Titman (1993) evidenced that there exists price continuation on stock prices (the phenomenon is thereafter known as “price momentum”), many studies have sought to explain such a phenomenon. Some argue that such a price momentum effect has been induced by the slow information diffusion or under-reaction in prices to public information (Barberis et al. (1998); Hong and Stein (1999)). Other studies attribute the momentum effect as a result of prices initially overreacting to news about fundamentals, and continuing to move further away before ultimately reverting to fundamentals (Daniel et al. (1998) and De Long et al. (1990)).

In their recent study examining the relation between price momentum and turnover rate (a proxy for trading volume), Lee and Swaminathan (2000), however, argue that price momentum phenomenon cannot be fully explained by either of the above theories. In order to fit into the Hong and Stein (1999) model, momentum profits should be larger for stocks with slower information diffusion. If less trading leads to insufficient diffusion of information, then the Hong and Stein model would predict a greater momentum effect among stocks with low trading volume. However, what Lee and Swaminathan (2000) find is that low volume winners exhibit greater momentum while low volume losers have less momentum, which is inconsistent with the under-reaction explanation in Hong and Stein model. On the other hand, Lee and Swaminathan stated that “... in Daniel et al. (1998), momentum arises from positive feedback traders that seek to capitalize on an initial price move by buying (selling) on good (bad) news. If we assume that trading volume is a proxy for positive feedback trading, or the activity of overconfident traders, then these models predict greater momentum among high volume stocks (in the case of Daniel et al. this is because high volume stocks are glamour stocks that are more difficult to value).” (Lee and Swaminathan (2000), p. 2062) However, Lee and Swaminathan find that although high volume losers exhibit greater momentum than low volume losers, high volume winners actually have less, instead of more, momentum. This is inconsistent with the overreaction theory.

By using turnover as a proxy for trading volume, the major findings in Lee and Swaminathan (2000) can be summarized as follows: low turnover winners (losers have greater (less) momentum, while high turnover winners (losers) have less (greater) momentum. That is, the price momentum effect regarding different high-low

turnover and winner-loser combinations is essentially an asymmetric one. Lee and Swaminathan explain this asymmetric momentum result as being a phenomenon that stock prices initially underreact, and ultimately overreact, to fundamental news. Thus, they claim that their findings imply the important role of trading volume in reconciling intermediate-horizon underreaction and long-horizon overreaction effects.

In addition to the above asymmetric momentum results, Lee and Swaminathan also evidence the following findings: high turnover stocks tend to have greater analyst coverage, have higher forecasted earnings, lower book-to-market ratios, and higher return on equity (ROE). Lee and Swaminathan further find that low turnover stocks, either winners or losers, have experienced a greater decline in ROE over the past three years compared to high turnover stocks. Altogether, these evidences all lead to a conclusion that high turnover stocks, either winners or losers, tend to experience better past performance. However, the more striking result that Lee and Swaminathan find is that high turnover stocks, both winners and losers, have actually worse performance in the future than low turnover stocks in terms of the change of ROE. That is, although high turnover stocks have more analyst coverage, higher forecasted earnings, and higher past ROE performance, they somehow tend to perform worse in the future than low turnover stocks. Lee and Swaminathan attribute this phenomenon to the argument that “analysts seem to consistently overestimate (underestimate) the future profitability of high (low) turnover firms, perhaps because they naively extrapolate recent operating performance.” (Lee and Swaminathan (2000), p. 2052)

Although analysts’ overestimation (underestimation) on high (low) turnover stocks may provide an explanation to the asymmetric price momentum phenomenon, essentially it needs trading activity to induce such an asymmetric result. Since the trading behavior of institutional investors may exhibit great impact on the movement of stock prices (Lakonishok, Shleifer and Vishny, 1992; Wermers, 1999), and there has been evidenced that institutional investors tend to exhibit momentum trading pattern (Chan, Jegadeesh and Lakonishok, 1996; Grinblatt, Titman and Wermers, 1995; Sias and Starks, 1997), institutional trading may be one of the major driving forces leading to the above-mentioned asymmetric price momentum phenomenon.

The purpose of this paper is, thus, to explore the impact of the institutional trading on the asymmetric price momentum found by Lee and Swaminathan (2000). Specifically, I argue that it may be due to the institutional investors’ better insights on the future prospects of the firms that are either overestimated or underestimated by the

analysts, institutional investors will buy the underestimated, low turnover stocks while sell the overestimated, high turnover stocks. Through the institutional buying (selling) on the low (high) turnover stocks, the prices of low (high) turnover stocks may, thus, increase (decrease). As a result, we would observe the exact asymmetric price momentum found by Lee and Swaminathan (2000): low turnover winners (high turnover losers) remain as winners (losers) and exhibit greater momentum, while low turnover losers (high turnover winners) will tend to move toward the opposite direction in prices and have less momentum.

The remainder of the paper is organized as follows. In the next section, the empirical design including the data sample, the portfolio formation and the specific testing procedures are described. In Section III the empirical results are reported and analyzed. Finally, the concluding remarks are presented in Section IV.

## **II. Empirical Design**

### *A. The Data:*

The stock price data is from the Taiwan Economic Journal (TEJ) database that includes all of the exchange listed and OTC listed stocks. The sample period is from 1993 to 2001. The data regarding institutional buying and selling on a certain stock will be inferred from the change of institutional ownership. An increase (decrease) in institutional ownership for a certain firm in a certain period indicates institutional investors' buying (selling) activity. The institutional ownership data is also from TEJ database.

Furthermore, the three categories of institutional investors: mutual funds, foreign investors (QFII) and securities dealers, will be investigated separately for their effects on the asymmetric price momentum.

### *B. Portfolio Formation Procedure*

The purpose of this study is to examine the effect of institutional trading (ownership) on the momentum effect, and the relationship between institutional trading and stock turnover. Thus, there are three basic types of portfolios that are needed: price momentum portfolios, trading volume (turnover) portfolios and institutional ownership portfolios.

Firstly, the price momentum portfolios are formed as follows. Similar to Lee

and Swaminathan (2000), at the beginning of each month, I first sort stocks based on past returns (returns of past 3, 6, 9 and 12 months) to form 10 winner-loser portfolios (r1 through r10, with r1 having the lowest past returns and r10 having the highest past returns) from all of the sample firms. Then, I define r9 and r10, the two portfolios with the highest past returns, as the winner portfolio; r1 and r2, the two portfolios with the lowest past returns, as the loser portfolio; and r5 and r6 as the intermediate portfolio.

Next, for the trading volume (turnover) portfolios, I rank all sample stocks at the beginning of each month into 5 turnover portfolios based on each stock's past turnover rate from previous 3, 6, 9 and 12 months. The portfolio with the highest (lowest) turnover rates is defined as the high (low) turnover portfolio. And the portfolios in between are defined as the intermediate turnover portfolio.

Finally, the institutional ownership portfolios are set up as follows. At the beginning of each month, for each type of the above-mentioned three institutional investors, all sample stocks are independently sorted based on the ownership levels of that specific type of institutional investor during the past 3, 6, 9 and 12 months to form three institutional ownership portfolios for each of the three types of institutional investors. The one with the highest (lowest) institutional ownership level is the high (low) institutional ownership portfolio. The one in the middle is the intermediate institutional ownership portfolio. The return series of each of the above portfolios are the equal-weighted average of the component stocks' returns in that portfolio.

### *C. Institutional Trading vs. Turnover in Asymmetric Price Momentum and Performance Effects:*

In order to examine the impact of institutional trading on price momentum, first, the focus is on the monthly returns of the various winner and loser deciles over the following months, i.e., the following 3, 6, 9, 12 months, to investigate the price momentum patterns for each of the winner-loser portfolios. Then, I examine whether the trading patterns of the institutional investors coincide with the asymmetric price momentum patterns. That is, the stocks with higher institutional ownership would tend to exhibit more pronounced price momentum.

Next, for investigating the relative role of institutional trading and turnover in explaining the asymmetric price momentum effect, the sample stocks are segregated according to institutional ownership and turnover rate, separately. That is, I first control the stocks' turnover rates and investigate the effect of various institutional

ownership levels on price momentum. Then, instead of controlling stocks' turnover, I control the stocks' institutional ownership level and examine the effect of different turnover rates on the price momentum. Specifically, the purpose is to uncover the major driving force of the asymmetric price momentum phenomenon documented by Lee and Swaminathan (2000). That is, whether the asymmetric price momentum phenomenon is mainly induced by turnover rates or institutional trading.

Furthermore, for examining the importance of institutional trading in driving the asymmetric performance phenomenon between high and low turnover stocks, the performances of stocks with different turnover rates and with different institutional ownership levels are tested. Finally, some robustness check on the interaction between institutional trading portfolios and market capitalization portfolios are performed in order to further identify the authentic source of the asymmetric performance phenomenon.

### **III. Empirical Findings**

In this section, the empirical results are reported and the findings regarding the explanation for the asymmetric price momentum as well as the asymmetric return performance are discussed. In subsection A, I reinvestigate for Taiwan's market both the asymmetric price momentum and asymmetric return performance documented by Lee and Swaminathan (2000). In subsection B, the relation between price momentum and institutional trading is examined. As mentioned in the first section of this paper, it is worthy to investigate the impact of institutional trading on the above-mentioned asymmetric price momentum and return performance since the trading behavior of institutional investors may have great impact on the movement of stock prices and exhibit momentum trading pattern.

Next, the effects of turnover and institutional trading on price momentum and return performance are explored in subsection C. Those two effects are also compared in order to identify the relative role and importance of turnover and institutional trading on the momentum and performance phenomena.

Finally, it is well documented that institutional investors prefer investing in stocks with larger capitalization (e.g., Falkenstein (1996); Yu (2002)). Thus, in subsection D, a robustness check is performed to insure that the explaining power of institutional trading for the price momentum and return performance is not simply a

proxy for stock capitalization.

#### A. *Price Momentum and Turnover*

This subsection discusses the turnover-based price momentum and return performance effects. The empirical results are reported in Table I.

In Table I, both the winner-loser portfolios and the turnover portfolios are formed independently from various (3, 6, 9 and 12-month) formation periods. The returns of winner, loser and intermediate portfolios for various return formation periods are shown in the rows of the table, while the returns of each turnover portfolio via different turnover formation periods are shown in the columns.

First, it is shown from the table that except for the 3-month formation period, the average returns of “R3-R1” are all positive, with many of them significant. This result shows that there exists price momentum phenomenon for almost all the formation periods. In other words, for almost all of the periods, winners remain as winners while losers sustains as losers. This is consistent with the momentum phenomenon documented in the extant finance literature.

Second, among those periods that exhibit price momentum, the average returns of “R3-R1” are higher for the high turnover portfolios. This indicates that there is a consistent tendency that the price momentum is more pronounced for the high turnover portfolios. This finding is similar to that found by Lee and Swaminathan (2000), which is the asymmetric price momentum mentioned in the above sections.

Finally, it is observed from the average returns under each of the turnover portfolios that stocks with lower turnover rates earn higher average returns in the following three to 12-month periods. And the returns earned in the future periods exhibit a clear decreasing pattern from lower to higher turnover portfolios. For example, for the formation period of 6-month (“J=6”) and the holding period of 3-month (“K=3”), the low turnover portfolio earns 0.5876% return while the high turnover portfolio earns -0.4163% return for the losers. For the rest of the winner-loser portfolios and the various portfolio formation and holding periods, the pattern is basically quite similar. That is, low turnover stocks earn higher returns and have better performance than high turnover stocks. This finding is also consistent with what Lee and Swaminathan (2000) has found and I call it here the asymmetric (turnover-based) return performance.

### *B. Price Momentum and Institutional Trading*

This subsection explores the institutional trading-based price momentum and return performance. From Table I, there are two basic asymmetric phenomena found: asymmetric price momentum and asymmetric return performance. Both are induced by stock's turnover rates. Lee and Swaminathan (2000) call these asymmetries "turnover-based". However, it is argued that those asymmetries may not be in effect induced by turnover. It may be that turnover is simply a proxy for some other factors which have more economic essence.

Institutional trading may be one important factor causing the asymmetries. The rational is well stated in the previous sections. That is, both the price momentum and return performance asymmetries are basically the results of price movement. And the price movement is essentially induced by trading. In other words, the above-mentioned asymmetries are necessarily caused by trading activities. Since there have been well documented that trading by institutional investors may exert great impact on price movement as well as on price momentum, it is quite natural to put institutional trading factor in the potential list of the source and explanation for those price movement-related asymmetries

The empirical results for the impact of institutional trading on price momentum and return performance are presented in Table II. The effects of the three types of institutional investors' trading are reported in Panel A, B and C, respectively, in Table II. Firstly, any of the panels in Table II shows a similar pattern that price momentum is more pronounced for the portfolios with higher institutional ownership. This can be seen from the returns of "R3-R1" (returns of longing winner and shorting loser, i.e., the momentum profit) in the table. For any of the panels, the momentum profit for the high institutional portfolio is larger than that for the low institutional portfolio. And this pattern exists in any of the return formation and holding periods<sup>1</sup>. This indicates that the asymmetric price momentum found in Table I for the turnover portfolios also exists for the institutional ownership portfolios.

Furthermore, the "F3-F1" returns figures are mostly positive in various return formation and holding periods and for any type of institutional investors. Since "F3-F1" represents the return difference between portfolios with high and low institutional ownership, this result implies that stocks with high institutional ownership outperform those with low institutional ownership. This, thus, exhibits a similar pattern as those presented in Table I for the turnover-based portfolios. The difference here is that the result in Table II shows an institutional trading-based, rather

than turnover-based, asymmetric return performance.

In sum, results in Table II indicate that there exist both institutional trading-based price momentum and institutional trading-based return performance phenomena. Possible explanation for the institutional trading-based price momentum is as follows. Firstly, Lee and Swaminathan (2000) document that growth stocks exhibit more price momentum than value stocks. Second, as the literature regarding the preferences of institutional investors shows, institutional investors prefer growth stocks than value stocks (e.g., Falkenstein (1996); Yu (2002)). These two lines of findings combined indicate that it may be due to that institutional investors are trading more on growth stocks and thus results in the asymmetric price momentum.

As for the institutional trading-based return performance, it may be due to the fact that institutional investors have more resources and better foresight toward the market than do individual investors. As a result, the stocks that institutional investors prefer to invest will incur better return performance.

### *C. Institutional Trading vs. Turnover*

In previous subsections, it has been found in Tables I and II that there exist both the effects of turnover-based and institutional trading-based price momentum and return performance. In this subsection, I attempt to disentangle these two effects in order to identify the ultimate source for the price momentum and return performance phenomena. I first examine the effect of institutional trading on those two phenomena by controlling stocks' turnover rates. By doing this, I am able to see the effect induced by institutional trading independent of that induced by turnover rates. Then, I also investigate the effect of turnover rates on those two phenomena by controlling institutional trading levels to look at the independent effect from turnover. The results are presented in Table III and Table IV, respectively.

Similar to Table II, in Table III, the results for each of the three types of institutional investors are also reported separately in Panels A, B and C, respectively. Furthermore, in each of the panels in Table III, the sample is broken down into three different turnover levels: the high, the intermediate and the low turnover ones. Those turnover portfolios are denoted as T3, T2 and T1, respectively.

First of all, from Panel A, it is found that in any of the three turnover levels, the price momentum effect is stronger in portfolios with high mutual funds ownership than in portfolios with low mutual funds ownership. Actually, there exists no price

momentum, instead, there exhibits price reversal, for the portfolios with low mutual funds ownership. This is simply contrary to the price momentum effect found in high mutual funds ownership portfolios.

More strikingly, even in the high turnover portfolios, the above pattern still persists. This is also contradictory to what Lee and Swaminathan (2000) have found for the turnover-based price momentum effect. According to their findings, high turnover portfolios should exhibit more price momentum pattern. However, such a pattern does not exist in the high turnover portfolios in Table III. That pattern only persists for the portfolios with high institutional ownership. The result here may imply that it is not turnover causing the asymmetric price momentum pattern, but rather, it is institutional trading that induces that pattern. The results for the other two institutional investors, i.e., QFII and securities dealers, in Panels B and C, are basically quite similar to that in Panel A.

Next, the return performance pattern which is shown by “F3-F1” returns figures in Table III are examined. From any of the three panels in Table III, the patterns for “F3-F1” figures are basically the same. That is, it is quite obvious that most of the “F3-F1” numbers are positive, with many of them are quite significant. For example, in Panel A, except for the high turnover (T3) and loser group (R1), other portfolios all exhibit positive numbers for “F3-F1”. This result indicates that no matter in which turnover group, stocks with high mutual funds ownership tend to outperform those with low mutual funds ownership. Again, the result is still the same for the other two institutional investors in Panels B and C.

In addition to the findings above, there also exists a pattern in Table III that the largest return performance result seems to occur in the portfolio which is both winner and with high institutional ownership level.

In sum, the basic findings in Table III are two-fold. The first finding is that after controlling turnover levels, the institutional trading still plays an important role in explaining the price momentum. This implies that the asymmetric price momentum found by Lee and Swaminathan (2000) may not be triggered by turnover, but rather, may actually be induced by institutional investors’ trading.

The second finding from Table III is that stocks with high institutional trading still outperform stocks with low institutional trading no matter in which turnover levels. Furthermore, overall, the extent of that outperformance is not higher for the low turnover group of stocks, a pattern which is predicted by Lee and Swaminathan (2000). Indeed, on the contrary, the result just shows the opposite that high turnover

stocks actually incur larger extent of that outperformance. In all, the results in Table III points to a direction where institutional trading, instead of turnover, is the key factor for both the asymmetric price momentum and asymmetric return performance.

Next, I focus on stock's turnover by controlling institutional ownership levels to examine whether there exists a turnover-based price momentum or a turnover-based return performance independent of the institutional trading. The results are presented in Table IV.

Firstly, in order to observe the turnover-based price momentum, it is expected to find positive return numbers for return difference between winners and losers, "R3-R1". However, Table IV's results simply reveal an opposite one. Specifically, from Table IV, the results show that after controlling the institutional ownership levels, most of the "R3-R1" figures are negative, instead of positive, showing a pattern contradictory to the turnover-based price momentum. The only exception for that pattern is in the high institutional ownership portfolio. Only in the high institutional ownership portfolio that high turnover stocks exhibit more pronounced price momentum effect. This result is stronger in both Panels A and B. Such a result is still persistent in Panel C, although the pattern is weaker.

Secondly, the turnover-based return performance can be seen from the return difference between high and low turnover portfolios, "T3-T1". The turnover-based return performance documented by Lee and Swaminathan (2000) implies return outperformance of high over low turnover stocks. Thus, according to their finding, we would expect to observe the return difference, "T3-T1", being negative.

From Panel A in Table IV, most of the "T3-T1" figures are negative. But, for some winner portfolios, this is no longer true after controlling institutional ownership. For example, two of three such numbers for winner portfolio in the high institutional ownership group exhibit positive numbers (0.0580 and 0.3953, respectively). In Panels B and C, this is still true that some winner portfolios show different result from what the turnover-based return performance would expect.

#### *D. Institutional Trading or Market Capitalization?*

This subsection discusses whether stock's market capitalization will have some impacts on price momentum and return performance. In the previous subsections, I document that institutional trading play an important role in explaining both price momentum and return performance. However, as stated in the above section that it is well documented that institutional investors prefer investing in stocks with large

capitalization. As a result, the findings regarding the impact of institutional trading on price momentum and return performance may well be contaminated by stock's capitalization. Therefore, it is necessary to perform a robustness check on this issue.

In order to diagnose the effect of capitalization on both price momentum and return performance, I follow a similar procedure as in Table II by comparing the momentum and return performance in different market capitalization groups. The results are reported in Table V<sup>2</sup>. First of all, from Table V, it is obvious that most of the return differences between winner and loser, R3-R1, are negative. This means that for most of the market capitalization groups, there does not exist any price momentum. On contrary, most of the capitalization groups reveal return reversal instead of momentum. Although some of the figures are positive, it is not in the right direction because larger capitalization stocks actually exhibit less momentum, which does not coincide with the findings from institutional trading above. In sum, this result indicates that market capitalization is not a factor explaining price momentum.

Secondly, the return performance effect can be examined by looking at the return difference between stocks with large and small market capitalization, C3-C1. Most of the figures in "C3-C1" are negative, showing that large capitalization stocks do not outperform small capitalization stocks. This is also inconsistent with what I find regarding institutional trading-based return performance based on the fact that institutional investors prefer investing in large capitalization stocks. Therefore, in all, the evidence in Table V shows that market capitalization has no role for either price momentum or return performance effects.

## **VI. Conclusions**

This paper explores the role of institutional trading in explaining the turnover-based asymmetric price momentum and return performance. There are four major findings in this paper and are summarized as follows.

1. The asymmetric momentum effect is NOT induced by stock's turnover, but induced by institutional trading. That is, institutional momentum trading behavior induces such an effect.
2. Turnover is only a proxy for institutional trading. That is, turnover per se has no economic significance.

3. Although the turnover-based asymmetric return performance phenomenon still exists, institutional ownership plays an important role in explaining this asymmetry. Specifically, stocks with higher institutional ownership (trading) tend to outperform those with lower institutional ownership (trading). This indicates that Institutional investors may have better insights on the future prospects of the firms that are either overestimated or underestimated by the analysts.
4. The institutional trading is not a proxy for market capitalization in explaining either price momentum or return performance effects.

Footnotes:

1. For compactness, Table II only shows the 3 and 6-month formation and holding periods. For the 9 and 12-month periods, results are essentially the same.
2. Although Table V only shows the results for 3 and 6-month formation and holding periods, results for other periods are basically quite similar to those in Table V.

## References

- Barberis, Nicholas, A. Shleifer and R. Vishny, 1998, A model of investor sentiment, *Journal of Financial Economics* 49, 307-343.
- Chan, Louis K., N. Jegadeesh and J. Lakonishok, 1996, Momentum strategies, *Journal of Finance* 51, 1681-1713.
- De Long, J. Bradford, A. Shleifer, L. H. Summers and R. J. Waldmann, 1990, Positive feedback investment strategies and destabilizing rational speculation, *Journal of Finance* 45, 379-395.
- Falkenstein, E. G., 1996, Preferences for stock characteristics as revealed by mutual fund portfolio holdings, *Journal of Finance*, 51, 111-135.
- Grinblatt, M., S. Titman and R. Wermers, 1995, Momentum investment strategies, portfolio performance, and herding: A study of mutual fund behavior, *American Economic Review* 85, 1088-1105.
- Hong, H. and J. C. Stein, 1999, A unified theory of underreaction, momentum trading and overreaction in asset markets, *Journal of Finance* 54, 2143-2184.
- Jegadeesh, N. and S. Titman, 1993, Returns to buying winners and selling losers: implications for stock market efficiency, *Journal of Finance* 48, 65-91.
- Lakonishok, J., A. Shleifer and R. Vishny, 1992, The impact of institutional trading on stock prices, *Journal of Financial Economics* 32, 23-44.
- Lee, Charles M. C. and B. Swaminathan, 2000, Price momentum and trading volume, *Journal of Finance* 55, 2017-2069.
- Sias, R. W. and L. T. Starks, 1997, Return autocorrelation and institutional investors, *Journal of Financial Economics* 46, 103-131.
- Wermers, Russ, 1999, Mutual fund herding and the impact on stock prices, *Journal of Finance*, 54, 581-622.
- Yu, Chih-Hsien, 2002, The role of institutional ownership and herding in diversification strategy," *Journal of Risk Management*, Vol. 4, No. 2, 1-29.

**Table I**  
**Price Momentum and Turnover**

This table presents average monthly returns for price momentum portfolio strategies under different turnover levels. At the beginning of each month, all sample stocks are sorted based on their previous J months' returns and divided into 10 portfolios (r1-r10). R1 (includes r1 and r2) represents the loser portfolio, R2 (includes r5 and r6) represents the intermediate portfolio, while R3 (includes r9 and r10) represents the winner portfolio. K represents monthly holding periods where K=3, 6, 9, or 12 months. Monthly holding period returns are computed as compound returns from momentum strategies initiated through the following K months. All sample stocks are also independently sorted based on turnover over the past J months and divided into three turnover portfolios: T1, T2 and T3, where T1 represents the portfolio with the lowest turnover and T3 represents the portfolio with the highest turnover. All the return figures are in percentage.

J	Portfolio	K=3				K=6				K=9				K=12			
		T1	T2	T3	T3-T1	T1	T2	T3	T3-T1	T1	T2	T3	T3-T1	T1	T2	T3	T3-T1
3	R1	0.5488	0.3897	-0.1089	-0.6576	-0.0028	-0.5203	-0.7948	-0.7921*	-0.2473	-0.8923*	-1.2471*	-0.9998*	-0.3356	-1.0010*	-1.1895*	-0.8539*
	R2	0.4577	0.0774	-0.3899	-0.8476*	0.0716	-0.2274	-0.5803	-0.6518*	-0.1189	-0.5031	-0.7562*	-0.6372*	-0.1269	-0.6126*	-0.8659*	-0.7390*
	R3	0.2730	-0.1605	-0.4675	-0.7405	0.0488	-0.1741	-0.4991	-0.5479*	-0.1362	-0.2644	-0.5904	-0.4542*	-0.2395	-0.3450	-0.8429*	-0.6035*
	R3-R1	-0.2758	-0.5502	-0.3586	-0.0828	0.0516	0.3462	0.2957	0.2442	0.1112	0.6279*	0.6567*	0.5456	0.0961	0.6560*	0.3465	0.2504
6	R1	0.5876	0.0113	-0.4163	-1.0039*	-0.0476	-0.6468	-1.0214	-0.9738*	-0.3356	-0.9437*	-1.3694*	-1.0338*	-0.3154	-0.9492*	-1.3282*	-1.0127*
	R2	0.5155	0.0714	-0.5167	-1.0322*	0.1050	-0.3656	-0.6630	-0.7680*	-0.0997	-0.4999	-0.8034*	-0.7036*	-0.1554	-0.5651*	-0.9449*	-0.7895*
	R3	0.3118	0.0431	-0.3721	-0.6838	0.1302	0.0246	-0.3926	-0.5228	-0.1200	-0.1809	-0.6160	-0.4960*	-0.2780	-0.3745	-0.9010*	-0.6230*
	R3-R1	-0.2758	0.0318	0.0442	0.3200	0.1779	0.6714*	0.6289	0.4510	0.2156	0.7629*	0.7534*	0.5378	0.0374	0.5747*	0.4272*	0.3898
9	R1	0.2043	-0.0927	-0.7899	-0.9942	-0.3237	-0.7943	-1.2135*	-0.8899*	-0.3693	-0.9467*	-1.5599*	-1.1906*	-0.2442	-0.9065*	-1.4243*	-1.1800*
	R2	0.2659	0.0136	-0.3897	-0.6556	0.0511	-0.1361	-0.5596	-0.6107*	-0.0886	-0.3381	-0.7427*	-0.6541*	-0.1517	-0.5158*	-0.9728*	-0.8210*
	R3	0.5744	0.4286	-0.2294	-0.8037	0.0669	0.2277	-0.4029	-0.4699	-0.1068	-0.1543	-0.6996	-0.5928*	-0.3089	-0.4227	-0.9189*	-0.6099*
	R3-R1	0.3701	0.5213	0.5606	0.1905	0.3906	1.0219*	0.8106*	0.4200	0.2625	0.7925*	0.8602*	0.5978	-0.0647	0.4837*	0.5054*	0.5701
12	R1	-0.0365	-0.1823	-0.7589	-0.7224	-0.2676	-0.7333	-1.2276*	-0.9600*	-0.2841	-0.8981*	-1.4183*	-1.1342*	-0.1968	-0.9291*	-1.3834*	-1.1866*
	R2	0.4451	0.0515	-0.2898	-0.7349	0.1079	-0.2377	-0.4984	-0.6064*	-0.0773	-0.4059	-0.7409*	-0.6636*	-0.1863	-0.5534*	-0.8787*	-0.6924*
	R3	0.2158	0.4598	-0.3355	-0.5513	0.0561	0.0155	-0.5247	-0.5808*	-0.1190	-0.3246	-0.7555*	-0.6365*	-0.1768	-0.4891	-0.9126*	-0.7358*
	R3-R1	0.2523	0.6421	0.4234	0.1711	0.3237	0.7488*	0.7029*	0.3793	0.1651	0.5735*	0.6628*	0.4977	0.0200	0.4400*	0.4708*	0.4509

“\*” denotes significance at 5% level in simple *t*-statistics.

**Table II**  
**Price Momentum and Institutional Trading**

This table presents average monthly returns for price momentum portfolio strategies under different institutional ownership levels. At the beginning of each month, all sample stocks are sorted based on their previous J months' returns and divided into 10 portfolios (r1-r10). R1 (includes r1 and r2) represents the loser portfolio, R2 (includes r5 and r6) represents the intermediate portfolio, while R3 (includes r9 and r10) represents the winner portfolio. K represents monthly holding periods where K=3 or 6 months. Monthly holding period returns are computed as compound returns from momentum strategies initiated through the following K months. All sample stocks are also independently sorted based on the institutional ownership over the past J months and divided into three portfolios. F1, Q1 and S1 (F3, Q3, and S3) represent the stock portfolio with the lowest (highest) mutual funds', QFII and securities dealers' ownership level, respectively. All the return figures are in percentage.

**Panel A: Price Momentum and Mutual Funds Ownership**

J	Portfolio	K=3				K=6			
		F1	F2	F3	F3-F1	F1	F2	F3	F3-F1
3	R1	0.1607	0.7075	0.5520	0.3913	-0.5760	-0.1202	-0.0541	0.5219
	R2	-0.0602	0.0136	0.4324	0.4927	-0.3913	-0.3404	0.0204	0.4117*
	R3	-1.6879*	-0.7569	0.7383	2.4262*	-1.6297*	-0.7886	0.3835	2.0132*
	R3-R1	-1.8486*	-1.4644*	0.1863	2.0349*	-1.0537*	-0.6683*	0.4376	1.4913*
6	R1	-0.8801	0.1193	0.0273	0.8862	-1.2561*	-0.5864	-0.3040	0.9134*
	R2	-0.2412	-0.2336	-0.0652	0.1760	-0.5448	-0.4068	-0.4181	0.1267
	R3	-2.3341*	-0.9714	0.5219	2.8559*	-1.8303*	-0.9579*	0.4066	2.2369*
	R3-R1	-1.4540*	-1.0907*	0.4998	1.9787*	-0.5742	-0.3715	0.7522*	1.3776*

**Panel B: Price Momentum and QFII Ownership**

J	Portfolio	K=3				K=6			
		Q1	Q2	Q3	Q3-Q1	Q1	Q2	Q3	Q3-Q1
3	R1	0.1675	-0.0550	0.1477	-0.0198	-0.9748	-0.8563	-0.5197	0.4551*
	R2	-0.4464	-0.3748	0.0196	0.4659	-0.7398	-0.6275	-0.3280	0.4118*
	R3	-1.4615*	-0.8951	0.0132	1.4747*	-1.4634*	-1.0888*	-0.3891	1.0743*
	R3-R1	-1.6290*	-0.8400	-0.1344	1.4945*	-0.4886	-0.2325	0.1306	0.6192*
6	R1	-0.6321	-0.2288	-0.1414	0.4908	-1.3537*	-1.0280*	-0.7662	0.5876*
	R2	-0.5079	-0.4814	-0.1614	0.3465	-0.7075	-0.7909	-0.5142	0.1933
	R3	-1.6214*	-1.1466	-0.1174	1.5041*	-1.4644*	-1.0303*	-0.3326	1.1318*
	R3-R1	-0.9893	-0.9178	0.0240	1.0133	-0.1106	-0.0023	0.4336	0.5442

**Panel C: Price Momentum and Securities Dealers Ownership**

J	Portfolio	K=3				K=6			
		S1	S2	S3	S3-S1	S1	S2	S3	S3-S1
3	R1	-0.0715	-0.2954	-0.6266	-0.5550	-1.3534*	-1.4965*	-1.9475*	-0.5940*
	R2	-1.0168	-0.9191	-0.9588	0.0580	-1.3082*	-1.1520*	-1.5077*	-0.1995
	R3	-2.0515*	-1.1677	-1.3614	0.6901	-1.8677*	-1.3443*	-1.4620*	0.4058
	R3-R1	-1.9799*	-0.8723	-0.7348	1.2451*	-0.5143	0.1523	0.4855	0.9998*
6	R1	-0.7006	-0.8573	-1.4493	-0.7487*	-1.5844*	-1.6563*	-2.6383*	-1.0539*
	R2	-0.6921	-1.3049	-1.0390	-0.3469	-1.3757*	-1.4026*	-1.6755*	-0.2998
	R3	-2.3093*	-1.1002	-1.3139	0.9954*	-2.1845*	-1.3416*	-1.3999*	0.7846*
	R3-R1	-1.6088*	-0.2429	0.1354	1.7442*	-0.6002	0.3147	1.2384*	1.8385*

“\*\*” denotes significance at 5% level in simple *t*-statistics.

**Table III**

**Impact of Institutional Trading on Price Momentum and Return Performance by Controlling Turnover**

This table presents average monthly returns for price momentum portfolio strategies under different institutional ownership levels after controlling for turnover. R1, R2 and R3 represent, respectively, the loser, intermediate and winner portfolios. T1, T2 and T3 represent the portfolio with the lowest, medium and the highest turnover. F1, Q1 and S1 (F3, Q3, and S3) represent the stock portfolio with the lowest (highest) mutual funds', QFII and securities dealers' ownership levels, respectively. The definitions for J and K are the same as those in Tables I and II. All the return figures are in percentage.

**Panel A: Mutual Funds Ownership**

Portfolio	T1				T2				T3			
	F1	F2	F3	F3-F1	F1	F2	F3	F3-F1	F1	F2	F3	F3-F1
J=3,K=3												
R1	0.1974	1.7642	1.8075	1.2226	-0.0330	0.4541	0.8946	0.9231	-0.1142	-0.0238	-0.3385	-0.0003
R2	0.2617	0.2049	1.7640*	1.1320*	-0.4452	0.0802	0.6157	1.0609*	-1.0802	-0.3668	-0.1270	0.7458
R3	-0.2782	0.2462	1.7686*	0.9466	-1.2253	-0.4770	1.0769	2.0948*	-3.5869*	-1.1990	0.8127	3.8610*
R3-R1	-0.4777	-1.7837	0.3103		-1.2285	-0.9311	0.2264		-2.1543*	-0.8525	1.2374*	

Portfolio	T1				T2				T3			
	F1	F2	F3	F3-F1	F1	F2	F3	F3-F1	F1	F2	F3	F3-F1
J=3,K=6												
R1	-0.4904	0.5208	1.7570*	1.8401*	-0.9887	-0.3039	0.1662	1.1602*	-0.6118	-0.4956	-0.7734	-0.0414
R2	-0.1415	-0.1895	1.1824*	0.9489*	-0.6815	-0.2355	0.1680	0.8495*	-0.5537	-0.7417	-0.3962	0.3511
R3	-0.7770	-0.2370	0.9415	0.9917	-1.1722*	-0.6492	0.6359	1.6073*	-3.0500*	-0.9771	0.3505	3.1007*
R3-R1	-0.2568	-0.8176	-0.6173		-0.1764	-0.3452	0.4802		-1.6932*	-0.3743	1.1538*	

Portfolio	T1				T2				T3			
	F1	F2	F3	F3-F1	F1	F2	F3	F3-F1	F1	F2	F3	F3-F1
J=6,K=3												
R1	-0.0739	1.2927	1.4063	1.0914	-1.1954	0.3128	0.3373	1.5652*	-0.9353	-0.5716	-0.5029	1.0567
R2	0.2923	0.0828	1.1185	0.6382	-0.8383	-0.1910	-0.0796	0.7509	-0.8788	-1.0192	-0.2135	0.7781
R3	-0.7593	-0.2228	1.6552*	1.8700*	-1.7092*	-1.0286	0.6554	2.3612*	-3.9165*	-0.7392	0.3887	3.6171*
R3-R1	-0.6781	-1.8172*	0.4723		-0.4179	-1.3414*	0.3516		-1.0454	-0.1953	0.9949	

Portfolio	T1				T2				T3			
	F1	F2	F3	F3-F1	F1	F2	F3	F3-F1	F1	F2	F3	F3-F1
J=6,K=6												
R1	-0.6571	0.2398	0.5487	1.4402*	-1.6405*	-0.5993	-0.1013	1.5389*	-1.5265*	-0.7241	-1.0421	0.7770
R2	-0.1853	-0.1657	0.2319	0.4309	-0.8957	-0.4750	-0.4804	0.3891	-1.1537	-1.0239	-0.5276	0.6579
R3	-0.5210	-0.4209	1.2173*	1.0994*	-2.0620*	-0.9071*	0.6662	2.7848*	-1.8954*	-0.7304	0.2161	2.2714*
R3-R1	0.0274	-0.8028	0.6373		-0.4028	-0.3079	0.7424		-0.0132	-0.1794	1.3148*	

**Table III**  
**Impact of Institutional Trading on Price Momentum and Return Performance by**  
**Controlling Turnover (Continued)**

Panel B: QFII Ownership

Portfolio	T1				T2				T3			
	Q1	Q2	Q3	Q3-Q1	Q1	Q2	Q3	Q3-Q1	Q1	Q2	Q3	Q3-Q1
J=3,K=3												
R1	0.0699	0.0233	0.1781	0.1294	0.1985	0.0997	-0.0555	-0.2539	-0.2475	-1.1429	0.0515	0.1549
R2	0.0001	-0.0598	0.5511	0.5222	-0.5349	-0.1908	-0.0288	0.5060	-1.1522	-1.1902	-0.3731	0.9227
R3	-0.7914	-0.8553	1.6381*	1.9387*	-1.0769	-0.1921	0.0661	1.1430*	-1.6369*	-1.0534	0.0833	1.6992*
R3-R1	-0.9300	-0.9365	1.6278*		-1.2754	-0.2918	0.1215		-1.3604	0.1574	-0.1025	

Portfolio	T1				T2				T3			
	Q1	Q2	Q3	Q3-Q1	Q1	Q2	Q3	Q3-Q1	Q1	Q2	Q3	Q3-Q1
J=3,K=6												
R1	-0.7250	-0.3329	0.3272	1.0283*	-1.5122*	-0.6479	-0.5617	0.9504*	-0.7624	-1.6662*	-1.1476	-0.3583
R2	-0.3751	-0.5131	0.0441	0.4184	-0.9207	-0.4250	-0.2774	0.6433*	-1.4282*	-1.3349*	-0.6634	0.8155*
R3	-0.7304	-1.2671*	0.3914	0.6618	-1.3010*	-0.7390	-0.1144	1.1866*	-1.7364*	-1.1259*	-0.4742	1.2678*
R3-R1	0.0233	-0.8944*	-0.1498		0.2112	-0.0911	0.4473		-0.8383	0.6068	0.7801*	

Portfolio	T1				T2				T3			
	Q1	Q2	Q3	Q3-Q1	Q1	Q2	Q3	Q3-Q1	Q1	Q2	Q3	Q3-Q1
J=6,K=3												
R1	-0.1068	0.0686	0.8585	0.9225	-1.0693	0.0982	-0.1851	0.8842	-0.4177	-0.9126	-1.4530	-0.7435
R2	0.2682	-0.2501	0.1998	-0.1278	-0.7895	-0.1931	-0.4105	0.3789	-0.9087	-1.4759	-0.5273	0.2065
R3	0.0244	-1.6208*	0.1369	0.1618	-1.3878	-0.8803	0.2463	1.6341*	-2.6422*	-0.9427	-0.1311	2.4179*
R3-R1	0.0287	-1.8602*	-0.6629		-0.3185	-0.9785	0.4314		-1.6660*	-0.0574	1.3671	

Portfolio	T1				T2				T3			
	Q1	Q2	Q3	Q3-Q1	Q1	Q2	Q3	Q3-Q1	Q1	Q2	Q3	Q3-Q1
J=6,K=6												
R1	-0.7707	-0.6578	0.2195	0.9541*	-1.7406*	-0.6385	-0.6736	1.0670*	-1.3963*	-1.2526	-1.3725*	-0.0533
R2	-0.0338	-0.6117	-0.2925	-0.2088	-0.9430*	-0.7299	-0.6264	0.3167	-1.1599*	-1.3411*	-0.5800	0.4843
R3	0.3229	-1.4575*	-0.5683	-0.5995	-1.2517*	-1.2479*	0.3345	1.5862*	-2.3546*	-0.7900	-0.4866	1.8748*
R3-R1	1.0867*	-0.9504*	-0.7884		0.4889	-0.6093	1.0081*		-0.7296	0.4750	1.0847*	

**Table III**  
**Impact of Institutional Trading on Price Momentum and Return Performance by**  
**Controlling Turnover (Continued)**

Panel C: Securities Dealers Ownership

Portfolio	T1				T2				T3			
	S1	S2	S3	S3-S1	S1	S2	S3	S3-S1	S1	S2	S3	S3-S1
J=3,K=3												
R1	-0.9305	0.1622	-0.6389	0.8697	-0.0272	0.0772	-0.5077	-0.4805	-1.0096	-1.4485	-2.2012	-1.0862
R2	-0.4496	-0.4675	-0.6237	-0.1741	-1.1484	-1.1451	-0.9759	0.1725	-1.4694	-0.8352	-1.6795	-0.2095
R3	-1.4610	-1.4561	-0.7630	1.0727	-1.7079	-0.9957	-1.3173	0.4983	-2.4601	-0.8875	-1.2886	1.0567
R3-R1	-0.4579	-1.3837	-0.6165		-1.8233	-1.0729	-0.8097		-1.3873	0.7151	1.0208	

Portfolio	T1				T2				T3			
	S1	S2	S3	S3-S1	S1	S2	S3	S3-S1	S1	S2	S3	S3-S1
J=3,K=6												
R1	-1.7960*	-0.8015	-2.0812*	0.1184	-1.1346	-1.5865*	-2.0741*	-0.9395*	-1.6411	-1.1243	-2.5827*	-0.8556
R2	-0.9246	-1.0573*	-0.9614	-0.0368	-1.5617*	-1.3263*	-1.5013*	0.0604	-2.0133*	-1.0585	-2.2435*	-0.2117
R3	-1.9481*	-1.8565*	-1.1918	0.7971	-1.5883*	-1.5967*	-1.2974	0.2921	-2.0028*	-0.9390	-1.3961	0.4443
R3-R1	-0.6227	-0.9421	0.5940		-0.5572	-0.0102	0.7767		-0.0381	0.4117	1.1865*	

Portfolio	T1				T2				T3			
	S1	S2	S3	S3-S1	S1	S2	S3	S3-S1	S1	S2	S3	S3-S1
J=6,K=3												
R1	-0.5013	0.4362	-1.2623	-0.7609	-1.0329	-0.4295	-1.4114	-0.3785	-0.7983	-1.9485	-3.2049*	-1.5779*
R2	-0.3256	-0.7152	-0.5782	-0.3203	-0.9589	-1.4827	-0.6793	0.2795	-1.2559	-1.1523	-1.6286	-0.3727
R3	-2.7917*	-0.9586	-0.8877	1.8894*	-1.7719*	-1.6833*	-2.0483*	-0.3738	-2.5601*	-0.2678	-0.7658	1.3755
R3-R1	-2.3175*	-1.5004	0.5035		-0.5502	-1.2538	-0.6369		-0.6197	1.6807	2.2904*	

Portfolio	T1				T2				T3			
	S1	S2	S3	S3-S1	S1	S2	S3	S3-S1	S1	S2	S3	S3-S1
J=6,K=6												
R1	-1.5948*	-0.8731	-1.8329*	-0.2381	-1.5281	-1.8298*	-2.8070*	-1.2788*	-2.3826*	-2.1837*	-3.2116*	-0.7510
R2	-1.2774*	-1.1224*	-1.3609*	-0.0823	-1.4421*	-1.5137*	-1.5046*	-0.0624	-1.3605	-1.3944	-2.2402*	-0.8797
R3	-2.7284*	-1.6576*	-1.9808*	0.7481	-2.1953*	-1.8804*	-1.6723*	0.5151	-2.1498*	-0.7404	-1.0369	0.9857
R3-R1	-1.2490*	-1.0143	-0.1691		-0.6502	-0.0506	1.1347*		0.1894	1.4434*	2.2283*	

“\*” denotes significance at 5% level in simple *t*-statistics.

**Table IV**  
**Impact of Turnover on Price Momentum and Return Performance by**  
**Controlling Institutional Trading**

This table presents average monthly returns for price momentum portfolio strategies under different turnover levels after controlling for institutional ownership. R1, R2 and R3 represent, respectively, the loser, intermediate and winner portfolios. T1, T2 and T3 represent the portfolio with the lowest, medium and the highest turnover. F1, Q1 and S1 (F3, Q3 and S3) represent the stock portfolio with the lowest (highest) mutual funds', QFII and securities dealers' ownership levels, respectively. The definitions for J and K are the same as those in previous tables. All the return figures are in percentage.

Panel A: Controlling for Mutual Funds Ownership

Portfolio	F1				F2				F3			
	T1	T2	T3	T3-T1	T1	T2	T3	T3-T1	T1	T2	T3	T3-T1
J=3,K=3 R1	0.1974	-0.0330	-0.1142	-0.5741	1.7642	0.4541	-0.0238	-1.7874*	1.8075	0.8946	-0.3385	-1.8909*
R2	0.2617	-0.4452	-1.0802	-1.1918	0.2049	0.0802	-0.3668	-0.5441	1.7640*	0.6157	-0.1270	-1.0810
R3	-0.2782	-1.2253	-3.5869*	-3.1199*	0.2462	-0.4770	-1.1990	-1.0303	1.7686*	1.0769	0.8127	0.0580
R3-R1	-0.4777	-1.2285	-2.1543*		-1.7837	-0.9311	-0.8525		0.3103	0.2264	1.2374*	

Portfolio	F1				F2				F3			
	T1	T2	T3	T3-T1	T1	T2	T3	T3-T1	T1	T2	T3	T3-T1
J=3,K=6 R1	-0.4904	-0.9887	-0.6118	-0.3860	0.5208	-0.3039	-0.4956	-1.0282*	1.7570*	0.1662	-0.7734	-2.0468*
R2	-0.1415	-0.6815	-0.5537	-0.4338	-0.1895	-0.2355	-0.7417	-0.5233	1.1824*	0.1680	-0.3962	-1.0250*
R3	-0.7770	-1.1722*	-3.0500*	-2.0035*	-0.2370	-0.6492	-0.9771	-0.5158	0.9415	0.6359	0.3505	0.3953
R3-R1	-0.2568	-0.1764	-1.6932*		-0.8176	-0.3452	-0.3743		-0.6173	0.4802	1.1538*	

Portfolio	F1				F2				F3			
	T1	T2	T3	T3-T1	T1	T2	T3	T3-T1	T1	T2	T3	T3-T1
J=6,K=3 R1	-0.0739	-1.1954	-0.9353	-1.2349*	1.2927	0.3128	-0.5716	-1.8481*	1.4063	0.3373	-0.5029	-1.7381
R2	0.2923	-0.8383	-0.8788	-1.2828	0.0828	-0.1910	-1.0192	-1.1021*	1.1185	-0.0796	-0.2135	-0.9429
R3	-0.7593	-1.7092*	-3.9165*	-2.4580*	-0.2228	-1.0286	-0.7392	-0.4554	1.6552*	0.6554	0.3887	-0.4604
R3-R1	-0.6781	-0.4179	-1.0454		-1.8172*	-1.3414*	-0.1953		0.4723	0.3516	0.9949	

Portfolio	F1				F2				F3			
	T1	T2	T3	T3-T1	T1	T2	T3	T3-T1	T1	T2	T3	T3-T1
J=6,K=6 R1	-0.6571	-1.6405*	-1.5265*	-1.0606*	0.2398	-0.5993	-0.7241	-0.9452	0.5487	-0.1013	-1.0421	-1.7241*
R2	-0.1853	-0.8957	-1.1537	-0.9909*	-0.1657	-0.4750	-1.0239	-0.8581*	0.2319	-0.4804	-0.5276	-0.7322
R3	-0.5210	-2.0620*	-1.8954*	-1.2861*	-0.4209	-0.9071*	-0.7304	-0.1533	1.2173*	0.6662	0.2161	-0.3041
R3-R1	0.0274	-0.4028	-0.0132		-0.8028	-0.3079	-0.1794		0.6373	0.7424	1.3148*	

**Table IV**  
**Impact of Turnover on Price Momentum and Return Performance by**  
**Controlling Institutional Trading (Continued)**

Panel B: Controlling for QFII Ownership

Portfolio	Q1				Q2				Q3			
	T1	T2	T3	T3-T1	T1	T2	T3	T3-T1	T1	T2	T3	T3-T1
J=3,K=3												
R1	0.0699	0.1985	-0.2475	-0.4057	0.0233	0.0997	-1.1429	-1.1147	0.1781	-0.0555	0.0515	0.0094
R2	0.0001	-0.5349	-1.1522	-1.1352	-0.0598	-0.1908	-1.1902	-1.1304*	0.5511	-0.0288	-0.3731	-0.8549
R3	-0.7914	-1.0769	-1.6369*	-0.5613	-0.8553	-0.1921	-1.0534	-0.2146	1.6381*	0.0661	0.0833	-1.1700
R3-R1	-0.9300	-1.2754	-1.3604		-0.9365	-0.2918	0.1574		1.6278*	0.1215	-0.1025	

Portfolio	Q1				Q2				Q3			
	T1	T2	T3	T3-T1	T1	T2	T3	T3-T1	T1	T2	T3	T3-T1
J=3,K=6												
R1	-0.7250	-1.5122*	-0.7624	-0.2060	-0.3329	-0.6479	-1.6662*	-1.3621*	0.3272	-0.5617	-1.1476	-1.4221*
R2	-0.3751	-0.9207	-1.4282*	-1.0656*	-0.5131	-0.4250	-1.3349*	-0.8218*	0.0441	-0.2774	-0.6634	-0.6647
R3	-0.7304	-1.3010*	-1.7364*	-0.9364*	-1.2671*	-0.7390	-1.1259*	0.1093	0.3914	-0.1144	-0.4742	-0.3930
R3-R1	0.0233	0.2112	-0.8383		-0.8944*	-0.0911	0.6068		-0.1498	0.4473	0.7801*	

Portfolio	Q1				Q2				Q3			
	T1	T2	T3	T3-T1	T1	T2	T3	T3-T1	T1	T2	T3	T3-T1
J=6,K=3												
R1	-0.1068	-1.0693	-0.4177	-0.4844	0.0686	0.0982	-0.9126	-1.0009	0.8585	-0.1851	-1.4530	-2.3650*
R2	0.2682	-0.7895	-0.9087	-1.2290	-0.2501	-0.1931	-1.4759	-1.2258*	0.1998	-0.4105	-0.5273	-0.7948
R3	0.0244	-1.3878	-2.6422*	-2.5335*	-1.6208*	-0.8803	-0.9427	0.6295	0.1369	0.2463	-0.1311	-0.2656
R3-R1	0.0287	-0.3185	-1.6660*		-1.8602*	-0.9785	-0.0574		-0.6629	0.4314	1.3671	

Portfolio	Q1				Q2				Q3			
	T1	T2	T3	T3-T1	T1	T2	T3	T3-T1	T1	T2	T3	T3-T1
J=6,K=6												
R1	-0.7707	-1.7406*	-1.3963*	-0.7960*	-0.6578	-0.6385	-1.2526	-0.6013	0.2195	-0.6736	-1.3725*	-1.9486*
R2	-0.0338	-0.9430*	-1.1599*	-1.0424*	-0.6117	-0.7299	-1.3411*	-0.7294*	-0.2925	-0.6264	-0.5800	-0.3159
R3	0.3229	-1.2517*	-2.3546*	-2.6174*	-1.4575*	-1.2479*	-0.7900	0.7282	-0.5683	0.3345	-0.4866	0.0519
R3-R1	1.0867*	0.4889	-0.7296		-0.9504*	-0.6093	0.4750		-0.7884	1.0081*	1.0847*	

**Table IV**  
**Impact of Turnover on Price Momentum and Return Performance by**  
**Controlling Institutional Trading (Continued)**

Panel C: Controlling for Securities Dealers Ownership

Portfolio	S1				S2				S3			
	T1	T2	T3	T3-T1	T1	T2	T3	T3-T1	T1	T2	T3	T3-T1
J=3,K=3												
R1	-0.9305	-0.0272	-1.0096	-0.8567	0.1622	0.0772	-1.4485	-1.7082	-0.6389	-0.5077	-2.2012	-1.9971*
R2	-0.4496	-1.1484	-1.4694	-1.0918	-0.4675	-1.1451	-0.8352	-0.3676	-0.6237	-0.9759	-1.6795	-1.0557
R3	-1.4610	-1.7079	-2.4601	-0.9643	-1.4561	-0.9957	-0.8875	0.1963	-0.7630	-1.3173	-1.2886	-0.4320
R3-R1	-0.4579	-1.8233	-1.3873		-1.3837	-1.0729	0.7151		-0.6165	-0.8097	1.0208	

Portfolio	S1				S2				S3			
	T1	T2	T3	T3-T1	T1	T2	T3	T3-T1	T1	T2	T3	T3-T1
J=3,K=6												
R1	-1.7960*	-1.1346	-1.6411	-0.5710	-0.8015	-1.5865*	-1.1243	-0.5163	-2.0812*	-2.0741*	-2.5827*	-1.1712
R2	-0.9246	-1.5617*	-2.0133*	-1.1029	-1.0573*	-1.3263*	-1.0585	-0.0012	-0.9614	-1.5013*	-2.2435*	-1.2821*
R3	-1.9481*	-1.5883*	-2.0028*	0.3391	-1.8565*	-1.5967*	-0.9390	0.6729	-1.1918	-1.2974	-1.3961	0.0111
R3-R1	-0.6227	-0.5572	-0.0381		-0.9421	-0.0102	0.4117		0.5940	0.7767	1.1865*	

Portfolio	S1				S2				S3			
	T1	T2	T3	T3-T1	T1	T2	T3	T3-T1	T1	T2	T3	T3-T1
J=6,K=3												
R1	-0.5013	-1.0329	-0.7983	-0.9679	0.4362	-0.4295	-1.9485	-2.3492*	-1.2623	-1.4114	-3.2049*	-2.1737*
R2	-0.3256	-0.9589	-1.2559	-0.9304	-0.7152	-1.4827	-1.1523	-0.4371	-0.5782	-0.6793	-1.6286	-0.9333
R3	-2.7917*	-1.7719*	-2.5601*	0.3932	-0.9586	-1.6833*	-0.2678	0.7058	-0.8877	-2.0483*	-0.7658	-0.1011
R3-R1	-2.3175*	-0.5502	-0.6197		-1.5004	-1.2538	1.6807		0.5035	-0.6369	2.2904*	

Portfolio	S1				S2				S3			
	T1	T2	T3	T3-T1	T1	T2	T3	T3-T1	T1	T2	T3	T3-T1
J=6,K=6												
R1	-1.5948*	-1.5281	-2.3826*	-0.9859	-0.8731	-1.8298*	-2.1837*	-1.3102*	-1.8329*	-2.8070*	-3.2116*	-1.6848*
R2	-1.2774*	-1.4421*	-1.3605	-0.0831	-1.1224*	-1.5137*	-1.3944	-0.2720	-1.3609*	-1.5046*	-2.2402*	-0.8907
R3	-2.7284*	-2.1953*	-2.1498*	0.5529	-1.6576*	-1.8804*	-0.7404	1.0617	-1.9808*	-1.6723*	-1.0369	0.7498
R3-R1	-1.2490*	-0.6502	0.1894		-1.0143	-0.0506	1.4434*		-0.1691	1.1347*	2.2283*	

“\*” denotes significance at 5% level in simple *t*-statistics.

**Table V**  
**Price Momentum and Market Capitalization**

This table presents average monthly returns for price momentum portfolio strategies under different market capitalization levels. R1, R2 and R3 represent, respectively, the loser, intermediate and winner portfolios. C1 represents the smallest firm portfolio, while C3 represents the largest firm portfolio. The definitions for J and K are the same as those in previous tables. All the return figures are in percentage.

J	Portfolio	K=3				K=6			
		C1	C2	C3	C3-C1	C1	C2	C3	C3-C1
3	R1	0.5830	0.3161	0.2388	-0.3442	-0.4737	-0.3880	-0.2272	0.2465
	R2	0.3618	-0.0688	0.0119	-0.3499	-0.0953	-0.3606	-0.1686	-0.0733
	R3	-0.3091	-0.4902	-0.2042	0.1049	-0.0808	-0.5035	-0.3326	-0.2518
	R3-R1	-0.8921	-0.8063	-0.4430	0.4491	0.3929	-0.1155	-0.1054	-0.4983
6	R1	-0.0558	-0.0512	0.2640	0.3198	-0.7511	-0.7218	-0.4579	0.2932
	R2	0.2099	-0.0679	0.1875	-0.0224	-0.0858	-0.4273	-0.1565	-0.0707
	R3	-0.0576	-0.3072	0.0325	0.0901	-0.1129	-0.2525	-0.0409	0.0721
	R3-R1	-0.0018	-0.2560	-0.2316	-0.2297	0.6382*	0.4693	0.4171	-0.2212

“\*” denotes significance at 5% level in simple *t*-statistics.