Uninformed Momentum Traders [*]

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Abstract

This paper studies the relationship between momentum trading and information. I present a variety of evidence supporting the hypothesis that momentum trading is linked to a lack of information. Using foreign portfolio flows in individual stocks I document significant momentum trading in stocks on which foreign investors potentially have more informational disadvantages. Small stocks, stocks with high volatility and low liquidity, stocks that are financially less integrated and have greater foreign exchange risk are subject to greater momentum trading. Moreover, stocks on which foreign trades indicate lower future profitability are subject to higher momentum trading. Additionally, I show that momentum trades exert contemporaneous price pressure and have no valuable longer-run information content. The contemporaneous price pressure of 2.30% per month is followed by a significant return reversal in the following two quarters. Finally, there is strong evidence that foreign investors do not possess local market specific information. Momentum trading by foriegn investors is triggered by the past profitability of the momentum factor in the local market. However, the negative profitability of momentum makes momentum trading a sub-optimal trading strategy.

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Fama (1998) and Schwert (2003) give momentum a special place among asset pricing anomalies in the sense that 1) it persists across all categories of stock characteristics, in international markets and consistently through time, and 2) it has not disappeared or weakened despite being widely used by investors since its documentation by Jegadeesh and Titman (1993, 2001) and Chan, Jegadeesh, and Lakonishok (1996).[1] The aim of this study is to contribute to the momentum literature by analyzing the momentum trading by foreign investors in relation to its informational content. More specifically, I ask the question whether momentum trading by foreign investors can be attributed to their lack of information in local stocks.

I suggest that momentum trading can be attributed to uninformed investors in the presence of asymmetric information. Looking at trades in the cross-section of stocks, I show that foreign investors engage in momentum trading strategies when they are at an informational disadvantage. My results contribute to the general understanding of the momentum in asset returns in two important ways. First, I provide empirical evidence on previously untested implications of theories on momentum. These theories predict that uninformed momentum traders can lead to momentum in the presence of asymmetric information. I test the hypothesis that momentum trading is linked to uninformed investors. Secondly, my results have implications for the interpretation of the use of momentum trading by institutional investors. The uninformed nature of the momentum trading challenges the conventional approach that attributes superior investment performance of institutional investors to the use of momentum trading.

Numerous theories have been developed to explain momentum in asset returns as a result of momentum trading under certain market imperfections. Most of these models use an asymmetric information environment where uninformed investors chase returns and limits to arbitrage in the form of market frictions temporarily prevent the prices

[1] Grinblatt, Titman and Wermers (1995), Nofringer and Sias (1999), Cai and Zheng (2004) and Sias (2004) provide evidence on momentum trading of mutual fund managers using the data from 13f filings.

from reverting back to the fundamentals.[2] Earlier static models show how uninformed momentum trading can cause temporary price distortions despite the existence of informed arbitrageurs (e.g. Cutler, Poterba and Summers (1990), and Delong, Shleifer, Summers and Waldmann (1990)). Later dynamic models further focus on the causal link between momentum trading and momentum (e.g. Wong (1993), Brennan and Cao (1996), Barberis, Shleifer and Vishny (1998), Hong and Stein (1999), and Watanabe (2008)).

Despite all the models that link momentum trading with the absence of information there is not much empirical evidence on the theoretical implications.[3] More specifically, the empirical question of whether momentum trading is done by uninformed traders is still outstanding. Several studies attribute momentum trading to be the key factor for return persistence in mutual fund returns (e.g. Grinblatt, Titman and Wermers (1995) and Wermers (1997)). On the other hand, Carhart (1997) claims that the positive momentum loading of institutional portfolios is not due to an active trading strategy. I motivate the analysis of the link between momentum trading and information with the conflicting approaches between theoretical and empirical results on momentum trading.

There are two important reasons why foreign portfolio flows in an emerging stock market, such as Turkey, provide an excellent medium to analyze momentum trading in relation to information. First, unlike the case for foreign investors there is considerable evidence showing that institutional investors are sophisticated.[4] For my purpose of establishing a link between information and momentum trading it is useful to analyze a group

[2]Shleifer and Vishny (1997) develop a framework where high risk aversion and other sources of market imperfections can prevent the arbitrage trading from bringing the prices back to fundamental levels.

[3]A branch of behavioral finance literature focuses on the link between overconfidence and momentum. Daniel and Titman (1999), Jiang, Lee and Zhang (2005), and Zhang (2006) show that there are higher momentum profits on stocks with higher informational uncertainties, which is explained by investor overconfidence.

[4]Institutional investors are shown to be informed. Badrinath, Kale and Noe (1995) and Sias and Starks (1997) show that institutional investors facilitate information transmission into stock prices. In both studies the returns of stocks with more institutional ownership lead the returns of the ones with less institutional ownership.

of investors that are known to be informationally disadvantaged. The empirical evidence on the profitability of foreign portfolio investments suggests that foreign investors have informational disadvantages compared to their local counterparts.[5] Moreover, Brennan and Cao (1997) formally develop a portfolio optimization model for international investments and show that the asymmetric information foreign investors face in local markets can explain the positive relation between foreign portfolio inflows and local returns. Also geographical distance alone is related to trading profits among different investor groups (Hau (2001)).

Second, the data on trades enables us to construct more robust momentum trading variables compared to the ones used by studies on US institutional holdings. Institutional holdings data has certain weaknesses in terms of measuring momentum trading. Momentum trading measures that are based on the changes in portfolio weights between two observations are dominated by trades in large-cap stocks. Furthermore, the inflows to institutional portfolios also are not accounted for when creating holdings-based measures.[6] Another relative strength of my data set compared to institutional holdings is the monthly frequency and therefore has less risk of missing interim trading that potentially can have an impact on empirical results.

This paper fills an important gap in the momentum literature by providing evidence that momentum trading occurs because of the lack of information. I analyze the relation between information and momentum trading in three different ways: (1) I show that momentum trading is concentrated in stocks with relative informational inefficiencies. I proxy the relative informational inefficiencies of foreign investors with stock characteristics such as size, return volatility, liquidity, foreign exchange risk, and global financial integration. Using stock level monthly foreign investor trading data I document momen-

[5] Stulz and Kang (1997), Choe, Kho and Stulz (2005), Dvorak (2005), and Kalev, Nguyen and Oh (2008) show the inferior trading profits of foreign investors compared to their local counterparts or with respect to the local index return in Japanese, Korean, Indonesian and Finnish stock markets, respectively.

[6] Sias (2007) discusses the weaknesses of holdings based data sets in terms of measuring momentum trading behavior of institutional investors in detail.

tum trading by foreign investors decreases in size, liquidity and increases in volatility. Moreover, stocks that are financially segmented from global markets and that have greater foreign exchange risk are subject to greater momentum trading by foreign traders. (2) Momentum trades by foreign investors cause high contemporaneous price pressure. An equal-weighted portfolio of foreign momentum buys outperforms a portfolio of foreign momentum sells during the month of momentum trades by 2.30% per month. The contemporaneous price pressure is followed by a strong return reversal: in two quarters there is complete return reversal for equal-weighted portfolio returns. I show that the strong return reversal following momentum trades leads to implementable investment strategies that have risk-adjusted returns of up to 8% per annum. (3) I show that momentum trading by foreign investors is triggered by the past profitability of the momentum factor in the local market. There is greater momentum trading by foreign investors following the months of high profitability of the momentum factor. However, a momentum trading strategy in the local market is shown to be a sub-optimal trading strategy in general. For portfolio formation and holding periods of one to twelve months I show that momentum has negative profitability and hence cannot be an informed trading strategy in the local market.

The contribution of this this paper is important in terms of providing empirical evidence on the link between information and momentum trading. Moreover, the empirical analysis is conducted using data from the Turkish stock market, which has not been analyzed in this context before.

The remainder of the paper is organized as follows. Section 2 describes my novel data set and its special use for my purposes. Section 3 analyzes how well the foreign investors are informed in the Turkish market. Section 4 describes my individual stock level information variables that measure the relative informational efficiency on the cross-section of local stocks. Section 5 presents the momentum trading results at individual stock level. Section 6 presents momentum trading by foreign investors across different stock characteristics. Section 7 shows the price impact of momentum trading done by foreign investors as well as the subsequent medium-term price reversal and describes the investment strategy I develop. Section 8 analyzes the profitability of momentum in the local market with its relation to momentum trading by foreign investors. Section 9 outlines my conclusion.

1 Summary Statistics and Data Description

The data set includes monthly foreign portfolio transactions for individual stocks listed on the Istanbul Stock Exchange (ISE) between January of 1997 and June of 2008.[7] The foreign trading data is matched with firm level variables such as price, market capitalization and trading volume from Datastream. I can match both data sets with reasonable success: on average more than 95% of stocks have both Datastream and foreign trading data. I also use MSCI world index return series for world returns (r_t^{glb}) and MSCI Turkey index returns for the local index returns (r_t^{loc}). The ISE is the only stock market in Turkey and has been open to international portfolio flows since 1989.[8]

The data set has monthly aggregate buy and sell trades by all foreign investors at the individual stock level. The foreign trades are observed both in Turkish Lira (TL) and number of shares traded within the given month. I define four different variables on foreign trades at individual stock level: b_t^i stands for foreign buys in TL, b_t^{*i} stands for number of shares bought by foreign investors, s_t^i stands for foreign sells, and, s_t^{*i} stands for number of shares sold by foreign investors.

The ISE has rapidly grown in market size during the sample period. In Table 1, I report the foreign trading activity on the ISE in annualized USD variables. The total market capitalization in the local market (MC^{ise}) increased from approximately $49

[7]Foreign portfolio investment data is publicly available at http://www.ise.org/.

[8]The official liberalization date of the ISE for foreign portfolio flows is August, 1989. The first closed-end country fund for Turkey started in December, 1989 and the first Turkish ADR was cross-listed in July, 1990.

billion in 1997 to $225 billion in 2008. Foreign participation has increased proportionally more relative to the market size. Aggregate annual foreign buys B^{ise} and sells S^{ise} relative to the local market capitalization increase fourfold during the sample. There is also an upward trend in foreign trading volume in the Turkish market: the average relative foreign trading volume - defined as the proportion of foreign trades in the entire trading volume - FV^{ise} in individual stocks has increased from 14.20% in 1997 to 46.40% in 2008.

International equity data from Datastream has certain data entry errors (see Ince and Porter (2006)). I use two different screenings to eliminate stocks with data errors. When I use daily data I eliminate errors by removing all daily observations with returns greater than one in absolute value and require each stock to have at least 18 return observations in any given month. In the monthly data set each stock has to have at least nine valid return, trading volume and price observations in a given year to be included in the data set. My final data set includes 38,168 stock-month observations that have valid return and foreign trading variables.

2 The Informational Disadvantages of Foreign Investors

In this section, I show that foreign investors have informational disadvantages compared to their local counterparts in Turkey. One of my key advantages of using foreign investment data to measure the information content of momentum trading is the informational disadvantages of foreign investors in Turkey. Numerous papers have analyzed the trading performances of foreign investors in comparison to local investors and there is evidence on both inferior trading performance of foreign investors (e.g. Choe, Kho and Stulz (2005), Dvorak (2005), and Kalev, Nguyen and Oh (2008)) and superior trading performance of foreign investors (e.g. Grinblatt and Keloharju (2000), and Chen, Johnson, Lin and Liu (2009)) compared to the their local counterparts. I measure the informational disadvantages of foreign investors with their trading performances in the Turkish market.

To show that foreign investors in Turkey are informationally disadvantaged, I employ two different performance measures to proxy the relative information level of foreign investors. The first measure compares the sell and buy prices of foreign trades of individual stocks within a given month. The profitability index (PI_t^i) uses foreign buys and sells in TL (b_t^i and s_t^i, respectively) and the number of stocks bought and sold by foreign investors (b_t^{*i} and s_t^{*i}, respectively). PI_t^i is defined as the ratio of trade-weighted average sell price divided by the trade-weighted average buy price by foreign investors for each stock-month observation ($PI_t^i = \frac{\frac{s_t^i}{s_t^{*i}}}{\frac{b_t^i}{b_t^{*i}}}$). Bae, Yamada and Ito (2006) use a very similar measure to compare the trading performance of foreign investors to performance of locals in Japan. In the context of this paper, the ideal analysis would include deriving the PI_t^i measure for local investors for comparison. Unfortunately, the limitations of the data set disables the derivation of a measure for local investors. However, under the assumption that the local investors are counterparties for all the foreign trades, the PI_t^i measure for the local investors is the negative of the one for foreign investors.[9] In other words, the data availability limits the direct comparison of the trading performances of local and foreign investors, but it should be reasonable to assume that the PI_t^i measures for local and foreign investors are strongly negatively correlated.

The idea behind the PI_t^i measure is that if foreigners are well informed about a certain stock they can be expected to trade at favorable prices, i.e. on average their buy prices should be lower than their sell prices. An average PI_t^i value of greater than one corresponds to superior trading performance and a value of less than one is associated with inferior trading performance by foreign investors. PI_t^i targets measuring the short-term

[9]The sufficient condition for this equality is that the local traders are the counterparties for both buys and sells by foreign investors.

information content of foreign trades. I report the equal-weighted and value weighted averages of PI_t^i in the full-sample as well as in each year in Table 2. Both equal-weighted and value-weighted averages of PI_t^i suggest poor trading performance of foreign trades. Full-sample pooled averages are below one at the 5% confidence level. Most of the annual averages also support these conclusions: Only two out of 24 annual averages are greater than one at the 5% level. The lower value-weighted averages suggest that poor trading performance of foreign investors is not due to any small stock effect.

The second measure for the investment performance of foreign investors is based on the future profitability of portfolios formed by their normalized net buys. f_t^i measures the foreign buys normalized by the total foreign trading volume at individual stock level ($f_t^i = \frac{b_t^i - s_t^i}{b_t^i + s_t^i}$).[10] Using f_t^i, I estimate the future profitability of foreign trades in the following month. I define GT_t^i as the product of last month's foreign net buy (f_{t-1}^i) with current month's return (r_t^i). In Table 2, I report the sample averages of GT_t^i, which corresponds to the returns of the portfolio that is built with the weights of last month's foreign portfolio inflow variable (f_{t-1}^i). The equal-weighted average value of GT_t^i can be considered as the raw returns of the equal-weighted portfolio built by using f_{t-1}^i as portfolio weights. In the full sample the equal-weighted average for GT_t^i is 0.12% per month and is not statistically significant at the 5% level. The value-weighted average value is statistically significant but also has low level of economic significance. A more realistic performance measure for foreign trades takes benchmarking strategies by foreign investors into account. In order to control for potential benchmarking strategies and/or to estimate risk-adjusted returns, I define two alternative measures. $GT_t^{i,loc}$ uses the local market as the appropriate benchmark and is defined as the product of f_{t-1}^i with the current month's excess returns with respect to the local market return ($GT_t^{i,loc} = f_{t-1}^i(r_t^i - r_t^{loc})$). Similarly, $GT_t^{i,glb}$ uses the global market as the benchmark and is defined

[10]My foreign inflow variable can also be interpreted as the net excess demand of foreign investors as used in Lakonishok, Shleifer and Vishny (1992). The main difference of f_t^i is that it is normalized by total trading volume instead of market capitalization.

as the product of f_{t-1}^i with the current month's excess returns with respect to the global market return ($GT_t^{i,glb} = f_{t-1}^i(r_t^i - r_t^{glb})$). I report the value-weighted avarages of both measures in the last two rows of Table 2. With the introduction of either index return the future returns of portfolios built by foreign trades turns out to be negative (-2.5% per month for local index and -2.3% for global index). Most of the annual averages for future portfolio returns also confirm the inferior trading performance of foreign investors.

Both approaches measuring the trading performance of foreign investors provide evidence on the poor information content of foreign trades at ISE, indicating that foreign investors at the ISE are not sophisticated or informed investors on average. Foreign investors on average sell at lower prices compared to their buys measured by PI_t^i. Also the portfolios built by foreign trades show low or negative future profitability measured by GT_t^i, $GT_t^{i,loc}$ and $GT_t^{i,glb}$.

3 Individual Stock Level Information Variables

Under the hypothesis that momentum trading is done due to a lack information there should be more momentum trading by foreign investors in stocks in which they have more informational disadvantages. The first method to establish the link between momentum trading and information is to analyze momentum trading across different stock level characteristics. The goal is to proxy for informational disadvantages of foreign investors with firm-level information characteristics. The basic assumption is that foreign investors are more likely to be uninformed in stocks with high informational asymmetries. I use ten different information variables to proxy for stock level informational asymmetry. All the information variables are for each stock-month observation.

The first candidate to measure cross-sectional variation in stock level informational efficiency is size (MC_t^i).[11] MC_t^i is defined as the average daily market capitalization

[11] Lo and Mackinley(1990) show the lead-lag relationship between small and large stocks. Large stocks

variable from Datastream. As shown in Table 1, the ISE is highly concentrated in large-cap stocks. There are on average 310 stocks per year during the sample period of 1997-2008. In a given year, six to eight firms constitute 1/3 of the total market capitalization and approximately 25 firms make up for another 1/3. I use size as an information proxy for foreign investors since large-cap firms are relatively more transparent and more visible globally. Size has also been used in the context of momentum trading by Lakonishok, Shleifer and Vishny (1992), and Wermers (1999), who show that institutional investors engage in more momentum trading on small stocks.

The second information variable is the monthly realized volatility (RV_t^i) which is the summation of squared demeaned daily returns for each stock. Realized volatility has been used as an ex-post measure of time-varying volatility (Schwert (1989)). My prior is that foreign investors are subject to greater levels of asymmetric information in highly volatile stocks. I estimate RV_t^i for each stock each month using the daily return series from Datastream.

My third information variable measures the foreign exchange risk for individual stocks. Because of the volatile nature of the TL/USD exchange rate returns, I assume that higher exchange rate risk corresponds to higher uncertainty and informational asymmetries for foreign investors across individual stocks.[12] The exchange rate exposure for firm i in month t ($fx\beta_t^i$) is measured as the absolute value of the coefficient estimate for TL/USD exchange rate returns in the local CAPM regression.[13] I assume that foreign investors have more informational disadvantages in high $fx\beta_t^i$ stocks.

have more informational efficiency and their returns lead small stock returns.

[12] I use a different variable for exchange rate exposure compared to the literature. The empirical results in the international finance literature show that exchange rate exposure of individual firms increase with their international business volume. Import-export firms and firms with high foreign revenues are shown to have high foreign exchange exposure. See Doidge, Griffin and Williamson (2006) for a more detailed review of the literature. My variable on the other hand targets to measure the foreign exchange risk and is defined as the absolute value of the exposure to the TL/USD exchange rate returns.

[13] To estimate the exchange rate exposure for individual stocks I use the local CAPM with TL/USD exchange rate returns as an additional variable. Using daily return series each month I estimate the exchange rate exposure for individual stocks. The absolute value of the coefficient estimate on the exchange rate returns is defined as $fx\beta_t^i$.

I use two liquidity measures as information variables.[14] The assumption is that foreign investors face higher informational asymmetries in illiquid stocks due to slower incorporation of information into prices. Trading turnover (TO_t^i) is the first liquidity variable I use in this study. TO_t^i is defined as the monthly average of daily stock level trading turnovers (number of traded shares/total number of shares outstanding). A higher TO_t^i represents higher liquidity. In addition, I use Amihud's (2002) measure to account for price impact dimension of liquidity. AM_t^i is a measure of liquidity and intuitively measures how much prices move in absolute value for a unit change in trading volume ($AM_t^i = \frac{1}{\frac{\sum_{k=1}^{K} \frac{|r_{k\epsilon t}|}{vol_{k\epsilon t}^i}}{K}}$).

The next two information variables are constructed using foreign investors' trades in individual stocks. The foreign trading variable, FV_t^i, measures the average relative foreign trading volume. It is defined as the ratio of TL-foreign trading volume over the TL-total trading volume for each stock.[15] FO_t^i is my proxy for stock level foreign ownership. Inspired by Merton (1987), I assume that foreign investors will have more incentives to learn about stocks that they own more of, because there are fixed costs associated in gathering stock specific information. Unfortunately, in my sample I do not have the actual portfolio holdings of foreign investors at any point. My proxy for stock level foreign ownership is constructed by cumulatively adding the past foreign portfolio flows. FO_t^i for each individual stock is created by adding the net foreign buys through time and compounding them by returns. Nominal foreign ownership is also normalized by the MC_t^i in order to control for potential concentration of foreign investors in large cap stocks ($FO_t^i = \sum_{k=1}^{t} \frac{(b_k^i - s_k^i)(1+r_k^i)}{MC_t^i}$).

FO_t^i is biased because I assume that at the beginning of the sample period the foreign ownership is negligible relative to their inflows during the sample period. I am reasonably confident in this assumption given the increase in foreign portfolio flows during the sample

[14] See Aslan, Easley, Hvidkjaer and O'Hara (2009) for a more general discussion on the use of stock level liquidity variables as information proxies.

[15] I have the prior that foreign traders know more about the stocks that they trade more, as modeled by Arrow (1962) and Grossman, Kihlstrom and Mirman (1977) and documented by Seru, Shumway and Stoffman (2008).

period. Even if the bias is higher than anticipated it should still be useful for my purposes in this paper. Like all the other information variables in this section, I use the foreign ownership proxy to rank stocks on the cross-section. In other words, as long as the ignored foreign ownership at the beginning of the sample is proportional to or negligible compared to foreign inflows during the sample, the measure should work reasonably well for ranking purposes.

The next information variable measures the level of financial integration to global markets. FI_t^i is the variable of financial integration for individual stocks and is defined as the relative explanatory power of the global market factor over the local market factor. Intuitively, a relatively higher (lower) explanatory power of the global (local) market factor corresponds to a higher level of financial integration. FI_t^i is estimated for each stock-month observation using a partially integrated international CAPM model utilizing daily returns.[16] My assumption is that foreign investors will have greater informational disadvantages on less financially integrated stocks, which are stocks with low FI_t^i values.

I also use two information variables based on the trading performance of foreign trades. Trading performance has been used as a proxy for informed trading by Alti, Kaniel and Yoeli (2008). As described in previous sections, GT_t^i measures the future profitability of foreign trades, and PI_t^i compares the average buy and sell price of foreign investors. For both variables the basic assumption is that the trading performance of foreign trades is higher for stocks in which they have less informational asymmetries.

In Table 3, I report the correlation structure between information variables with the time series averages of cross-sectional correlation coefficients. Several clear patterns are apparent in Table 3. Foreign investors trade and own larger stocks more, which confirms

[16] Konukoglu (2010) explains the estimation of FI_t^i in greater detail. The partially integrated international CAPM assumes that local stocks are driven by both local and global market risk factors, for which I use the local and global index returns, respectively. To avoid problems of multi-collinearity, in the first step I orthogonalize the Turkish index returns, r_t^{loc}, by the world-index returns, r_t^{glb}. In the second step, I regress the excess returns (in excess of 1-month US treasury bill return) of stock returns on the excess-world index returns and the orthogonalized Turkish index returns.

the main findings in home bias literature. In addition, there is a greater level of foreign ownership on liquid stocks, on stocks with less foreign exchange risk and greater levels of financial integration. The correlations with size confirm the priors on other information variables. Larger stocks are more liquid, and less volatile and have less foreign exchange risk. Foreign trading performance shows interesting results: GT_t^i is higher on larger stocks and decreases in liquidity. On the other hand, PI_t^i shows low correlations with most of the other information variables and is negatively correlated with GT_t^i, which suggests that both variables measure different dimensions of trading performance of foreign trades. The negative correlation between financial integration and size is of a mechanical nature and is further explained in Konukoglu (2010).[17]

4 Momentum Trading at the Individual Stock Level

4.1 Momentum Trading Measure

The measure of momentum trading is based on the methods used by Grinblatt, Titman and Wermers (1995) and Kaminsky, Lyons and Schmuckler (1997). In both studies the momentum trading measure for US institutional investors is created using their portfolio holdings from 13-f filings. One of the key advantages of my data set is that I observe portfolio flows directly without having to derive them from changes in portfolio holdings. MT is the momentum trading measure and defined as the average of the products of stock level foreign inflow variable f_t^i and the last month's returns (r_{t-1}^i) across all stocks and months in the sample ($MT = \frac{\sum_{i=1}^{N}\sum_{t=1}^{T} f_t^i r_{t-1}^i}{NT}$).

Under the null hypothesis of no momentum trading MT is not significantly different from zero. In Table 4, I report the pooled averages of MT for the entire sample as well as

[17] Konukoglu (2010) uses the same financial integration and shows that larger stocks have lower financial integration values due to the formula of FI_t^i. Larger stocks have higher explanatory power of the local and global market factors compared to small stocks and unproportionately higher for the explanatory power of the local market factor.

in two subsamples, which are pre- and post-2001 periods. MT is greater than zero in the full-sample at 5% significance. The subsample analysis shows that momentum trading by foreign investors is only significant in the second half of the sample suggesting that it is a more recent phenomena in the local market. Another interesting question is whether momentum trading by foreign traders is symmetric across their buys and sells. A simple analysis is to divide foreign trades into buys and sells and to calculate the MT measures in each subsample. In the next two columns, I report the MT values for the buys and and sells seperately. The results suggest that momentum trading by foreign investors is only relevant for buys and that there is contrarian foreign trading behavior for sell trades.

I use three alternative momentum measures that control for certain index returns and the returns of the momentum factor in the local market.[18] Each alternative momentum measure uses the excess returns over a certain index to control for benchmarking strategies by foreign investors. In other words, trading on past returns might not be on the nominal stock returns but on the difference over certain benchmarks the investors use. MT^{loc} uses the individual stock returns in excess over ISE returns ($MT^{loc} = \frac{\sum_{i=1}^{N}\sum_{t=1}^{T} f_t^i (r_{t-1}^i - r_{t-1}^{ise})}{NT}$). MT^{glb} uses the excess return over the MSCI world index returns ($MT^{glb} = \frac{\sum_{i=1}^{N}\sum_{t=1}^{T} f_t^i (r_{t-1}^i - r_{t-1}^{glb})}{NT}$). Similarly, MT^{mom} controls for the momentum factor in the local market. The momentum factor is created using the portfolio formation method introduced by Jagadeesh and Titman (1993) A more detailed description of the momentum factor is given in Section 8. The results for MT^{loc}, MT^{glb} and MT^{mom} are reported in the Table 4. The momentum trading measure seems to be stronger with the use of the local and global index returns. Not surprisingly, the use of the local momentum factor reduces the statistical significance of the momentum trading measure.

In the next three columns, I report the value-weighted, FV_t^i-weighted and FO_t^i-weighted averages of the different momentum measures. Value-weighted results indicate

[18]Grinblatt, Titman and Wermers (1995) and Wermers (1997) similarly report benchmark adjusted momentum trading measures for US institutional investors.

that there is less momentum trading for large stocks. FV_t^i-weighted and FO_t^i-weighted results show higher momentum trading measures for stocks with higher foreign investor participation. The difference of results with varying weighting schemes clearly suggests that (1) foreign traders execute momentum trades heterogeneously on the cross-section of stocks, and (2) that momentum trading is more pronounced for small stocks and for stocks that are subject to greater foreign participation.

4.2 Regression Analysis

In this section, I conduct regression analysis to detect momentum trading by foreign investors. One potential shortcoming of the results produced by the momentum trading measure in the previous section is the inability to control for other factors that can affect the relationship between foreign trades and past returns. The regression analysis enables the use of exogenous factors and therefore provides robustness tests for the result with the momentum trading measures. I use two different regression frameworks. First, I analyze the cross-sectional momentum trading strategies by foreign investors using the Fama and MacBeth (1973) (FM) regression framework. FM regressions consist of two steps. In the first step I regress the foreign portfolio flows (f_t^i) on past returns (r_{t-1}^i), and on firm level controls (MC_t^i, FV_t^i, FO_t^i, RV_t^i, and AM_t^i). I use the firm level information variables on the right hand side in cross-sectional regressions to control for potential preferences of foreign investors for certain types of stocks. In the second step, I take the time series averages of the cross-sectional coefficient estimates and report them with robust t-statistics in Table 5. I report FM regression results for three different specifications. In the most simple specification I regress f_t^i on r_{t-1}^i and on its own past values, f_{t-1}^i. In the second specification I add size and in the third specification I use all the firm level controls together. The first two specifications result in statistically significant coefficient estimates for r_{t-1}^i at 5%. The economic significance of the effect is robust: One standard deviation increase in returns (20.5%) corresponds to a 3.25% increase in foreign portfolio inflows. In the third specification the statistical significance of the effect declines to 10%, but the economic significance remains at a similar level. Other important observations from Table 5 are that foreign investors have a preference for large stocks with low return volatility and for stocks that they already own more of.

As discussed by Skoulakis (2008), one potential criticism of FM regressions is biased t-statistics under certain conditions. Therefore I also conduct panel regression analysis, where least squares regressions are used with firm- and time-fixed effects. I use the same three empirical specifications for panel regressions and report the results in the last three columns of Table 5. The results are qualitatively similar; there is a higher statistical significance for the coefficient estimate of r^i_{t-1} with similar levels of economic significance. One surprising result from Table 5 is the different signs for the coefficient estimates for FV^i_t in FM and panel regressions. I interpret this difference as an effect of the added time-series dimension in the coefficient estimates in panel regressions, which is fundamentally different from FM coefficients that are based on the cross-sectional effect.

5 Momentum Trading Across Different Stock Characteristics

In this section, I examine the link between information and momentum trading by analyzing the momentum trading of foreign investors across different stock characteristics. The method consists of sorting stocks by information variables each month into three subgroups and estimating the momentum trading measure by foreign investors in each subgroup.[19] In Table 6, I report the MT values for different subgroups created by the ten

[19]For size I use the break points at ISE instead of the absolute ranking method. I create the size terciles by first determining the breakpoints in ISE. Small stocks are the smallest stocks that constitute $1/3^{th}$ of the total market capitalization each year. Medium and large stocks constitute the $2/3^{rd}$ and the totality of the market capitalization, respectively.

information variables, which are described in the previous sections. The subgroups are called low, medium and high. In Table 6, I also report the t-statistics for the difference between the MT measures of the high and low groups (H-L).

Panel A reports the results for unconditional sorting and for MT measure and they largely confirm the link between information asymmetries and momentum trading by foreign investors. Momentum trading by foreign investors is concentrated in stocks with potential informational asymmetries for foreign investors. Foreign investors are doing momentum trades in small and illiquid stocks, stocks with high volatility, stocks with high foreign exchange rate exposure, and financially less integrated stocks. Also across stocks on which foreign trades imply low future profitability (GT_t^i) there is higher momentum trading. In terms of statistical significance the strongest results are for size and GT_t^i subgroups. Foreign ownership and foreign trading volume are the only two variables that do not confirm my prior in terms of their use as information variables. There is significantly higher momentum trading in stocks with higher foreign ownership and trading volume.

One potential concern with sorting stocks by different information variables is their high correlation with size (Table 3). In other words, with unconditional sorting results it is hard to determine whether the size effect is captured with other information variables since they are highly correlated with size on the cross-section of stocks. A straightforward solution for this issue is a conditional sorting method also used by Badrinath, Kale and Noe (1995). Each month I double sort stocks first by size and then by the respective information variable. The conditional sorting results are reported in Panel B and they qualitatively confirm the results with unconditional sorting method in Panel A.

In the rest of the Table 6, I provide further robustness checks to the main results. In Panel C, I create the momentum trading measure with USD returns for local stocks ($MT^{usd} = \sum_{i=1}^{N}\sum_{t=1}^{T}\frac{b_t^i - s_t^i}{b_t^i + s_t^i} r_{t-1}^{i,\$}$). The results with MT^{usd} confirm the previous results with higher statistical significance. High-low difference for RV_t^i becomes significant in

Panel C. In Panel D, I use MT^{mom} to control for the profitability of the momentum factor in the local market.

Another potential criticism of my momentum trading variables is that f_t^i can artificially have extreme values for illiquid and small stocks that do not receive high foreign trading volume. In order to address this issue, I create another alternative momentum trading measure, which uses MC_t^i instead of the sum of foreign buys and sells to normalize foreign net buys. In Panel E, I report the momentum trading across different stock characteristics with my alternative momentum trading measure ($MT^{mc} = \sum_{i=1}^{N} \sum_{t=1}^{T} \frac{b_t^i - s_t^i}{MC_t^i} r_{t-1}^i$).

In this section, I document that there is greater levels of momentum trading by foreign investors on stocks with informational asymmetries. The strongest results are obtained across size groups: Foreign investors are momentum traders on small stocks and contrarians on large stocks. Other stock characteristics mostly confirm the results with varying degrees of statistical significance. The results are also reported with alternative momentum trading measures for robustness checks.

6 Temporary Price Impact of Momentum Trades

6.1 The price impact and subsequent return reversal

In this section, I document further evidence on the uninformed nature of momentum trading, which is the temporary price impact caused by momentum trades. I show that momentum trades by foreign investors do not include any long-term informational content. The basic intuition is that the momentum trades by foreign investors cause temporary price pressures that revert back in the subsequent months and therefore do not contain long-term fundamental information for local stocks. In order to show the price pressure of momentum trades, I build portfolios by momentum-buys and momentum-sells each month and look at the contemporenous and future returns of these portfolios. I also construct the spread portfolio that tracks the return difference between momentum-buys and momentum-sells.

The methodology is based on sorting stocks by their momentum trading measures (MT_t^i) in relation to the previous month's returns.[20] Both momentum buys (p_{mom}^{buys}) and momentum sells (p_{mom}^{sells}) exclusively contain stocks which are subject to momentum trading by foreign investors and therefore have positive MT_t^i values. The only difference between the two portfolios is that p_{mom}^{buys} is consisted of stocks that have had positive returns in the previous months, and in contrast p_{mom}^{sells} only has stocks that have had negative returns in the previous month. The spread portfolio $p_{mom}^{buys} - p_{mom}^{sells}$ measures the return difference between the two portfolios. The rest of the stocks are put in the third portfolio called p_{no-mom}.

I report the equal-weighted returns for the portfolios in Table 7 and value-weighted returns in Table 8. In each table the future returns of the portfolios up to a year (month=12) after the portfolio formation period (month=0) are reported. I report both the raw returns and the partially integrated international CAPM alphas of the portfolios. The c-spread columns show the cumulative returns of the spread portfolio during the out-of-sample period. The equal-weighted results strongly suggest that momentum trades exert contemporaneous price pressure on the stock returns during the month of trading. The contemporaneous spread between equal-weighted momentum-buy and momentum-sell portfolios is around 2.30% (2.20% in risk-adjusted terms), which is reverted back to zero in six months (a year for risk-adjusted returns). For value-weighted returns the results on return reversals are weaker. The initial contemporenous spread of 6.50% return partially persists in the out-of-sample period. For both raw-returns and risk-adjusted returns the return reversal in a year is around 40% of the initial spread. Clearly, the price impact is lower for value-weighted portfolio returns, which suggests that there is

[20] I use conditional sorting by size as in previous sections to control for the potential size effect on portfolios.

a greater information content in foreign trades on large-cap stocks. In this aspect, the result in this section confirm the main assumption in previous sections, which states that foreign investors face greater informational asymmetries on small stocks.

There is a well placed critique of the interpretation of results in this section as price pressure. A potential alternative explanation of the empirical results documented in Tables 7 and 8 is that foreign investors buy (sell) stocks towards the end of the month after price increases (decreases) for the specific stocks. In other words, if foreign investors are momentum trading at weekly or daily frequency the empirical evidence is not necessarily the price impact of foreign momentum trades, but rather a manifestation of the implementation of foreign momentum trading strategies at higher frequencies. Therefore, an important robustness check for the results on temporary price impact by foreign momentum trades is the analysis of correlation structure of foreign trades with weekly returns. I address this robustness concern by basically analyzing the correlation structure between foreign portfolio flows (f_t^i) and weekly individual stock returns. If most of the positive correlation between f_t^i and r_t^i - as documented with the high returns of the spread portfolios in month 0 - is due to active momentum trading strategies by foreign investors at high frequency, f_t^i should be highly correlated with the earlier weekly returns within the month. If there is a high correlation between f_t^i and later weekly returns within the month it can be interpreted as price impact of foreign trades (combined with the result on the consequent return reversal in the following months). The correlation coefficients between the weekly returns and monthly foreign portfolio flows in the pooled sample are 0.94%, 0.01%, 0.99% and 1.98% for the returns from the first, second, third and fourth week, respectively. The high correlation between f_t^i and later weeks' returns within the month support the interpretation of results in Table 7 and 8 as the temporary price impact of foreign momentum trades.

The results in this section have important implications for the local markets in terms of the cost-benefit analysis of foreign equity flows. From the perspective of the local market the temporary price impact caused by foreign trades has a destabilizing effects that reduces potential benefits of receiving international portfolio investments.[21] On the other hand, destabilizing effects of foreign portfolio investments - such as the one reported in this section - have been claimed to cause the periodic financial crises across emerging markets. Foreign investors have been often blamed for destabilizing the local markets by making them more vulnerable to financial crises.[22] The results in this section are salient in this regard. The price impact results of momentum trades by foreign investors show that the foreign portfolio investments cause prices to temporarily diverge from fundamentals and hence cause destabilization of the local market.

6.2 Portfolio strategies based on momentum trading at ISE

I also use the price impact by foreign momentum trades as a base for cross-sectional investment strategies. I analyze the profitability of the investment strategy using overlapping portfolio returns as in Jagadeesh and Titman (1993). Every month I build portfolios using the previous month's MT measures and hold them for n periods and the return for the strategy is the equal-weighted average return of n portfolios at any given point in time. I show the strategy's returns for holding periods of 3 and 12 months.[23] I analyze the return on my strategy using the whole stock universe at ISE as well as across small stocks only (Table 9).

I use two different specifications for my investment strategy depending on the time I allow for the portfolio formation, k. For k=0, I assume that I build portfolios at the

[21] The greater risk sharing or base-broadening is an important advantage of liberalizing local markets for international portfolio flows (See Stulz (1995) for an extensive survey of base-broadening literature). Foreign portfolio investments enable better sharing of company specific and market wide risks in the local markets and under the existence of segmented markets they will also push the local stock prices up. Increased liquidity is also another big advantage of foreign participation in local stock markets (Pagano (1989) and Allen and Gale (1991)).

[22] e.g. Dornbush and Park (1995)

[23] The overlapping portfolio return calculation depends on forming portfolios each month and holding them for n periods. Starting from the n'th month the strategies return is the average return of the n portfolios.

end of the month of momentum trades, whereas k=1 uses a month between the month of momentum trades and portfolio holding period and is more realistic in terms of its implementability. I report raw returns of the strategy as well as the partially integrated international CAPM alphas as described in the previous sections. In Panel A, I report the equal-weighted returns of the strategy. In the complete universe of local stocks after controlling for local and global risk factors the strategy brings 0.21% to 0.53% a month (0.23% to 0.52% per month in terms of raw returns). The value-weighted returns of the strategy is similar to equal-weighted returns (Panel B). The profitability of the strategy decreases with the length of holding period confirming that most of the return reversal occurs before three quarters following momentum trades. In Panel C, I analyze the profitability of the strategy for only small stocks. The return predictability is slightly stronger across small stocks: the strategy has risk adjusted alphas of up to 0.55% per month.

7 Momentum and Momentum Trading

In order to provide the third piece of evidence on the hypothesis that momentum trading is done due to a lack information, I analyze momentum in Turkey and its relation to momentum trading by foreign investors. My argument depends on two pieces of evidence to show that momentum trading by foreign investors occurs under a lack information about the general market conditions in the local market. In the previous sections, I demonstrate that the uninformed nature of foreign investors at individual stock level is related to their momentum trading behavior. My analysis in this section complements the uninformed nature of momentum traders to general information about the local market, i.e. the profitability of a trading strategy that is purely built on buying past winners and selling past losers is negative and that despite its negative profitability the momentum in the local market triggers momentum trading. Below, I first illustrate the negative profitability of momentum under various specifications. I then show that momentum trading by foreign investors depends positively on the profitability of momentum in the local market.

7.1 The Profitability of Momentum in the Local Market

I use the Jagadeesh and Titman (1993) method to create the momentum factor as in the local market. Every month, I sort stocks by their cumulative past returns during the formation periods of 1 to 12 months (m=1, 3, 6 and 12) into five portfolios. I hold the five momentum portfolios and the spread portfolio that measures the return difference between the winner and loser portfolios for different portfolio holding periods of 1 to 12 months (n=1, 3, 6 and 12). I also use two different specification for the time lag between portfolio formation and portfolio holding periods (k=0 and 1 month). In Table 10, I give the profitability of the momentum in ISE using both equal-weighted and value-weighted portfolio returns.[24] The negative profitability of momentum portfolios suggests that momentum trading is not a profitable investment strategy in the Turkish market: the momentum factor has negative profitability for various portfolio formation and holding periods.

7.2 The Link between Momentum and Momentum Trading

I ask two central questions regarding the relation between momentum and momentum trading. (1) How does momentum trading by foreign investors related to the past profitability of the momentum? The answer to my first question is important in order to further understand the momentum trading by foreign investors in relation to general market conditions. (2) Is the profitability of the momentum is related positively on the past

[24] I only report the profitability of the momentum for (m,n)=(1,1), (3,3), (6,6), and (12,12). The results for the other values of m and n are qualitatively similar and support the negative profitability of the momentum in ISE.

momentum trading by foreign investors? My second question can be understood as an empirical test of the theories that imply that momentum can be created by the existence of momentum trading under certain market imperfections. Thus far I have established the fact that momentum trading can be attributed to uninformed investors as suggested by the theories. The causal relationship between momentum trading and momentum is the next step of the analysis.[25] My analysis in this section is a study of the lead-lag relationship between momentum trading by foreign investors and the profitability of the momentum strategies in the local market.

For the time-varying profitability of the momentum I use the monthly time series of the spread portfolio that measures the return difference between the winner and loser portfolios. For different portfolio formation and holding periods I derive the time series of my spread portfolio returns and use it as the profitability of the momentum. I call the time series of the returns of the spread portfolio S_t. I also create the time-series of monthly momentum trading measure by foreign investors each month by estimating the cross-sectional averages ($MT_t = \frac{\sum_{i=1}^{N} f_t^i r_{t-1}^i}{N}$). I use the MT_t measure as the time-varying monthly momentum trading measure. The empirical analysis of the relationship between S_t and MT_t requires the explicit consideration of potential endogeneity issues because of the potential double-causality problem between the momentum trading and momentum. To mitigate the risk of endogeneity between the two series I exclude the contemporaneous values of both series from my analysis. I construct a bi-variate VAR framework for S_t and MT_t with using lagged values of both series as explanatory variables. The results are reported in Table 11.

My results suggest that a positive dependence of momentum trading by foreign investors on past profitability of the momentum in the local market. Combined with my results in Table 10, I interpret this result as an evidence on the uninformed nature of mo-

[25] Qin (2009) shows that the profitability of momentum factor is higher on stocks that are open to foreign equity investments.

mentum trading. Momentum trading by foreign investors is triggered by the profitability of the momentum in the local market, which has negative profitability in general. In other words, foreign investors are potentially pursuing an active trading strategy that has negative profitability. On the other hand, the profitability of the momentum in the local market is negatively related to the past values momentum trading variable.[26]

8 Conclusions

In this paper, I link momentum trading to uninformed nature of foreign investors using a novel data set on foreign portfolio flows in ISE. My results suggest that foreign investors use momentum investment strategies on stocks with greater informational asymmetries, which I measure with firm level characteristics. I document a significant relation between momentum trading by foreign investors and certain firm characteristics. Foreign momentum trading decreases in size, liquidity and financial integration, and increases in volatility and foreign exchange risk. Foreign investors also engage in momentum trading in stocks on which their trades imply lower future returns. Interestingly, relative foreign trading volume and foreign ownership are related to greater momentum trading by foreign investors.

Momentum trading destabilizes the local market. I demonstrate the significant contemporaneous price impact of momentum trades by foreign investors which is followed by significant return reversal in the subsequent quarters. My results also have important implications regarding the regulation of the local markets against the destabilizing effects of foreign momentum trading. According to my results, foreign momentum trading occurs due to a lack of information and is concentrated in stocks with informational disadvantages for foreign investors.

[26] A similar result has been established by Bloomfield, Tayler and Zhou (2009), who use an experimental setting to analyze the conditions under which momentum trades do not lead to momentum in asset returns.

Momentum trading by foreign investors also seems to be triggered by the past profitability of the momentum in the local market, which may indicate that the foreign investors are following the momentum spread. However, on average momentum strategies have negative profitability and therefore is a suboptimal trading strategy at ISE.

9 References

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10 Tables

Table 1: Summary statistics for foreign trading activity at Istanbul Stock Exchange (ISE) between 1997/01 and 2008/06. Annual values of foreign trading variables and market capitalization of ISE is reported in USD ($) values. B^{ise} and S^{ise} stand for annual buys and sells by foreign investors at individual stock level. MC^{ise} stands for the annual market capitalization of ISE. FV^{ise} stands for the annual relative foreign trading volume by foreign investors and defined as the proportion of foreign trades in the entire trading volume. The last three columns report the number of stocks in size terciles defined by annual market capitalization break-points.

							No of Stocks in size decile		
year	B^{ise}	S^{ise}	$B^{ise}-S^{ise}$	MC^{ise}	$\frac{B^{ise}-S^{ise}}{MC^{ise}}$	FV^{ise}	1	2	3
1997	$4.35bn	$4.66bn	$-0.31bn	$48.8bn	-0.63%	14.20%	248	17	7
1998	$5.64bn	$6.07bn	$-0.43bn	$51.1bn	-0.84%	15.30%	266	18	6
1999	$9.47bn	$8.45bn	$1.02bn	$56.9bn	1.80%	20.20%	280	9	6
2000	$15.2bn	$18.3bn	$-3.1bn	$99bn	-3.17%	16.60%	292	14	6
2001	$6.33bn	$5.8bn	$0.53bn	$43.8bn	1.20%	14.20%	283	11	6
2002	$6.42bn	$6.44bn	$-0.02bn	$38.6bn	-0.05%	17.70%	278	14	6
2003	$9.15bn	$8.14bn	$1.01bn	$43.9bn	2.30%	15.70%	277	15	6
2004	$19.4bn	$18bn	$1.43bn	$74bn	1.94%	23.30%	290	15	6
2005	$42.6bn	$39bn	$4.08bn	$117bn	3.48%	36.60%	298	15	6
2006	$44.9bn	$43.7bn	$1.16bn	$158bn	0.73%	35.50%	308	17	7
2007	$74.3bn	$69.7bn	$4.53bn	$230bn	1.97%	43.70%	311	16	7
2008/01-06	$39.8bn	$41bn	$-1.2bn	$226bn	-0.51%	46.40%	317	15	8

Table 2: The trading performance of foreign investors and future profitability implied by foreign trades in the sample period 1997/01-2008/06. Panel A reports the equal-weighted and value-weighted averages of PI_t^i, which is the ratio of average sale price over average buy price of foreign investors for each stock-month observation. Panel B shows the future profitability of foreign trades. GT_t^i calculates the returns of the portfolio that is built by the weights of foreign buys in the following month. Equal- and value-weighted averages of GT_t^i are reported in the first two rows. $GT_t^{i,loc}$ and $GT_t^{i,glb}$ calculates the future portfolio returns in excess of local and global market returns, respectively.

Panel A: Average PI_t^i values for foreign trading													
	full sample	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
equal-weighted	0.999	0.994	0.991	1.005	0.999	0.999	0.999	1.001	1.002	0.999	0.997	0.999	1
	(-2.18)	(-2.56)	(-4.94)	(2.30)	(-0.22)	(-0.30)	(-0.10)	(0.61)	(1.81)	(-0.40)	(-2.61)	(-1.61)	(0.29)
value-weighted	0.994	0.992	0.985	0.997	0.993	0.982	0.995	0.998	0.996	0.995	0.995	0.994	0.995
	(-23.23)	(-5.68)	(-9.63)	(-2.57)	(-5.36)	(-11.55)	(-4.39)	(-2.33)	(-6.15)	(-9.03)	(-9.94)	(-10.71)	(5.02)
	28,092	1,697	2,177	2,148	2,343	2,117	2,159	2,120	2,513	3,024	2,900	3,112	1,782

Panel B: Average GT_t^i values for foreign trading													
	full sample	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
equal-weighted	0.001	7E-06	-3E-04	-0.001	0.002	-0.009	0.003	-0.001	0.002	0.004	0.003	0.004	-0.004
	(1.07)	(-0.01)	(-0.11)	(-0.10)	(0.99)	(-4.11)	(2.02)	(-0.49)	(1.27)	(3.92)	(2.35)	(3.48)	(-2.41)
value-weighted	0.001	-0.003	0.001	0.006	0.003	-0.009	0.009	0.003	0.003	0.002	0.001	0.001	-0.002
	(4.96)	(-1.75)	(0.49)	(4.03)	(2.26)	(-7.07)	(7.38)	(3.33)	(2.85)	(3.09)	(1.32)	(2.35)	(-1.51)
$GT_t^{i,loc}$	-0.025	-0.087	-0.040	-0.062	-0.040	-0.045	-0.010	0.004	-0.002	-0.004	-0.014	0.006	0.005
	(-27.78)	(-23.83)	(-10.86)	(-15.98)	(-11.68)	(-10.91)	(-3.69)	(1.40)	(-0.80)	(-1.70)	(-6.40)	(2.67)	(1.43)
$GT_t^{i,glb}$	-0.023	-0.024	-0.085	0.081	-0.064	-0.013	-0.002	0.022	0.030	0.020	-0.031	0.013	-0.001
	(-2.24)	(-6.35)	(-20.18)	(18.04)	(-16.07)	(-2.56)	(-0.71)	(7.56)	(11.24)	(8.39)	(-11.77)	(5.34)	(-0.20)
N	39,506	2,730	3,031	3,145	3,339	3,367	3,385	3,372	3,418	3,491	3,617	3,652	2,115

Table 3: Time series averages of cross-sectional pair-wise correlation coefficients between information proxies. All the variables are estimated for each month-stock observation. MC_t^i is the market capitalization in TL. TO_t^i is turnover is defined as the ratio of trading volume over the number of outstanding shares. AM_t^i is Amihud (2002) liquidity measure. $fx\beta_t^i$ measures the foreign exchange risk and is defined as the absolute value of the foreign exchange beta of individual stock returns. FV_t^i is the relative foreign trading volume over the total trading volume. FO_t^i is the cumulative foreign inflows to the individual Turkish stocks starting at the beginning of the sample and it measures aggregate foreign ownership. RV_t^i is individual stock level monthly realized volatility that is constructed using daily returns. GT_t^i measures the next month's profitability for foreign trades at individual Turkish stocks. PI_t^i compared the average price of foreign sell trades to buy trades. Each month pair-wise cross-sectional correlation coefficients between information variables are estimated. The time series averages are reported in the table. T-statistics are reported below coefficient estimates in parenthesis. The sample period is 1997/01-2008/06.

	MC_t^i	FO_t^i	FV_t^i	AM_t^i	TO_t^i	RV_t^i	GT_t^i	FI_t^i	$fx\beta_t^i$	PI_t^i
MC_t^i	1									
FO_t^i	0.038	1								
	(2.12)									
FV_t^i	0.642	0.077	1							
	(133.89)	(3.48)								
AM_t^i	0.626	-0.065	0.557	1						
	(90.44)	(-4.10)	(77.22)							
TO_t^i	-0.209	-0.116	0.013	0.296	1					
	(-11.06)	(-7.89)	(0.73)	(15.80)						
RV_t^i	-0.119	0.012	-0.051	-0.041	0.266	1				
	(-10.44)	(1.96)	(-5.19)	(-3.36)	(24.27)					
GT_t^i	0.0188	0.011	0.016	0.014	-0.002	-0.004	1			
	(2.75)	(1.16)	(1.98)	(1.99)	(-0.14)	(-0.68)				
FI_t^i	-0.132	0.019	-0.11	-0.144	0.001	0.098	0.01	1		
	(-14.60)	92.80)	(-13.25)	(-16.10)	(0.09)	(10.59)	(1.91)			
$fx\beta_t^i$	-0.093	0.025	-0.065	-0.086	0.068	0.378	0.002	0.223	1	
	(-14.53)	(4.15)	(-10.76)	(-11.40)	(5.90)	(54.46)	(0.36)	(13.66)		
PI_t^i	-0.089	-0.003	-0.064	-0.062	0.0164	0.013	-0.006	0.032	0.016	1
	(-11.78)	(-0.55)	(-8.38)	(-7.79)	(1.24)	(1.70)	(-0.84)	(4.26)	(2.50)	

Table 4: Momentum Trading Measure in the Turkish Market for the sample period 1997/01-2008/06. The table reports the equal-weighted, value-weighted, foreign ownership-weighted and foreign trading volume-weighted pooled sample averages of MT, MT^{loc}, MT^{glb}, and MT^{mom}. MT is defined as the sample average product of the current foreign portfolio inflows with lagged individual stock returns ($MT = \frac{\sum_{i=1}^{N}\sum_{t=1}^{T} f_t^i r_{t-1}^i}{NT}$). MT^{loc} and MT^{glb} controls for benchmarking strategies with respect to the local and global market returns, respectively ($MT^{loc} = \frac{\sum_{i=1}^{N}\sum_{t=1}^{T} f_t^i (r_{t-1}^i - r_{t-1}^{ise})}{NT}$ and $MT^{glb} = \frac{\sum_{i=1}^{N}\sum_{t=1}^{T} f_t^i (r_{t-1}^i - r_{t-1}^{w})}{NT}$). MT^{mom} controls for the returns of the Jagadeesh and Titman (1993) momentum factor in the local market. Equal-weighted momentum trading measures for buys and sells are also reported. T-values are reported below average momentum trading measures in parenthesis.

	equal-weighted					value- weighted	FV_t^i- weighted	FO_t^i-weighted
	all sample	< 2002	> 2001	Buys	Sells			
MT	0.0012	0.0009	0.0015	0.0080	-0.0048	0.0003	0.0039	0.0032
	(2.41)	(0.87)	(3.13)	(9.23)	(-4.96)	(1.25)	(10.17)	(6.23)
MT^{loc}	0.0020	0.0029	0.0014	-0.0014	0.0064	0.0008	0.00345	0.0037
	(4.98)	(3.71)	(3.45)	(-1.97)	(8.47)	(4.23)	(11.52)	(8.65)
MT^{glb}	0.0017	0.0024	0.0012	0.0006	0.0036	0.0004	0.0039	0.0035
	(3.37)	(2.43)	(2.37)	(0.76)	(3.79)	(1.53)	(10.43)	(6.82)
MT^{mom}	0.0011	0.0004	0.0015	0.009	-0.0066	-0.0005	0.0035	0.007
	(1.99)	(0.37)	(2.87)	(10.51)	(-6.68)	(-1.72)	(9.01)	(17.26)
N	38,169	15,273	22,896	15,178	15,304	38,169	38,005	38,165

Table 5: Fama and MacBeth (1973) (FM) and panel regression results for the sample period 1997/01-2008/06. With the FM method I regress foreign flow variable f_t^i on its lagged values as well as lagged values of returns and on firm characteristics such as MC_t^i, FV_t^i, FO_t^i, RV_t^i and AM_t^i each month on the cross-section of individual stocks. The time-series averages of cross-sectional coefficient estimates are reported. Robust t-statistics are reported in parenthesis below the FM coefficient estimates. Panel regressions use pooled regressions with firm- and time-fixed effects. Robust t-statistics are reported below the coefficient estimates.

	FM	FM	FM	panel	panel	panel
α_t	-0.016	-0.019	-0.010	-0.009	0.001	-0.024
	(-2.90)	(-3.32)	(-1.10)	(-0.02)	(0.01)	(-0.44)
f_{t-1}^i	0.065	0.065	0.061	0.055	0.053	0.055
	(8.98)	(8.98)	(8.19)	(10.84)	(10.36)	(10.86)
r_{t-1}^i	0.04	0.042	0.033	0.048	0.048	0.044
	(2.12)	(2.11)	(1.70)	(3.11)	(3.08)	(2.81)
$MC_{t*10^{-11}}^i$		3.29	4.15		-3.00	-7.09
		(2.47)	(3.10)		(-0.34)	(-2.10)
FV_t^i			-0.05			0.052
			(-1.82)			(2.30)
FO_t^i			0.133			0.816
			(1.86)			(14.67)
$AM_{t*10^{-11}}^i$			6.35			-5.00
			(0.84)			(-0.49)
RV_t^i			-7.59			-0.477
			(-2.28)			(-0.60)
firm-level controls				yes	yes	yes
time-level controls				yes	yes	yes
N	132	132	132	38,311	38,311	38,311

Table 6: Momentum trading across different stock characteristics for the period 1997/01-2008/06 at ISE. MC_t^i is the market capitalization in TL. TO_t^i is turnover is defined as the ratio of trading volume over the number of outstanding shares. AM_t^i is Amihud (2002) liquidity measure. $fx\beta_t^i$ measures the foreign exchange risk and is defined as the absolute value of the foreign exchange beta of individual stock returns. FV_t^i is the relative foreign trading volume over the total trading volume. FO_t^i is the cumulative foreign inflows to the individual Turkish stocks starting at the beginning of the sample and it measures aggregate foreign ownership. RV_t^i is individual stock level monthly realized volatility that is constructed using daily returns. GT_t^i measures the next month's profitability for foreign trades at individual Turkish stocks. PI_t^i compared the average price of foreign sell trades to buy trades. MT is defined as the sample average product of the current foreign portfolio inflows with lagged individual stock returns ($MT = \frac{\sum_{i=1}^N \sum_{t=1}^T f_t^i r_{t-1}^i}{NT}$). MT^{usd} uses individual stock returns measured in USD ($MT^{usd} = \sum_{i=1}^N \sum_{t=1}^T \frac{b_t^i - s_t^i}{b_t^i + s_t^i} r_{t-1}^{i,\$}$). MT^{mom} controls for the returns of the Jagadeesh and Titman (1993) momentum factor in the local market. MT^{mc} uses the market capitalization instead of foreign trading volume to normalize foreign portfolio inflows ($MT^{mc} = \sum_{i=1}^N \sum_{t=1}^T \frac{b_t^i - s_t^i}{MC_t^i} r_{t-1}^i$). T-values are reported below average momentum trading measures in parenthesis.

	MC_t^i	RV_t^i	$fx\beta_t^i$	TO_t^i	AM_t^i	FV_t^i	FO_t^i	GT_t^i	FI_t^i	PI_t^i
Panel A: Unconditional Sorting										
low	0.002	0.0005	0.0006	0.0023	0.002	2.00E-05	-0.001	0.004	0.002	0.0005
	(2.95)	(0.64)	(0.71)	(2.62)	(1.71)	(0.04)	(-0.66)	(3.86)	(2.05)	(0.46)
med	-0.001	0.0011	0.001	0.0006	0.0018	0.0004	-9.00E-04	0.0002	0.0009	0.003
	(-0.96)	(1.29)	(0.96)	(0.67)	(1.84)	(0.40)	(-1.08)	(0.48)	(1.10)	(3.37)
high	-0.004	0.0021	0.0022	0.0006	0.0002	0.0032	0.0052	-0.001	0.001	-0.0006
	(-2.13)	(2.06)	(2.39)	(0.60)	(0.32)	(3.89)	(5.73)	(-0.52)	(1.18)	(-0.58)
H-L	(-3.02)	(1.29)	(1.33)	(-1.35)	(-1.57)	(2.86)	(4.99)	(-3.40)	(-0.85)	(-0.91)
Panel B: Conditional sorting by size										
low		0.001	0.001	0.002	0.002	-0.0004	-0.0003	0.004	0.002	0.0006
		(0.93)	(1.40)	(2.56)	(1.75)	(-0.27)	(-0.27)	(3.55)	(2.13)	(0.56)
med		0.001	0.001	0.001	0.002	0.0004	-1.00E-03	0.0004	0.001	0.0029
		(1.13)	(2.13)	(1.05)	(1.62)	(0.42)	(-1.28)	(0.11)	(1.26)	(3.67)
high		0.002	0.002	0.0004	0.001	0.004	0.005	-0.0002	0.0009	-0.001
		(2.10)	(2.49)	(0.19)	(0.78)	(4.31)	(5.59)	(-0.24)	(0.97)	(-0.98)
H-L		(1.32)	(1.25)	(-1.41)	(-0.85)	(3.67)	(4.81)	(-4.05)	(-0.93)	(-1.13)
Panel C: MT^{usd}										
low	0.0021	0.0002	0.0009	0.0026	0.0023	-0.0002	0.001	0.0085	0.0025	0.0013
	(3.40)	(0.23)	(0.97)	(2.53)	(2.29)	(-0.27)	(1.08)	(6.85)	(2.62)	(1.12)
med	-0.001	0.0017	0.0014	0.0011	0.0025	0.0014	-9.9E-06	0.0003	0.0016	0.0032
	(-0.52)	(1.75)	(1.41)	(1.17)	(2.38)	(1.16)	(-0.01)	(0.77)	(1.69)	3.89
high	-0.0037	0.0036	0.0032	0.002	0.0006	0.0043	0.0044	-0.0031	0.0015	0.0002
	(-2.15)	(3.24)	(3.08)	(1.80)	(0.63)	(4.30)	(4.31)	(-2.61)	(1.42)	0.19
H-L	(-3.19)	(2.42)	(1.69)	(-0.56)	(-1.78)	(3.63)	(2.34)	(-6.81)	(-0.68)	(-0.74)

Table 2.6 Cont'd

					Panel D: MT^{mom}					
low	0.001	0.0005	0.0002	0.0017	0.001	-3.00E-06	-0.001	0.004	0.0013	-0.0009
	(2.14)	(0.65)	(0.26)	(1.92)	(1.26)	(-0.04)	(-0.95)	(3.91)	(1.51)	(-0.84)
med	-0.0002	0.0008	0.0009	0.0005	0.0018	0.0005	-0.0013	0.0002	0.001	0.0023
	(-0.15)	(0.95)	(0.95)	(0.54)	(1.77)	(0.44)	(-1.57)	(0.53)	(1.11)	(2.88)
high	-0.004	0.0018	0.002	0.0005	0.0001	0.0027	0.0053	-0.001	0.001	-0.0009
	(-2.60)	(1.74)	(2.14)	(0.53)	(0.14)	(3.15)	(5.75)	(-1.18)	(1.01)	(-0.84)
H-L	(-2.79)	(0.96)	(1.33)	(-0.89)	(-0.67)	(2.85)	(6.64)	(-3.70)	(-0.22)	(0.00)
					Panel E: MT^{mc}					
low	1.00E-04	-1.70E-05	3.23E-06	3.40E-05	1.80E-05	-8.18E-06	-8E-05	2.00E-05	3.00E-05	3.6E-05
	(3.23)	(-0.58)	(0.10)	(2.42)	(1.14)	(-2.75)	(-1.80)	(0.71)	(1.41)	(1.03)
med	-2.00E-04	-6.04E-07	-7.21E-06	3.60E-04	6.30E-05	-4.86E-06	-1.27E-06	1.68E-06	6.50E-05	7.90E-05
	(-0.92)	(-0.03)	(-0.34)	(1.66)	(1.93)	(-0.29)	(-0.14)	(0.15)	(1.84)	(2.84)
high	-2.00E-04	1.00E-04	1.00E-04	1.00E-04	4.12E-05	1.00E-04	0.0002	1.00E-04	2.90E-05	4.70e-05
	(-3.17)	(3.34)	(3.25)	(0.19)	(1.00)	(2.60)	(7.02)	(2.19)	(0.79)	(0.74)
H-L	(-5.30)	(2.28)	(2.26)	(1.31)	(0.46)	(1.91)	(5.47)	(1.56)	(-0.03)	(0.33)

Table 7: Price impact and return reversal of momentum trades by foreign investors at ISE for the sample period 1997/01-2008/06. Every month stocks are sorted by the foreign momentum trading measure MT and lagged return r^i_{t-1}. p^{buys}_{mom} (p^{sells}_{mom}) is consisted of stocks that foreign investors buy (sell) and has positive (negative) lagged returns. p_{no-mom} includes all the stocks that are not subject to momentum trading. Equal-weighted raw returns and semi-integrated World CAPM alphas are reported for the portfolios as well as for the spread portfolio that is long on p^{buys}_{mom} and short on p^{sells}_{mom}. c-spread stands for the cumulative returns on the spread portfolio. T-values are documented below the returns.

	raw returns					CAPM-α				
month	p^{buys}_{mom}	p^{sells}_{mom}	p_{no-mom}	$p^{buys}_{mom} - p^{sells}_{mom}$	c-spread	p^{buys}_{mom}	p^{sells}_{mom}	p_{no-mom}	$p^{buys}_{mom} - p^{sells}_{mom}$	c-spread
0	2.50%	0.20%	1.50%	2.30%	2.30%	1.10%	-1.10%	0.40%	2.20%	2.20%
	(2.12)	(0.17)	(1.32)	(3.76)		(1.47)	(-1.54)	(0.63)	(3.45)	
1	0.40%	0.91%	1.66%	-0.50%	1.80%	-0.60%	0.10%	0.80%	-0.70%	1.50%
	(0.35)	(0.75)	(1.52)	(-1.07)		(-0.93)	(0.12)	(1.29)	(-1.39)	
2	0.99%	0.91%	0.15%	0.10%	1.90%	0.10%	0.20%	0.10%	-0.20%	1.30%
	(0.89)	(0.78)	(1.37)	(0.19)		(0.12)	(0.31)	(1.13)	(-0.31)	
3	1.10%	0.80%	1.50%	0.29%	2.19%	0.40%	-0.10%	0.70%	0.40%	1.70%
	(0.93)	(0.63)	(1.37)	(0.64)		(0.52)	(-0.10)	(1.12)	(0.87)	
4	1.33%	1.10%	1.60%	0.22%	2.41%	0.40%	0.63%	0.70%	0.30%	2.00%
	(1.16)	(0.88)	(1.44)	(0.50)		(0.59)	(0.08)	(1.09)	(0.73)	
5	1.33%	1.42%	1.65%	-0.10%	2.31%	0.50%	0.50%	0.70%	0.04%	2.04%
	(1.18)	(1.19)	(1.48)	(-0.23)		(0.79)	(0.72)	(1.13)	(0.10)	
6	1.17%	1.67%	1.54%	-0.50%	1.81%	0.30%	0.90%	0.74%	-0.50%	1.54%
	(1.04)	(1.33)	(1.38)	(-1.03)		(0.48)	(1.16)	(1.17)	(-1.10)	
7	1.21%	1.50%	1.40%	-2.70%	-0.89%	0.40%	0.60%	0.70%	-0.20%	1.34%
	(1.06)	(1.25)	(1.27)	(-0.60)		(0.61)	(0.92)	(1.05)	(-0.50)	
8	1.23%	1.10%	1.49%	0.20%	-0.69%	0.40%	0.40%	0.80%	0.04%	1.38%
	(1.05)	(0.88)	(1.33)	(0.32)		(0.69)	(0.52)	(1.20)	(0.08)	
9	1.33%	1.14%	1.38%	0.19%	-0.50%	0.70%	0.50%	0.80%	0.20%	1.58%
	(1.17)	(0.98)	(1.22)	(0.48)		(1.13)	(0.72)	(1.22)	(0.59)	
10	1.11%	1.35%	1.34%	-0.20%	-0.70%	0.60%	0.90%	0.80%	-0.30%	1.28%
	(0.95)	(1.20)	(1.19)	(-0.52)		(1.01)	(1.37)	(1.31)	(-0.61)	
11	1.39%	1.59%	0.91%	-0.70%	-1.40%	0.40%	1.10%	0.90%	-0.60%	0.68%
	(1.24)	(1.37)	(0.81)	(-1.76)		(0.61)	(1.63)	(1.43)	(-1.60)	
12	0.65%	1.20%	1.36%	-0.50%	-1.90%	0.30%	0.84%	0.96%	-0.60%	0.08%
	(0.56)	(1.02)	(1.21)	(-1.15)		(0.43)	(1.22)	(1.55)	(-1.19)	

Table 8: Price impact and return reversal of momentum trades by foreign investors at ISE for the sample period 1997/01-2008/06. Every month stocks are sorted by the foreign momentum trading measure $MT1$ and lagged return r^i_{t-1}. p^{buys}_{mom} (p^{sells}_{mom}) is consisted of stocks that foreign investors buy (sell) and has positive (negative) lagged returns. p_{no-mom} includes all the stocks that are not subject to momentum trading. Raw returns and semi-integrated World CAPM alphas for value-weighted returns are reported for the portfolios as well as for the spread portfolio that is long on p^{buys}_{mom} and short on p^{sells}_{mom}. c-spread stands for the cumulative returns on the spread portfolio. T-values are documented below the returns.

	raw returns					CAPM-α				
month	p^{buys}_{mom}	p^{sells}_{mom}	p_{no-mom}	$p^{buys}_{mom} - p^{sells}_{mom}$	c-spread	p^{buys}_{mom}	p^{sells}_{mom}	p_{no-mom}	$p^{buys}_{mom} - p^{sells}_{mom}$	c-spread
0	5.60%	-0.80%	2.70%	6.50%	6.50%	3.85%	-2.30%	1.27%	6.16%	6.16%
	(4.47)	(-0.67)	(2.09)	(7.78)		(5.72)	(-3.37)	(2.56)	(6.94)	
1	0.96%	1.10%	1.42%	-0.10%	6.40%	-0.20%	0.10%	0.50%	-0.20%	5.96%
	(0.82)	(0.81)	(1.21)	(-0.14)		(-0.24)	(0.10)	(1.02)	(-0.27)	
2	0.64%	1.53%	1.62%	-0.90%	5.50%	-0.40%	0.80%	0.60%	-1.20%	4.76%
	(0.52)	(1.22)	(1.38)	(-1.11)		(-0.63)	(1.09)	(1.37)	(-1.37)	
3	1.16%	1.34%	1.65%	-0.20%	5.30%	0.30%	0.30%	0.60%	0.10%	4.86%
	(0.97)	(1.02)	(1.35)	(-0.25)		(0.47)	(0.37)	(1.21)	(0.07)	
4	1.50%	1.75%	1.60%	0.15%	5.45%	0.40%	0.44%	0.38%	0.01%	4.87%
	(1.21)	(1.40)	(1.19)	(0.18)		(0.63)	(0.64)	(0.77)	(0.01)	
5	1.18%	2.04%	1.94%	-0.90%	4.55%	0.20%	0.90%	0.63%	-0.70%	4.17%
	(0.98)	(1.61)	(1.61)	(-1.28)		(0.38)	(1.54)	(1.33)	(-1.04)	
6	1.31%	2.14%	1.25%	-0.80%	3.75%	0.60%	1.27%	0.20%	-0.63%	3.54%
	(1.19)	(1.59)	(1.03)	(-1.16)		(1.11)	(1.82)	(0.41)	(-0.89)	
7	1.45%	1.32%	1.49%	0.13%	3.88%	0.50%	0.30%	0.55%	0.14%	3.68%
	(1.25)	(1.04)	(1.19)	(0.16)		(0.80)	(0.47)	(1.03)	(0.17)	
8	1.62%	1.18%	1.43%	0.44%	4.32%	0.80%	0.60%	0.34%	0.20%	3.88%
	(1.29)	(0.98)	(1.16)	(0.53)		(1.30)	(0.79)	(0.67)	(0.25)	
9	1.68%	0.60%	1.57%	1.10%	5.42%	1.10%	-0.50%	0.80%	1.54%	5.42%
	(1.42)	(0.49)	(1.25)	(1.33)		(1.89)	(-0.61)	(1.54)	(1.87)	
10	1.52%	1.60%	1.10%	-0.10%	5.32%	0.81%	0.90%	0.40%	-0.10%	5.32%
	(1.28)	(1.30)	(0.89)	(-0.07)		(1.28)	(1.29)	(0.82)	(-0.18)	
11	0.60%	1.80%	1.60%	-1.20%	4.12%	-0.20%	1.00%	0.90%	-1.30%	4.02%
	(0.49)	(1.43)	(1.31)	(-1.50)		(-0.30)	(1.72)	(1.62)	(-1.60)	
12	0.83%	0.90%	1.62%	-0.10%	4.02%	0.30%	0.30%	1.12%	0.03%	4.05%
	(0.69)	(0.75)	(1.30)	(-0.12)		(0.51)	(0.45)	(2.15)	(0.04)	

Table 9: Profitability of the investment strategy that invests momentum-buys and sells momentum-sells by foreign investors across the whole universe of stocks and on small stocks. Each month the investment strategy invests in stocks that were momentum-bought by foreigners last month (two months ago for k=1) and sells stocks that were momentum-sold by foreigners. Each portfolio is held for n months. The raw returns as well as semi-integrated World CAPM alphas are reported for each portfolio as well as for the strategy. T-values are reported besides the expected portfolio returns. The sample period is 1997/01-2008/06.

k=0					k=1				
Panel A: equal-weighted returns									
n=3	ret	t	CAPM-α	t	n=3	ret	t	CAPM-α	t
winner	0.84 %	(0.76)	-0.10%	(-0.10)	p-buys	1.04 %	(0.93)	1.10 %	(0.86)
looser	1.36 %	(1.18)	0.47 %	(0.76)	p-sells	1.32 %	(1.14)	1.40 %	(1.11)
spread	0.52 %	(2.28)	0.53 %	(2.22)	spread	0.28 %	(1.14)	0.35 %	(1.32)
n=12					n=12				
winner	1.14 %	(1.06)	0.27 %	(0.48)	buys	1.19 %	(1.09)	0.40%	(0.61)
looser	1.39%	(1.23)	0.50 %	(0.83)	sells	1.40 %	(1.23)	0.52 %	(0.86)
spread	0.25%	(1.93)	0.23 %	(1.76)	spread	0.21 %	(1.73)	0.20 %	(1.39)
Panel B: value-weighted returns									
n=3	ret	t	CAPM-α	t	n=3	ret	t	CAPM-α	t
winner	1.34%	(1.17)	0.46 %	(0.75)	p-buys	1.34 %	(1.16)	1.47%	(1.15)
looser	1.89%	(1.81)	1.10 %	(1.53)	p-sells	1.72%	(1.64)	2.20 %	(1.90)
spread	0.56%	(1.56)	0.55%	(2.08)	spread	0.38%	(1.07)	(0.72) %	(1.88)
n=12					n=12				
winner	1.38%	(1.23)	0.50 %	(0.86)	buys	1.38 %	(1.22)	1.53%	(1.23)
looser	1.78 %	(1.73)	1.00%	(1.41)	sells	1.65%	(1.61)	2.00 %	(1.79)
spread	0.40%	(1.18)	0.50 %	(1.71)	spread	0.27 %	(0.83)	0.50 %	(1.38)
Panel C: small stocks only									
n=3	ret	t	CAPM-α	t	n=3	ret	t	CAPM-α	t
winner	0.48%	(0.39)	-0.30%	(-0.48)	p-buys	0.85 %	(0.70)	0.02 %	(0.03)
looser	1.07 %	(0.86)	0.20 %	(0.34)	p-sells	1.12%	(0.89)	0.18 %	(0.26)
spread	0.60 %	(2.50)	0.55%	(2.22)	spread	0.27%	(1.04)	0.16%	(0.59)
n=12					n=12				
winner	0.81%	(0.69)	0.03 %	(0.04)	buys	1.01 %	(0.86)	0.14 %	(0.23)
looser	1.14 %	(0.93)	0.30%	(0.47)	sells	1.25 %	(1.02)	0.32%	(0.49)
spread	0.33 %	(2.79)	0.28 %	(2.37)	spread	0.24 %	(2.00)	0.17 %	(1.49)

Table 10: Profitability of the investment strategy that buys past winners and sells past losers in the last m months. Each month stocks are sorted into quintiles by their cumulative returns in the past m months. Each quintile portfolio's return is calculated starting after k months. Each portfolio is held for n months. The expected raw returns as well as semi-integrated World CAPM alphas are reported for each portfolio as well as for the spread portfolio. T-values are reported besides the expected portfolio returns. The sample period is 1997/01-2008/06.

	domestic CAPM-α			partially integrated CAPM-α		
m=1, n=1, k=1	pf1	pf5	spread	pf1	pf5	spread
equal-weighted	-0.018	-0.022	-0.004	0.003	-0.003	-0.006
	(-2.26)	(-3.29)	(-0.88)	(0.38)	(-0.49)	(-1.32)
value-weighted	-0.019	-0.02	-0.001	0.005	0.0002	-0.005
	(-2.50)	(-2.94)	(-0.10)	(0.72)	(0.03)	(-0.59)
m=3, n=3, k=1	pf1	pf5	spread	pf1	pf5	spread
equal-weighted	-0.02	-0.025	-0.008	0.004	-0.005	-0.009
	(-2.14)	(-3.67)	(-2.12)	(0.57)	(-0.83)	(-2.39)
value-weighted	-0.02	-0.024	-0.003	0.003	-0.003	-0.005
	(-3.06)	(-4.38)	(-0.48)	(0.43)	(-0.57)	(-0.83)
m=6, n=6, k=1	pf1	pf5	spread	pf1	pf5	spread
equal-weighted	-0.018	-0.022	-0.004	0.003	-0.003	-0.006
	(-2.26)	(-3.29)	(-0.88)	(0.38)	(-0.49)	(-1.32)
value-weighted	-0.018	-0.022	-0.006	0.003	-0.003	-0.004
	(-2.26)	(-3.29)	(-1.32)	(0.38)	(-0.49)	(-0.88)
m=12, n=12, k=1	pf1	pf5	spread	pf1	pf5	spread
equal-weighted	-0.014	-0.02	-0.006	0.005	-0.001	-0.006
	(-1.77)	(-3.03)	(-1.65)	(0.69)	(-0.21)	(-1.75)
value-weighted	-0.01	-0.02	-0.01	0.006	0.0003	-0.012
	(-1.48)	(-3.70)	(-1.80)	(1.91)	(0.10)	(-2.09)

Table 11: The bivariate VAR system results for the profitability of the momentum in the local market, S_t, and the momentum trading by foreign investors, MT_t. SUR are estimated for both variables in the sample period 01/1998-06/2008. The t-statistics are reported below the coefficient estimates.

	m=1, n=1		m=3, n=3		m=6, n=6		m=12, n=12	
α	-0.006	0.001	-0.007	0.002	-0.005	0.002	-0.003	0.002
	(-2.29)	(1.33)	(-1.88)	(1.68)	(-1.79)	(1.48)	(-1.21)	(1.54)
S_{t-1}	-0.148	0.069	-0.014	0.071	0.174	0.086	0.186	0.027
	(-1.55)	(1.76)	(-0.14)	(2.57)	(1.84)	(2.44)	(2.07)	(0.66)
S_{t-2}	-0.103	0.011	0.089	0.03	-0.129	0.015	-0.099	0.032
	(-1.07)	(0.26)	(0.93)	(1.08)	(-1.36)	(0.44)	(-1.12)	(0.81)
MT_{t-1}	-0.369	0.095	-0.84	0.084	-0.505	0.101	-0.389	0.099
	(-1.60)	(1.00)	(-2.59)	(0.89)	(-1.97)	(1.06)	(-1.92)	(1.09)
MT_{t-2}	0.168	-0.099	-0.01	-0.067	-0.027	-0.073	0.083	-0.143
	(0.74)	(-1.05)	(-0.03)	(-0.71)	(-0.11)	(-0.78)	(0.41)	(-1.56)
R^2	6.3%	5.2%	5.9%	8.9%	9.2%	4.7%	6.2%	4.0%
N	115	115	115	115	115	115	115	115