Do Foreign Investors chase or Impact Returns in Turkey?

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There are variant findings regarding whether the foreign investors' trading decisions have a significant impact on emerging markets' future stock returns or whether their decisions are primarily driven by past returns.

This study attempts to determine the bilateral interaction between foreign investors' trading activity and returns in Turkish stock market by utilizing Granger-causality and OLS methodologies.

The results gathered from VAR analysis imply a strong Granger-causality between foreign net portfolio inflows and stock returns in Turkish stock market. The results indicate that foreign investors follow a negative (contrarian) feedback strategy by buying (selling) past losers (winners).

The results gathered from OLS analyses further support the VAR analysis findings indicating that, contemporaneously, there is a significant bilateral interaction between foreign portfolio inflows and stock returns reflecting the existence of price pressure effect and return chasing behavior in Turkish stock market.

Overall, both analyses demonstrate that current and lagged stock returns are important determinants in foreign investors' asset allocation strategies. Furthermore, the findings of this study reveal that foreign investors frequently change their positions on majority of the stocks in Turkish stock market which might basically stem from the absence of exit barriers in Turkish financial markets.

Introduction

There has been a growing interest of international investors, particularly in the last decade, in emerging countries owing mainly to the low correlation of these financial markets with those of developed countries resulting in significant risk diversification opportunities in these markets. Moreover, the higher economic growth of these emerging economies was translated into higher stock returns which in turn led to a further liberalization of financial markets and has also paved the way to growing interest by foreign investors.

Subsequently, the trading behavior and the impact of foreign portfolio investors in this segment of international capital markets have been of perennial interest to professionals, academicians and domestic policymakers.

However, this phenomenon has also led to an ongoing debate on the impact and behavior of foreign investors in emerging markets.

Specifically, there are two major empirical facts about the trading behavior of foreign investors in international capital markets:

First, majority of the empirical findings assert that foreign investors are engaged in positive feedback strategy by chasing returns, which in turn creates excess volatility and drives the stock prices away from their fundamental values. Furthermore, the same studies also claim that this irrationality might end up with destabilization of the financial markets.

The second set of findings illustrate that the current foreign portfolio inflows/outflows have a predictive power and impact on future stock returns and occasionally leads to the destabilization in these markets. The proponents of this argument support their assertion with the global financial crises experienced particularly in the last decade.

This study concentrates on this issue by aiming to reveal the trading behavior of foreign investors and their impact on Turkish stock markets.

Turkish stock market is chosen because, particularly following the European Union (EU) accession negotiation meetings on December 16th and 17th, it has been alleged that the foreign portfolio investors started considering Turkey as a highly promising market for the upcoming years.

The current statistics strongly support this fact in the sense that the market value of foreign investors' investment in Turkish stock market have reached to 64 billion New Turkish Lira as of May 16th 2007 and the foreign investors' share in overall trading surged up to slightly higher than 70%. This figure corresponds to an overall trading volume of approximately 9.4 million shares by foreign investors as of May 16th 2007 and represents an approximately 40% increase when compared to May 2006. Indeed, many authorities relate the surge in stock prices experienced since January 2005 to the growing interest of foreign investors, stemming particularly from the relative stability achieved in the exchange rate and major economical indicators, such as inflation and interest rates.

Some authorities on the other hand claim that one of the major causes of the financial crisis experienced in 2001 was the sudden and massive capital flight from the Turkish stock market. Accordingly, they further propose that stemming from the destabilizing effect of "hot money"

and sudden capital flight, foreign investors' trading should cautiously be monitored and required measures should be taken to prevent any other possible crisis in Turkey.

In light of these arguments, this particular study attempts to discover the relationship between foreign portfolio flows and stock returns in Turkish stock market by examining the cross-sensitivity of these factors. Furthermore, the general debate in literature regarding whether foreign investors' trading behavior change during crises will also be tested in Turkish stock market by using a sub-sample covering the period of 2001 financial crisis in Turkey.

In terms of methodology, the relationship between foreign portfolio flows and returns will be tested by the use of Vector Auto regression (VAR) and Ordinary Least Squares Regression (OLS) models. The findings from VAR and OLS tests will shed a light on the simultaneous interaction as well as Granger-causality effects of returns and net foreign portfolio inflows in Turkish stock market.

The lack of any other comprehensive study on this topic signifies the contribution of this particular study. In addition, the findings from this study may also be utilized by policymakers in setting up future regulations regarding foreign portfolio investment and ownership restrictions in Turkish stock market. This issue will further be addresses in the concluding remarks of this paper.

Literature Review

There are a number of studies that investigate the foreign investors' trading behavior in international markets. Majority of these studies have concentrated on detecting the presence of positive feedback strategy and price pressure effects[1] on international financial markets.

As a pioneer theoretical study on this topic, DeLong, Shleifer and Summers (1990) have asserted that positive feedback investment strategies (noise traders) might have a significant destabilizing effect and might augment the volatility in stock markets, particularly if rational investors also follow positive feedback traders.

Stemming from these arguments, recent literature includes many studies attempting to reveal the existence of positive feedback strategy as well as the impact of foreign investors in international markets, particularly in emerging markets where volatility is much higher compared to their developed counterparts.

Froot, Connell and Seasholes (2001) have tried to identify the patterns of foreign portfolio inflows into and out of 44 countries between 1994 and 1998 by utilizing a bivariate VAR model. They have revealed the existence of positive feedback strategy and price pressure effect indicating that inflows are strongly influenced by past stock returns and that the inflows predict future stock returns negatively.

Similarly, Pavabutry and Yan (2003) have investigated the presence of price pressure effect and positive feedback trading using the largest 25 stocks in Thai stock market. Like Froot et al., they have also found a significant price pressure effect in Thai market and they have also documented that the price pressure effect is increasing in crisis periods and is stronger for large size firms.

[1] Price pressure effect is characterized as the significant of lagged inflows on stock returns.

Using the same sample, Worasinchai (Bangkok University research paper) has also indicated that foreign investors were influential in Thai stock market before and during the crisis periods and that the influence was much stronger before the crisis period. He has also concluded that foreign investors were engaged in positive feedback strategy before and during the crisis periods.

Korean stock market has been another focal emerging market for studies on foreign portfolio inflows and returns.

As such, Choe, Kho and Stulz (1998) and Kim and Wei (1999) conducted a detailed research on foreign investors' trading behavior in Korean stock market. Both studies have found evidence in favor of the positive feedback trading but did not find any evidence of a destabilizing effect of foreign investors before, during and after the crisis periods.

Park and Park (2000) have also failed to extract a clear evidence of a destabilizing impact of foreign investors before and during the crisis periods in Korean stock market. They have attributed the enormous volatility during the crisis largely to the trading pattern of domestic investors.

Wei (2000) has reached similar results for Korean stock market and proposed that the non-resident investors increased their intensity of positive feedback trading during non-crisis periods.

Some studies have examined the relationship between foreign investors' behavior and stock returns covering a larger sample of emerging markets.

Griffin, Nardari and Stulz (2003) tested the relationship using nine emerging market countries and found that portfolio flows are significantly influenced by host country stock returns; finding consistent with positive feedback strategy.

Koutmos and Saidi (2001) have examined the existence of positive feedback strategy in six Asian markets. They have also demonstrated that feedback trading is an important factor in determining short-term stock returns in these markets. However, they have also found that positive feedback trading is observed during market declines but not during market advances.

Some studies have attempted to observe the relationship using emerging market mutual funds.

Kaminsky, Lyon and Schmukler (2002) have investigated trading strategies of mutual funds in Latin American mutual funds. They have depicted the existence of positive feedback strategy. However, lagged positive feedback strategy was much stronger during non-crisis periods whereas contemporaneous positive feedback trading was much more intense during crises.

Using a very comprehensive database, Borenztein and Gelos (2000) have also concluded that positive feedback trading was dominant in most of the emerging market mutual funds between 1996 and 1999. However, like Kaminsky et al., they have also demonstrated that positive feedback trading was less visible during Asian crisis leading to the conclusion that foreign investors' trading behavior was not driven by sudden irrational panics and by mimicking other investors' behavior.

As a summary, by using various data, sample and methodology, most of the studies find evidence of positive feedback strategy. Majority of these studies have also found evidence supporting the price pressure effect although the findings are somewhat weaker compared to those of the feedback strategy.

Data and Descriptive Statistics

The dataset consist of monthly returns and net foreign portfolio inflows[2] for 20 large size stocks traded in Istanbul Stock Exchange (ISE) and span from January 1997 to April 2006. 17 of these 20 stocks in the sample are being traded in ISE-30 Index which is comprised of 30 largest size firms' stocks. The largest size firm stocks were included simply because the foreign investors have the largest trading volume in ISE-30 Index stocks and thus these stocks provide the highest liquidity in terms of foreign investor trading. This approach is similar to Pavabutr and Yan (2003) and is expected to provide more consistent and robust results.

The monthly return for a single stock was calculated by averaging the sum of daily returns for the associated month:

$$\sum_{i=1}^{N} \frac{r_i}{N}$$

where r_i = daily return for stock i

N = number of trading days in associated month

The primary reason for using average daily returns instead of differencing the end-of-month and start-of-month prices is the fact that interim price effects of the foreign investors' trading during the month are better captured by averaging daily returns. This issue is even particularly important in OLS analysis since the key rationale in using OLS method in this study is to extract the contemporaneous interaction of stock returns and foreign investor's trading for the selected months.

The monthly return and foreign portfolio inflow figures for the sample stocks span from January 1997 to April 2006 for most of the stocks in the sample. Thus, there are 112 monthly observations for majority of the stocks in the sample. However, either due to data availability or late IPO by some firms, some stocks have shorter sample[3].

The data have been obtained from two major sources; ISE website and www.bigpara.com, an online financial site that include various financial market data compiled from various sources. The return and foreign inflow data gathered from ISE and www.bigpara.com was matched and cross- checked to ensure the accuracy of the data. The foreign portfolio purchase and sale figures from these sources were provided in gross terms and gross purchases and sales were netted to reach net foreign portfolio inflows for each stock covered in the sample.

Table 1 provides the aggregate foreign investor trading figures in ISE for the sample period.

[2] Net foreign portfolio inflow = Gross purchases by foreign investors- Gross sales by foreign investors

[3] The list of stocks included in the sample and the observation period for these stocks are provided in Appendix 1.

Table 1: Foreign Investor Trading Volume in ISE (Million $)

Year	Total Foreign Investor Trading Volume
1997	8,219
1998	11,645
1999	17,837
2000	33,365
2001	12,134
2002	12,781
2003	17,324
2004	37,356
2005	78,479
2006 (January- April)	33,325

From Table 1, it can be clearly observed that the foreign investor trading volume figures in ISE display various patterns for the sample period. More specifically, the figures exhibit an upward trend from 1997 up until 2000 with a more than 300% increase during that period. However, in 2001, there is a sudden reversal in trading volume figures resulting in a 63% decrease compared to 2000. This remarkable change in foreign trading figures can mainly be attributed to the effect of the deep economical and financial crisis experienced in 2001 which led to a massive amount of sell off during that year. The devaluation of the Turkish Lira in February 2001 has amplified this trend and the annual trading volume of foreign investors has declined from $33.3 million to $12.1 million between 2000 and 2001. Starting from 2003, another turnaround in foreign investor trading volume pattern can be observed. Specifically, between years 2003 and 2005, the trading volume increases by approximately 350%. This significant upsurge in trading volume can mainly be attributed to the relative stability achieved in the major economic indicators such as inflation, interest and exchange rate owing mainly to the tight economic policies applied following the 2001 crisis period. Coupled with the commencement of negotiations with EU officially, positive developments in Turkey have led to a relative optimism among foreign investors attracting their interest back in Turkish stock market. In 2006, even four-month trading volume figure has significantly surpassed the annual volume figures for the pre-crisis periods.[4]

Table 2 provides the mean and standard deviation values for returns and foreign net portfolio inflows for the selected sample.

As Table 2 portrays, for almost 80% of the stocks in the sample, foreign investors appear to be net buyers for the sample period observed. However, inflow figures for individual stocks also display a large disparity ranging from – 1,235,642 $ to a maximum of 9,350,254 $ whereas the standard deviation of inflows range between 2,411,193 to 53,926,574. This finding is in fact commensurate with the other studies' findings regarding emerging market statistics indicating an excessive level of volatility in foreign investors' trading in this market segment.

On the other hand, the monthly return figures for the stocks in the sample vary within a tighter band ranging from a minimum of 0.161 % to a maximum of 0.336 %. Accordingly, the

[4] Some of the authorities link the short turmoil experienced in Turkish financial markets in May 2006 to this tremendous increase in foreign investor trading volume alleging that a massive and sudden capital flight during May 2006 following this rising trend has deeply unsettled ISE and resulted in more than 10 billion $ loss in total market value.

standard deviation of returns ranges from 0.688 % to 1.538%. This result stems from using the method of averaging daily returns instead of taking the difference between end and beginning of the month figures.

Jacque-Bera and skewness statistics provided in Table 2 indicate that for almost all of the stocks in the sample, net foreign investor inflow and return series do not follow a normal distribution. The only exceptions to this conclusion are the return series for Beko and Eregli for which the normality assumption cannot be rejected at 10% significance level.

Table 2: Descriptive Statistics

Stock	**Net Foreign Inflow**				**Return**			
	Average	Std.dev	Skewness	Jarque-Bera	Average (%)	Std.dev (%)	Skewness	Jarque-Bera
Akbank	4786394	33286683	0.493	283.49 (0.000)	0.186	1.149	-1.666	397.98 (0.000)
Aksigorta	738297	5463801	-2.655	1479.24 (0.000)	0.295	1.020	-0.577	39.911 (0.000)
Alarko	286207	4820710	3.211	3901.91 (0.000)	0.244	0.981	-0.195	8.631 (0.000)
Beko	-130423	2411193	0.456	67.956 (0.000)	0.194	0.973	0.276	1.898 (0.387)
Dogan Holding	283562	20933338	-0.579	249.72 (0.000)	0.198	1.538	-1.462	201.67 (0.000)
Enka	1002164	6814036	-0.075	115.28 (0.000)	0.320	0.902	0.029	16.45 (0.001)
Eregli	-888651	18884717	-1.163	108.02 (0.000)	0.240	0.903	0.184	2.314 (0.314)
Finansbank	1677560	9605199	3.289	2133.29 (0.000)	0.336	1.035	0.173	10.988 (0.004)
Ford	488705	6643029	0.066	83.018 (0.000)	0.274	0.945	0.273	26.532 (0.000)
Garanti Bankası	5080194	31826395	4.011	4044.79 (0.000)	0.304	1.049	0.089	4.986 (0.083)
Hurriyet	285349	6109897	-0.009	6.717 (0.035)	0.297	1.241	-0.722	194.08 (0.000)
Is Bankası C	7206139	45470938	-1.016	1048.18 (0.000)	0.290	0.989	0.616	18.976 (0.000)
Koc Holding	787821	20929114	0.409	40.806 (0.000)	0.219	0.983	0.486	9.368 (0.009)
Migros	-605254	8806391	-1.697	177.39 (0.000)	0.214	0.688	0.422	8.491 (0.014)
Petrol Ofisi	12321	9392897	1.924	933.28 (0.000)	0.274	1.157	0.352	6.936 (0.032)
Sabanci	2597318	39099856	0.031	462.22 (0.000)	0.231	0.937	0.179	6.849 (0.033)
Sisecam	626617	6425298	-0.036	57.229 (0.000)	0.237	0.955	0.375	12.511 (0.002)
Tansas	-1235642	9774002	-6.699	15953.59 (0.000)	0.161	1.334	-1.818	305.91 (0.000)
Tofas	309690	8732160	-0.138	65.76 (0.000)	0.243	1.110	0.419	5.797 (0.056)
Tupras	9350254	53926574	6.843	14199.61 (0.000)	0.204	1.058	-0.890	135.98 (0.000)

These statistics indicate that the return figures display a relative homogeneity among the stocks in the sample. On the contrary, a very high degree of heterogeneity in foreign net

inflow figures can be observed among the same stocks in the sample. This finding can be interpreted as the frequent rebalancing and position change of foreign investors' portfolio investments in ISE stocks.

Methodology and Results

This section, at the outset includes a concise discussion of methodology used in examining the joint dynamics and interaction between individual stock returns and foreign investor inflows in Turkish stock market. Subsequently, the results from these analyses as well as their interpretations will be discussed.

Granger-Causality and VAR Analysis:

As previously stated, the primary objective of this study is to examine whether foreign portfolio investors are engaged in positive feedback strategies or whether inflows have a significant impact on future returns. Thus, the primary question addressed and tested in this study is: "Do returns and inflows Granger-cause each other?"

The existence of Granger-causality relationship between returns and inflows will be tested by utilizing the following bivariate unrestricted VAR model:

$$\begin{bmatrix} r_{i,t} \\ f_{i,t} \end{bmatrix} = \begin{bmatrix} \alpha_r \\ \alpha_f \end{bmatrix} + \begin{bmatrix} \beta_{11}(L)\beta_{12}(L) \\ \beta_{21}(L)\beta_{22}(L) \end{bmatrix} \begin{bmatrix} r_{i,t-1} \\ f_{i,t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_{i,t}^{r} \\ \varepsilon_{i,t}^{f} \end{bmatrix} \quad \text{(Equation 1)}$$

where $r_{i,t}$ is the time t return on stock i and $f_{i,t}$ is the net foreign inflow (purchase) to stock i at time t. The alphas represent intercept terms, which can also be interpreted as the unconditional mean return and foreign net inflows for stock i, respectively. $\beta(L)$ represents the polynomials in the lag operator *L* and include the autoregressive coefficients. The off-diagonal coefficients β_{12} and β_{21} represent the conditional positive feedback trading and the price-pressure effect of flows on returns, respectively.

$\varepsilon_{i,t}^{r}$ and $\varepsilon_{i,t}^{f}$ are error terms that are assumed to have zero mean and are serially and contemporaneously uncorrelated.

VAR framework is considered as the most appropriate framework due to the following reasons:

First, VAR estimation procedure aims to determine the interrelationships among the variables in hand ignoring the parameter estimates. Properly, this study tries to merely test the existence of positive feedback and price-pressure effects of foreign portfolio inflows and returns without concentrating on the magnitude of cross impact between these two variables.

Secondly, contrary to the standard estimation techniques, VAR estimation in standard form does not require the regressors to be uncorrelated with the error term.

Thirdly, by use of a VAR system, it is also possible to test the imposed restrictions on the variables.

In addition to using VAR framework, the large number of observations even by using monthly data provides better power and allows us to conduct a sub period analysis and to account for possible structural break points such as the crisis period. However, even though the relative low frequency of monthly data to daily stand as a potential problem, this problem can be disregarded for this study since the forecasting power of returns and flows is not the primary concern of this study.

By using the formulation in Equation 1, the following hypotheses will be used for Granger-causality tests to assess the joint significance of lagged returns and flows:

$$H_0 : \beta_{12} = 0$$

(Equation 2)

$$H_0 : \beta_{21} = 0$$

Particularly, the first null hypothesis in Equation 2 indicates that past foreign portfolio flows have no significant effects on current stock returns. Likewise, the second null hypothesis in Equation 2 above indicates that past stock returns do not have any significant effect on current foreign portfolio flows. In another saying, the null hypotheses specify that past returns (flows) do not Granger cause current flows (returns) and the rejection of both hypotheses imply a significant mutual impact between these variables.

OLS Analysis:

In literature, price-pressure effect is characterized as the significant impact of the past trading volume in current prices. As one of the objectives in this study, price-pressure effect in ISE will be tested by the use of Equations 1 and 2 described above. However, since almost 70% of the trading volume in ISE is realized by foreign investors, it is also possible that the volume effect might be more apparent on current prices and returns.

OLS model will be utilized to test the contemporaneous interaction between net foreign inflows and returns by using the following formation:

$$A_{i,t} = \alpha + B_{i,t} + \varepsilon_t$$

where $A_{i,t}$ and $B_{i,t}$ represent returns and net foreign inflows on stock i in month t, respectively.

The existence of any possible significant interaction between net foreign investor inflows and returns contemporaneously could also have some implications for the existence of a herd behavior by individual investors in Turkish stock market. More specifically, as previously suggested, individual investors, whether rationally or irrationally have more tendency to herd the trading behavior of institutional investors simply because institutional investors have much more extensive resources to process any information. (Kim and Wei, 1999). Thus, due to any possible informational asymmetry, domestic investors might mimic the trading behavior of foreign investors causing prices to deviate from their fundamental values. This issue however, is beyond the scope of this study and the results to be gathered from this study could pave the way for a future research concentrating on determining the existence of herd behavior in Turkish stock market.

Diagnostic Tests:

Stock	**Net Foreign Inflow**	**Return**	**Net Foreign Inflow**	**Return**

Before moving on to the analysis and hypothesis testing, some diagnostic tests were applied on the data and the results from these tests are discussed in the following section.

As the first diagnostic test on the data in hand, a unit root test has been applied to ensure the stationarity of the net foreign flow and return data.

Table 3: ADF and KPSS Unit Root Test Statistics

	ADF Test Statistics	ADF Test Statistics	KPSS LM Statistics	KPSS LM Statistics
Akbank	-7.413671 (-3.4906) *	-7.653777 (-3.5200)	0.1014	0.0955
Aksigorta	-7.175372 (-3.4911)	-7.887836 (-3.5200)	0.1154	0.1046
Alarko	-6.088325 (-3.4906)	-7.783954 (-3.5200)	0.0592	0.0731
Beko	-6.229298 (-3.4906)	-6.392757 (-3.5200)	0.0679	0.0451
Dogan Holding	-4.663983 (-3.4911)	-6.859197 (-3.5200)	0.1275	0.1187
Enka	-8.604214 (-3.4906)	-7.570995 (-3.5200)	0.0628	0.0714
Eregli	-5.081166 (-3.4906)	-5.6497 (-3.5200)	0.0785	0.0463
Finansbank	-8.376003 (-3.4922)	-6.652868 (-3.5200)	0.1371	0.1306
Ford	-5.231700 (-3.4952)	-6.439506 (-3.5200)	0.0876	0.1131
Garanti Bankasi	-8.987555 (-3.4906)	-7.654760 (-3.5200)	0.0544	0.1056
Hurriyet	-7.088134 (-3.4906)	-8.121050 (-3.5200)	0.0458	0.0722
Is Bankasi C	-6.675480 (-3.4906)	-9.677226 (-3.5188)	0.1132	0.1137
Koc Holding	-10.28440 (-3.4906)	-11.35860 (-3.5188)	0.0618	0.0601
Migros	-5.607438 (-3.4906)	-6.851990 (-3.5200)	0.0676	0.1460
Petrol Ofisi	-6.687479 (-3.4906)	-3.666738 (-3.5226)	0.0630	0.1059
Sabanci	-4.758314 (-3.4952	-4.821244 (-3.5239)	0.0882	0.0904
Sisecam	-5.688316 (-3.4906)	-7.733528 (-3.5200)	0.1327	0.0564
Tansas	-7.613583 (-3.4906)	-6.000759 (-3.5239)	0.0992	0.1381
Tofas	-6.921429 (-3.4906)	-9.726238 (-3.5188)	0.0608	0.0477

Tupras	-6.422642 (-3.4906)	-5.698629 (-3.5213)	0.0577	0.0831

The unit root test results, shown in Table 3, indicate that for all of the stocks in the sample, both the return and net inflow series were stationary. The stationarity of the net inflow series is commensurate with the former claim that foreigners frequently rebalance their investments in most of the stocks in ISE and hence do not seem to follow a consistent pattern in their trading strategies.

Results:

The test results from VAR and OLS analysis are provided in Table 4. The results indicate a significant interaction and Granger causality between foreign portfolio flows and stock returns at 5% significance level for almost half of the stocks in the sample. However, for the same stocks, the direction of Granger causality is unilateral originating from returns towards net inflows indicating that past month's returns have a significant impact on the foreign investors' decision to trade in the current month. Reverse causality, however, is not existent for all the sample stocks. This result implies that net purchases by foreign investors' in the past month do not Granger cause current month's returns. The intercept term is not significant when current month's net inflows is on the left hand side in Granger causality equation , but it is significant in the equation when return is the on the left hand side of Equation 1. This result implies that there is an unconditional risk premium in stock returns independent of past flows and returns.

These findings further confirm that the explanatory power of lagged foreign investor flows in affecting present stock returns is weaker owing mainly to the effect of other possible idiosyncratic risk factors.

When the lag-lead relationship between flows and returns are analyzed, the coefficients of lagged values for both flow and return equations are negative and significant. In terms of flow equation, this result specifies that foreign investors in Turkey follow very dynamic asset allocation strategy and thus frequently reverse their long and short positions on the stocks that they hold. Particularly, an inflow in certain stocks in the present month is usually followed by an outflow or vice versa in the following month, which further leads to instability, and unwarranted volatility in major stocks traded in ISE.

Table 4: VAR and OLS Results

Stock	**Type of Analysis**					
	Granger Causality Test		VAR Analysis		OLS	
	H_0 = Returns Do not Granger-Cause Net Inflows	H_0 = Net Inflows Do not Granger-Cause Returns	$r_t = \alpha + f_{t-1} + \varepsilon_t$	$f_t = \alpha + r_{t-1} + \varepsilon_t$	$r_t = \alpha + f_t + \varepsilon_t$	$f_t = \alpha + r_t$
Akbank	**5.315 *** **(0.0231)**	0.614 (0.4351)	2.71E-09 ** (0.7834)	**-6628808** **(-2.3054)**	**1.19E-08** **(3.8747)**	**10713206** **(4.1552)**
Aksigorta	**7.940 (0.0058)**	0.113 (0.7377)	5.84E-09 (0.3356)	**-1352793** **(-2.8178)**	1.70E-08 (0.9661)	6016423 (1.1823)
Alarko	**3.313 (0.0715)**	0.123 (0.7261)	-6.85E-09 (-0.3511)	**835587** **(1.8202)**	-1.16E-08 (-0.5958)	-262394 (0.5769)

Beko	0.013 (0.9083)	0.019 (0.8896)	5.34E-09 (0.1391)	-26829.93 (-0.1154)	**9.14E-08 (2.3955)**	**548422 (2.3877)**
Dogan Holding	1.514 (0.2153)	1.092 (0.3558)	1.17E-08 (1.5898)	**-2243707 (-1.7281)**	**1.81E-08 (2.7085)**	**2790423 (2.2212)**
Enka	**8.762 (0.0038)**	2.281 (0.1338)	-1.89E-08 (-1.5104)	**-2078005 (-2.9599)**	1.50E-08 (1.1592)	7650899 (1.0281)
Eregli	1.740 (0.1899)	0.010 (0.9220)	4.66E-10 (0.0981)	-2749984 (-1.3189)	**1.67E-08 (3.8986)**	**7900893 (4.1878)**
Finansbank	0.289 (0.8845)	0.348 (0.8445)	-5.11E-09 (-0.5009)	-387834 (-0.4121)	**2.50E-08 (2.5348)**	**2084224 (2.3219)**
Ford	**2.528 (0.0345)**	**2.112 (0.0712)**	**-3.49E-08 (-2.3254)**	**-1971592 (-3.0961)**	**-2.83E-08 (-1.8638)**	**-1167245 (-1.7634)**
Garanti Bank	1.118 (0.2927)	0.346 (0.5575)	3.35E-09 (1.0573)	-1740112 (-0.5883)	**6.30E-09 (2.0389)**	**5784538 (2.0389)**
Hurriyet	0.774 (0.3810)	0.202 (0.6539)	-9.20E-09 (-0.4496)	-442219 (-0.8795)	**6.98E-08 (3.8393)**	**1693213. (3.8393)**
İs C	**9.671 (0.0023)**	0.210 (0.6476)	9.68E-10 (0.4583)	**-13377218 (-3.1098)**	**5.93E-09 (2.9736)**	**12537537 (2.9736)**
Koc	0.392 (0.6765)	0.015 (0.9854)	3.75E-10 (0.0773)	-2048018 (-0.8772)	**2.09E-08 (5.2133)**	**9472591 (5.2133)**
Migros	**15.068 (0.0001)**	0.786 (0.3771)	6.74E-09 (0.8868)	**-4352447 (-3.8817)**	**1.43E-08 (1.8415)**	**2383093 (1.9860)**
Petrol Ofisi	0.873 (0.3520)	0.224 (0.6367)	-1.12E-08 (-0.9346)	-376984 (-0.4735)	**3.17E-08 (2.7976)**	**2092628 (2.7976)**
Sabanci	10.802 **(0.0013)**	0.021 (0.8847)	-3.55E-10 (-0.1453)	**-13613795 (-3.2867)**	**6.06E-09 (2.6537)**	**10552649 (2.6537)**
Sisecam	1.349 (0.2480)	0.211 (0.6470)	-6.42E-09 (-0.4591)	-684608.5 (-1.1613)	7.19E-09 (0.5080)	325641 (0.5080)
Tansas	1.549 (0.2160)	1.179 (0.2801)	-1.62E-08 (-1.2443)	-768391.2 (-1.0856)	2.00E-08 (1.5500)	1070816 (1.5500)
Tofas	0.055 (0.8147)	1.483 (0.2259)	-2.98E-09 (-0.2348)	-960124.6 (-1.2179)	**4.51E-08 (3.9841)**	**2793453 (3.9841)**
Tupras	0.072 (0.7891)	0.321 (0.5724)	4.97E-10 (0.2681)	-2793344. (-0.5662)	-2.96E-10 (-0.1595)	-87528. (-0.0176)

r_t = Monthly stock returns

f_t = Net foreign investor inflows

* Represents Granger-Causality coefficient for the associated variable. The numbers in parentheses represent the probability of rejecting the null hypotheses that returns (inflows) do not Granger-cause inflows (returns).

** Represents the VAR coefficient for the associated variable. The numbers in parentheses represent t-statistics.

- Bold figures in the table indicate significance at 10% level.

These findings have very important implications for policymakers, too. Since the existing trading behavior of foreign investors might have a serious destabilizing effect on Turkish stock market, particularly in turbulent periods, it is essential for the policymakers to closely monitor foreign investors' trading patterns to prevent a sudden capital flight from Turkish stock market.

The test results also reveal that change in past returns significantly Granger-cause the change in present flows at 5% significance level. These results further support the existence of feedback strategy in foreign portfolio investor and are consistent with the earlier findings in terms of correlation coefficient between the change in returns and the change in flows. However, the sign of the Granger-causality coefficient is negative which leads to the inference that foreign portfolio investors in Turkey follow a negative (contrarian) feedback strategy and thus sell past month's winner stocks and buy past the previous month's losing stocks. Even though this finding is contrasting with the seminal literature which document the existence of positive feedback strategy in majority of the emerging markets, it is in parallel with the findings in lead-lag flow relationship suggesting a high volatility of returns caused by the foreign investors' inverse asset allocation strategies on monthly basis. This finding is analogous to the perception that foreign investor's massive selling and a sudden capital outflow from emerging markets trigger the financial crises by leading to sharp declines in domestic stock prices and moving stock prices away from their fundamental values.

From VAR test results, it can also clearly be observed that present month's stock returns are significantly affected by past month's returns as well as past foreign portfolio flows on these stocks, however with opposite signs.

Specifically, in bivariate VAR equation, it can be seen that when taken as the endogenous variable, the coefficient of lagged monthly return is negative whereas the coefficient of lagged flow, when taken, as the exogenous variable is positive.

The positive coefficient between past flows and present stock returns indicate that foreign investors' trading in previous month is influential in determining current month's stock returns in general and has a positive impact.

These results also support the argument of tight monitoring of foreign investors' trading in Turkish stock market and accordingly take necessary precautionary measures to halt a sudden and massive capital outflow from the country. The policymakers in Turkey has initiated such an action in January 2006 by imposing a withholding tax on capital gains from all marketable securities and other capital market instruments.[5] The main ration for such an act was to discourage foreign investors from changing their positions frequently, albeit at a possible cost of reduced foreign portfolio inflow to Turkish stock exchange. However, notwithstanding the prevailing global market conditions has been the predominant trigger for an unprecedented massive shock experienced in Turkish markets in May 2006, the policymakers have removed the withholding tax on capital gains for foreign investors to shun a possible further destructive effect of taxes on existing turmoil.

[5] The investors who hold their stocks for at least two years would be exempt from the tax.

Similarly, during Asian crisis, Malaysia has been less affected from the Asian crisis by imposing modest restrictions on the borrowing and lending by non-residents to prevent a sudden capital outflow.[6]

The results obtained from OLS analysis are analogous to those obtained from VAR analysis. Particularly, the results suggest a significant contemporaneous interaction between current month's returns and foreign investor flows for 14 stocks, which correspond to 70% of the whole sample. These findings elucidate the existence of contemporaneous price pressure effect by foreign investors in Turkish stock market. Specifically, the results show that foreign investors' net inflows in stocks seem to augment the prices of these particular stocks during a particular month. This result is not surprising considering the massive trading power of foreign investors in IMKB.

Nevertheless, unlike the results gathered from VAR analysis, when the current month's return is taken as the independent variable in OLS equation, the sign of the coefficients is positive. These results further confirm the evidence that, foreign investors flow a very dynamic asset allocation strategy in Turkish stock market and the stock returns seem to be an important factor in foreign investors' trading strategy. In particular, the results indicate that even though the foreign investors seem to be net buyers for the winning stocks in a particular month, they reverse their positions for the following months and sell their holdings, most likely for profit realization purposes. This result is likewise not surprising, since exit barriers like capital gain tax is not existent in Turkish stock market allowing a free reallocation of financial assets in Turkish stock market.

Overall, the results obtained from VAR and OLS analyses can be summarized as follows:

- For majority of the stocks in the sample, past period stock returns do seem to Granger-cause current foreign portfolio inflows; results consistent with the findings in earlier studies on emerging markets.
- The sign of the Granger-causality coefficient between past stock returns and present foreign portfolio flows on the associated stocks as well as the sign between past and present flows is negative specifying that foreign investors frequently switch their positions on largest size stocks and tend to buy (sell) previous month's losing (winning) stocks. These findings also reveal the existence of a significant negative feedback in Turkish stock market. This is somewhat in contrast with the findings of the studies on emerging markets where positive feedback strategies were found to be more dominant in foreign investors' portfolio decisions.
- The results also indicate that past month flows do not seem to Granger cause present month returns except some few stocks in the sample.
- There is a significant bilateral contemporaneous interaction between foreign investors inflows and stock returns in Turkish stock market, as pronounced in OLS test results. Unlike VAR results, the sign of the interaction coefficient is positive pointing out the fact that stocks with an increasing price trend seem to foster the appetite of foreign investors leading to a further increase in net inflow of these stocks in a particular month. Furthermore, the significant positive impact of foreign investor inflows on current month stock returns denote the existence of contemporaneous price pressure effect in Turkish stock markets, which basically stems from the manipulative power of foreign investors on stock prices in Turkish stock market.

[6] In Malaysia, borrowing and lending in foreign currency from/to nonresidents was freely allowed subject to a net overnight open position in foreign currencies.

- There are very crucial implications of these results for Turkish policymakers. The significant influence of foreign investors trading on stock returns, imply that a sudden and massive capital flight could result in major fluctuations and destabilization in Turkish stock markets, as recently experienced in 2001 and 2006. This possible destruction in financial markets can be avoided by taking certain precautionary measures or restrictions on foreign investors' trading that has been moderately applied in some emerging markets such as Malaysia during the Asian crisis.

Conclusion

International finance literature contains numerous studies examining the foreign investors' trading patterns, particularly in emerging markets. Majority of the studies have documented that foreign portfolio investors display a return-chasing behavior and positive feedback strategy in their portfolio investment decisions on emerging markets.

Some of these studies have also attributed the causes of major global crises to foreign investors' massive selling behavior before and during the crises resulting in a sudden capital outflow while some studies have found no significant interaction between non-resident investors' trading behavior and stock returns during the crisis periods.

This study, particularly, attempts to examine the portfolio investment patterns of foreign investors in Turkish stock market, which stands as one of the most appealing emerging stock markets for international investors revealed by the noteworthy surge of portfolio inflows by non-residents in the past months, owing mainly to the relative stability in major economic indicators and remarkable progress in European Union membership access.

The interdependence between foreign portfolio inflows and returns has been tested by a bivariate VAR analysis.

The results gathered from VAR analysis are indicative of a significant Granger-causality relationship between foreign flows and returns. Specifically, the results show that while foreign investors are engaged in negative (contrarian) feedback strategy by buying (selling) past month's losers (winners), their trading behavior in past month also have a strong price pressure effect on associated stocks for the full sample period. Similar results have been obtained for the sub sample of 2001 crisis period, too.

These results carry very vital propositions for Turkish policymakers stating that enforcing some control on foreign capital flows might be effective in monitoring and preventing sudden capital outflow from the country which in turn might be detrimental in achieving short and long run stability in financial markets, as experienced recently in 2001 crisis.

Appendix 1: List of Sample Stocks and Observation Periods:

Stock Name	Observation Period
AKBANK	January 1997- April 2006
AKSIGORTA	January 1997- April 2006
ALARKO	January 1997- April 2006
BEKO	January 1997- April 2006
DOGAN HOLDING	January 1997- April 2006
ENKA	January 1997- April 2006
EREGLİ	January 1997- April 2006
FINANSBANK	January 1997- April 2006
FORD OTOSAN	January 1997- April 2006
GARANTI BANK	January 1997- April 2006
HURRIYET	January 1997- April 2006
IS BANK (C)	January 1997- April 2006
KOC HOLDING	January 1997- April 2006
MIGROS	January 1997- April 2006
PETROLOFISI	January 1997- April 2006
SABANCI HOLDING	July 1997- April 2006
SISECAM	January 1997- April 2006
TANSAS	January 1997- April 2006
TOFAS	January 1997- April 2006
TUPRAS	January 1997- April 2006

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