Foreign Investors and Noise Trade in Istanbul Stock Exchange

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Abstract

As well known, in Istanbul Stock Exchange (ISE), most of the total market capitalization is constituted by foreign investors. This study aims to investigate whether foreign investors make their decisions about portfolio investments based on the information of ISE market index return or not, and to investigate whether their behavior has a causal effect on the changes in ISE market index return. After the time series analysis of variables, causality analysis results indicate that there is Vector Error Correction Granger Causality from buying of foreign investors to market index return for the analysis period indicating that excessive returns on market resulted from the buying of foreign investors might create new purchases. It is important that stock market index return does not Granger cause buying or selling of foreign investors. Foreign investors might make noise trading implying that the reason to buy or sell securities may result from the expectations and sentiments.

Key words: Foreign Investors, Istanbul Stock Exchange, Time Series Models

JEL Codes: G11, G10, C22

1. Introduction

One of the desired results of the financial liberalization of capital markets might be the flow of developed countries' funds to developing country capital markets with the help of big financial intermediates and declining of information asymmetry while the liquidity and depth of these markets are increasing. There are number of studies about financial intermediates, flow of funds, information asymmetry, liquidity and depth of markets in several different country markets. For years, more than half of capitalization of Turkish stock markets is composed of foreign investors. The share of foreign investors in ISE was 52.2 in 2003 and it increased to 66.2 in 2010. Such big foreign capitalization might have some important implications for the capital market and should be analyzed. From Figure 1, foreign investors' concealment balance in stock market of Turkey as percent of total for 2003-2010 could be observed.

The aim of this study is to investigate the expected causal relationships between buying of foreign investors, selling of foreign investors and stock market return in Turkish stock market. Despite the fact that there are number of studies investigating the different properties of stock market, we could not reach a study attempting to empirically study the relationship between foreign investors' behaviours and stock market index specifically in Turkey. From January 2006 to April 2010:4 this lack might be filled out by this study about the causal relationship between foreigners' behavior in Turkish market and the stock index return. The study is organized as follows. Second part gives the basic information about noise trading, third part reviews the literature, fourth part reports the empirical analysis and the last part concludes and evaluates the results.

2. Noise Trade

In modern finance theory, participants of capital markets are assumed to be rational according to Fama's (1970) efficient market hypothesis. However, in real world there are many cases that we observe the irrationalities of market participants, since many investors may make decisions based on their subjective beliefs in recent years. For example, Dorsey (2004) cited a study evaluating sentiment metrics as a part of the model of buying and selling of stocks and related buy-sell signals to sentiment indicators. Behavioral finance theory is developed to explain these contradictions of the investors' behavior with the behavioral theories instead of traditional finance theories. Also, it is known that some investors might sometimes make transactions with noise instead of information, and also they might overreact or underreact the information about the market. Finally, the herding behavior and the anomalies in the financial markets such as weekend effect, January effect, small sized enterprise effect, investment trust effect, value line puzzle, loss aversion, egocentric bias, etc. are known concepts in behavioral finance theory.

Some part of the change in investors' demands of securities is accepted to be totally rational. The rational changes in demand indicate the reactions to information announced publicly. However, all the change in demand may not be rational. This irrational part is accepted to be resulted from the expectations and sentiments of investors. This type of changes may be resulted in reaction to the signals that are not true or that would not be reacted in rational investment atmosphere. Dorsey (2004) exemplified the recommendations of market agencies. These signals and recommendations are called noise, and people make transactions according to noise rather than information is called noise traders. Noise traders are investors whose expectations about future are affected by their sentiment.

The concept of noise becomes a fact that its being, its effect and its need in financial markets are acknowledged. All units make transactions in financial markets have to distinguish these two concepts: information and noise. Investors sometimes make transactions on the basis of information, and sometimes they make investment decisions on the basis of noise. Noise zooms out the observations of investors from the perfect condition, and makes it difficult to estimate the expected return of a stock or a portfolio. Despite its negative effects on the clarity of observations, noise is said to be needed in financial markets. Stocks would have been very difficult to be bought and sold when there is no noise trading. Kandır (2006) denotes that investors would have bought the stocks, however they would have changed or updated their portfolio very seldom if there were no noise trading.

When all of the units have the same information, there will be no investor as counterparty and valuation of securities will be impossible. The structure of financial markets needs that all of the securities are traded in liquid markets. Noise trade is required at this point. Noise traders pursue noise, misperceive it as information, and make investment decisions based on it. Therefore, investors having the real information are able to find counterparties in transactions. In other words, as the noise trade increases, so does the liquidity of the market. According to Dorsey, during all these transactions, parties make decisions on the basis of information earn money as a group while parties make decisions on the basis of noise loses money as a group.

There are two types of investors: rational investors who have rational expectations about security returns and noise traders who are under the effect of their own sentiment. Noise traders also sometimes underestimate or overestimate the expected return because of their emotions. Always both rational investors and noise traders make transactions in the market according to their beliefs. Since all securities are risky in capital markets and investors are risk averse, equilibrium price accepted to reflect the estimates of both groups.

3. Literature Review

There are number of studies in the literature searching the behavior of foreign traders and effects of behavior of foreign traders in different capital markets. Some of the studies focus on developing markets and some of them are about developed markets. Here, it is decided to summarize the literature whose empirical parts are close to this study by chronological order. DeLong, Shleifer, Summers and Waldman (1990) studied noise trade and they found that in markets where there is no noise trading, the market price of securities equals to the fundamental price. On the other hand, in markets where there is noise trading, the gap between two prices increases and so does the volatility in the market. Kim and Wei (1999) searched the behavior of foreign investors in Korean market before and during the Asian crisis between years 1996-1998. The results indicate that the foreign investors not living in Korea are positively reacting before and during the crisis while foreign investors living in Korea positively reacting during the crisis and negatively reacting before the crisis.

At the same time it is found that personal investors have herding behavior more than the corporate investors. Lastly, it was concluded that foreign investors living in Korea less react to news about Korea and Western countries than their counterparts. Froot, Cornell and Seasholes (2001) analyzed inward and outward portfolio investments of 28 developing and 16 developed economies between 1994 and 1999. Their results are as follows: the importance of regional factors affecting the direction of portfolio investments are increased, portfolio flows may be considered as stationary but they are more permanent than stock returns, portfolio flows are highly affected by past returns, foreign portfolio investments coming to developing countries have the positive estimation power of future stock returns, the sentiment of domestic stock prices to inward foreign portfolio investments is positive and high, and lastly, stock prices are consistent with persistence of portfolio investments.

Nam (2004) analyzed the relationship between foreign investors' trading volume and stock returns in Korean market between 1992 and 1998. As a result it was found that foreign traders are not buying or selling securities according to noise, they trade according to information. At the same time they do not cause noise in Korean market. Therefore, foreign traders do not directly affect the riskiness of security prices.

Griffin, Nadari and Stulz (2004) tried to model the net buying of foreign investors in Indonesia, Korea, Phillipines, Taiwan, Thailand, India, Sri Lanka, Slovenia and South Africa and they found that net buying of foreign investors in those countries increases when the stock market return increases. At the same time, buying of foreign investors in smaller countries increases when the return in bigger countries increases as well. The reaction is fast but the duration of reaction is short.

The causality between corporate foreign investments and stock returns in India was analyzed by Inoue (2009) in two periods: before and after May 2003. Cross correlation approach was used to daily data and it is found that for the first period, there is causality from stock returns to net cumulative buying of corporate foreign investors both in mean and in variance but there is no causality in the opposite direction. However for the second period, casual relationship was determined in both directions. It was found that the causality from net cumulative buying of corporate foreign investors to stock returns took longer time because of macroeconomic variables.

Kim, Landi and Yoo (2009) searched the effects of foreign investors on Korean market.VAR analysis was applied to daily data in 1955-2006 separately for the domestic and foreign investor groups. As a result, it was found that net buying of foreign investors does not affect the stock market return. At the same time net buying of foreign investors reacts immediately to positive changes in return. GARCH-M analysis was resulted that net buying of foreign investors has no significant effect on volatility in the market. Finally, it was found that after the increase in net buying of foreign investors, Won appreciates across U.S.D.

Effects of different investor groups on stock returns in U.S.A market was studied by Boyer and Zheng (2009) between years 1952-2004. It was determined that net buying of foreign investors and mutual funds has significant positive effect on stock market return. The concurrent relationship of these groups with stock returns explained to be the result of unexpected parts of cash flows.

Rhee and Wang (2009) analyzed how the liquidity of Indonesian stock market been affected by foreign investors who have 41% of market capitalization. The results of the study which covers the years 2002-2007 are as follows: foreign investors have negative effects on liquidity of the stock market, and the stated reason was that corporate investors increase the information asymmetry, foreign corporate investors' big amount of buying or selling increase the volatility, dominant foreign investors decrease the competition in the market, or foreign corporate investors use passive portfolio management strategies.

Barniv (2009) analyzed the information demand of foreign investors in China stock market. Regression analysis was conducted for the data of 1991-2001 and it was found that foreign investors have less information than domestic investors and therefore they demand more. At the same time, because foreign analysts try harder to have information, their forecasts are found to be more accurate than forecasts of domestic counterparts.

Aydın (2011) theoretically emphasized the importance of investigating how investors actually behave in financial markets. He specified the key points of efficient market hypothesis and market anomalies for the Turkish market. He introduced the concept of intrinsic bubbles for explaining the anomalies. As a result he asserted that the field of behavioral finance should be studied as a main branch instead of supplementary branch and it should be empirically studied more in the Turkish financial market.

4. Empirical Analysis

In this study, it is tried to analyze whether foreign investors cause a change in stock market index return in Turkey or not. At the same time it is tried to analyze whether ISE index return causes a change in buying or selling behavior of foreign investors. Via this analysis, it is expected to be able to conclude whether foreign investors make noise trade or they make decisions based on the information they get from the market index return, and also to see the direction of the causal relationship if there is any.

4.1. Data

Three different variables were used as measures of trade by foreign investors which are foreign investors' buying (BUY), foreign investors' selling (SELL), and foreign investors' net buying (NET_BS) which is the difference between buying and selling. Also, ISE-all return index (INDEX) was used as a measure of stock market return. ISE-all index includes the domestic market, secondary domestic market, watch list market and new economy market. Since net buying is the difference of buying and selling, there is a linear relationship with these variables so that it could not be used in the causal analysis. Only the descriptive information is given about it. In the study, monthly data was used, which is the highest frequency data available, to capture the short-run effects which may not be the case when by annual or quarterly data is used. The time period is 2006:1 and 2010:4 (t=52) and data was obtained from ISE official web site. Buying, Selling, Net Buying and Index Variables at Level Values are reported in Figure 2. Descriptive statistics related to variables used in the analysis are reported in Table 1. The mean value of buying of foreign investors is 6.72 billion TL while the mean of selling of foreign investors 6.56 billion TL in the analysis period. The variables can be designated to be normally distributed according to Jarque-Berra statistics.

4.2. Methodology and Empirical Analysis

Granger causality methodology is decided to be used in order to test whether there is a causal relationship between buying of foreign investors, selling of foreign investors and stock index return in any direction. The main reason to use Granger causality test is the expectance of finding a causal relationship between variables.

Prior to carrying out the Granger causality test, one needs to know the time series properties of the each variables, such as the degree of integration, whether they are cointegrated and so on so forth, used in the study, since form of the test equations completely depends on the these properties of the variables.

Therefore, empirical analysis starts by examining the stationarity of the variables by using Zivot and Andrews's (1992) stationarity test with structural breaks, since the time series plots of each variable clearly indicate the presence of structural breaks in data, perhaps suggesting that global financial crisis started in 2007 and hit the Turkish economy in about late 2008.

As it is well known, Zivot and Andrews transformed Perron's (1989) unit-root test that is conditional on structural change at a known point in time into an unconditional unit-root test. They also took into account the effects of fat-tailed innovations on the performance of the tests. The null hypothesis is a unit root process without any exogenous structural breaks, and the alternative hypothesis is a trend-stationary process with possible structural change occurring at an unknown point in time. In this test, three different test equations are suggested. They are:

$$y_t = \hat{\mu}^A + \hat{\theta}^A DU_t(\hat{\lambda}) + \hat{\beta}^A t + \hat{\alpha}^A y_{t-1} + \sum_{j=1}^{k} \hat{c}_j^A \Delta y_{t-j} + \hat{e}_t \quad (1)$$

$$y_t = \hat{\mu}^B + \hat{\beta}^B t + \hat{\gamma}^B DT_t^*(\hat{\lambda}) + \hat{\alpha}^B y_{t-1} + \sum_{j=1}^{k} \hat{c}_j^B \Delta y_{t-j} + \hat{e}_t \quad (2)$$

$$y_t = \hat{\mu}^C + \hat{\theta}^C DU_t(\hat{\lambda}) + \hat{\beta}^C t + \hat{\gamma}^C DT_t^*(\hat{\lambda}) + \hat{\alpha}^C y_{t-1} + \sum_{j=1}^{k} \hat{c}_j^C \Delta y_{t-j} + \hat{e}_t \quad (3)$$

$DU_t(\lambda) = 1$ if $t > T\lambda, 0$ otherwise and $DT_t^*(\lambda) = t - T\lambda$ if $t > T\lambda, 0$ otherwise.

Table 2 presents the Zivot and Andrews Unit-root Test Results. According to Table 2, all of the three variables are stationary in their first differences. From this table, it can be said that the effects of global crisis on the variables started with index return in September 2008.

Then it started to affect the buying behavior of foreign investors in October 2008. Lastly in November 2008, the selling behavior of foreign investors in ISE started to be affected by the financial crisis. These reactions could be evaluated to be in logical order.

Since we found that all variables are first difference stationary, we have to next look at whether they are cointegrated or not by using Johansen cointegration test. To perform this test, the lag length is first determined based on the unrestricted VAR estimation. Lag Length Selection Results are given in Table 3. According to Table 3, lag length is determined as 1 in compliance with the Schwarz information criterion and the Hannan-Quinn information criterion.

After determinig the lag length, the Johansen Cointegration Test was carried out. Test results are given in table 4. Johansen (1991) suggested two tests as Trace Test and Max-eigenvalue test aiming at showing the cointegration relationship among variables. More information about the Johansen cointegration test can be found at Vogelvang (2005) and Ozer and Erdogan (2006).

Trace test indicates two cointegrating eigens at the 0.05 significance level and Max-eigenvalue test also indicates two cointegrating eigens at the 0.05 significance level. Both Trace and Max-eigen test results indicate that all variables are cointegrated perhaps suggesting that we should estimate vector error correction model (VECM) instead of unrestricted VAR model. Then VECM was estimated and Granger causality tests were performed. Table 5 represents the results of the Granger causality tests.

The results of the Granger causality test indicate that there is an unidirectional causality from BUY to INDEX. No other causal relationship is found.

5. Conclusion and Evaluation

In this study, the effects of the foreign entrance and exits in ISE were analyzed by using monthly data over the period of January 2006 and April 2010. Particularly, to provide answers to questions of whether these entrances and exits cause a change in ISE-all return index, and whether foreign investors make their decisions of buying and selling according to return index information or not was tried by using time series econometric techniques of cointegration, VECM and Granger Causality test.

Based on the Granger causality test, it is found that buying of foreign investors does Granger cause a change in ISE-all index return. Buying of foreign investors might lead to other investors' (mostly individual small groups) decisions to buy. As argued in Boyer and Zheng (2009), it is known that net buying of foreign investors and net buying of mutual funds have significant positive effect on stock market returns because of the unexpected parts of cash flows. It is believed that this finding also applies to the Turkish market so that excessive returns on market resulted from the buying of foreign investors do create new purchases.

On the other hand, selling of foreign investors does not seem to affect selling decisions of other investors, because investors' selling decisions might be affected mainly by some other factors such as behavioral differences or different beliefs.

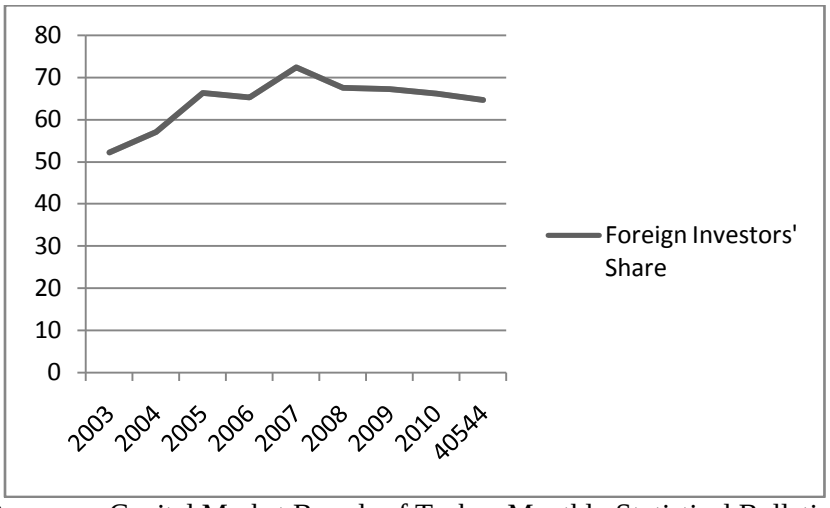
It is also found that stock market index return does not Granger cause buying or selling of foreign investors. Foreign investors do not seem to act according to the information they gather from the changes in index return. There might be other factors such as risk perception about the global markets, changes in macroeconomic conditions or changes in liquidity that is effecting the decision of foreign investors to buy or sell securities in Turkish capital market. At the same time, they might make noise trading when they are buying or selling, implying that the reason to buy or sell securities may result from the expectations and sentiments of foreign investors. These expectations may be shaped by other countries' market conditions or market returns, as mentioned in Griffin, Nadari and Stulz (2004). Foreign investors also might be reacting to the false signals or would not be reacted in rational investment climate which leads to a noise trade. Furthermore, they might not base their decision making the index return, when they decide to entering into or exiting from Turkish market, since the market is not deep enough and also highly volatile.

In order to understand the foreign investors' decision fully regarding for investing in Turkish markets, all these issues can be studied carefully; perhaps doing a survey, which basically designed to analyze behavioral differences of the investor groups, may be very beneficiary to understand the attitudes of foreign investors when they make their investment decisions in Turkey.

References

- Aydın, Suat. (2011). Noise Traders in Financial Markets. İktisat İşletme ve Finans, 26(304), 9-36.
- Barniv, Ran. (2009). Does Foreign Investor Demand for Information Affect Forecast Accuracy? Evidence from the Chinese Stock Markets. Journal of International Accounting, Auditing and Taxation, 18, 101-118.
- Boyer, Brian and Lu Zheng. (2009). Investor Flows and Stock Market Returns. Journal of Empirical Finance, 16, 87-100.
- Brooks, Chris. (2008). Introductory Econometrics for Finance, Second Edition, Cambridge University Press, New York.
- Capital Market Boards of Turkey Monthly Statistical Bulletins at http://www.cmb.gov.tr/
- DeLong, J.B, A. Shleifer, L.H. Summers and R.J. Waldman. (1990). Noise Trader Risk in Financial Markets. Journal of Political Economy, 98(4), 703-738.
- Dickey, David A. and Wayne A. Fuller. (1981). Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root. Econometrica, Vol. 49, No. 4, 1057-1072.
- Doowoo Nam. (2004). Do Foreign Investors Cause Noise in an Emerging Stock Market? Journal of Emerging Market Finance, 3:1, 21-36.
- Dorsey, Woody. (2004). Behavioral Trading: Methods for Measuring Investor Confidence, Expectations and Market Trends, Thomson/ Texere, Australia.
- Fama, Eugene F. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work. Journal of Finance, Vol.25, No: 2, 383-417.
- Froot, K.A., Paul G.J.O'Connell and Mark S. Seasholes. (2001). The Portfolio Flows of International Investors. Journal of Financial Economics, 59, 151-193.
- Griffin, John M., Frederico Nardari and Rene M. Stulz. (2004). Are Daily Cross-Border Equity Flows Pushed or Pulled? The MIT Press Review of Economics and Statistics, Vol.86, No: 3, 641-657.
- Johansen Soren. (1991). Estimation and Hypothesis Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models. Econometrica, Vol.59, No:6, 1551-1580.
- Kandır, Serkan Yılmaz. (2006). Effect of Investor Sentiment on Stock Returns in Turkey. Dissertation for Doctor of Philosophy in T.C Çukurova University.
- Kim, Jaemin, James Landi and Sean Sehyun Yoo. (2009). Inter-Temporal Examination of The Trading Activities of Foreign Investors in the Korean Stock Market. Pacific-Basin Finance Journal, 17, 243-256.
- Kim, Woochan and Shang-Jin Wei. (1999). Foreign Portfolio Investors Before and During a Crisis. Center for International Development at Harvard University, Working Paper No:6.
- Özer, Mustafa and Levent Erdoğan. (2006). Türkiye'de İhracat, İthalat ve Ekonomik Büyüme Arasındaki İlişkilerin Zamman Serisi Analizi. Ekonomik Yaklaşım, Vol.17, No:60-61, 93-110.
- Perron, P. (1989). The Great Crash, the Oil-Price Shock, and the Unit Root Hypothesis. Econometrica, 57, 1361-1401.
- Rhee, S. Ghon and Jianxin Wang. (2009). Foreign Institutional Ownership and Stock Market Liquidity: Evidence from Indonesia. Journal of Banking & Finance, 33, 1312-1324.
- Takeshi Inoue. (2009). The Causal Relationships in Mean and Variance between Stock Returns and Foreign Institutional Investment in India. Margin- The Journal of Applied Economic Research, 3:4, 319-337.
- Vogelvang, Ben. (2005). Econometrics: Theory and Applications with E-Views. Pearson Education Limited, England.
- Ziwot, E. and D. W. K. Andrews. (1992). Further Evidence on the Great Crash, the Oil-Price Shock, and the Unit Root Hypothesis. Journal of Business and Economic Statistics, Vol.10, No.3, 251-270.
- http://www.imkb.gov.tr/Data/StocksData.aspx
- http://www.spk.gov.tr/apps/aylikbulten/index.aspx?submenuheader=-1

Figure 1: Foreign Investors Concealment Balance in Stock Market of Turkey as Percent of Total, 2003-2010



Resource: Capital Market Boards of Turkey Monthly Statistical Bulletins

Figure 2: Buying, Selling, Net Buying and Index Variables at Level Values

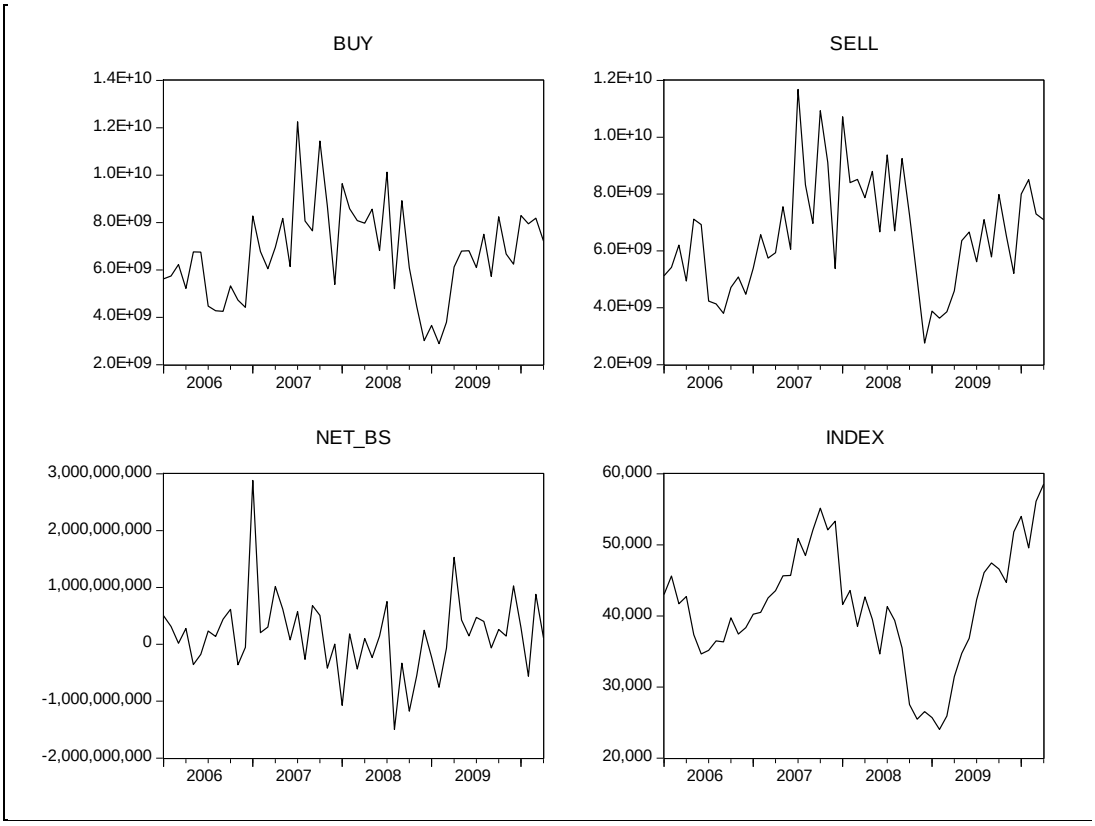


Table 1: Descriptive Statistics for Variables at Level Values

	BUY	SELL	INDEX
Mean	6.72E+09	6.56E+09	41361.20
Median	6.75E+09	6.55E+09	41652.96
Maximum	1.23E+10	1.17E+10	58555.09
Minimum	2.88E+09	2.76E+09	24023.09
Std. Dev.	1.98E+09	1.97E+09	8411.753
Skewness	0.377297	0.466093	-0.155558
Kurtosis	3.237818	2.874084	2.599944
Jarque-Bera	1.356266	1.917120	0.556481
Probability	0.507564	0.383445	0.757115
Sum	3.49E+11	3.41E+11	2150782.
Sum Sq. Dev.	2.00E+20	1.98E+20	3.61E+09
Observations	52	52	52

Table 2: Zivot and Andrews Unit-root Test Results

	BUY	**SELL**	**INDEX**
t-statistics	-4.214.071	-3.713.844	-3.387.711
Lag(s)	4.000.000	2.000.000	0.000000
Break	2008M10	2008M11	2008M09
DU1 p-value	0.001048	0.000757	0.004125

Table 3: Lag Length Selection Results

Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-2307.485	NA	1.22E+44	110.0231	110.1472	110.0686
1	-2255.157	94.68912	1.55E+43*	107.9598	108.4563*	108.1418*
2	-2250.197	8.266660	1.89E+43	108.1522	109.0211	108.4707
3	-2244.552	8.600575	2.26E+43	108.3120	109.5532	108.7670
4	-2240.993	4.915590	3.03E+43	108.5711	110.1846	109.1625
5	-2233.952	8.717268	3.53E+43	108.6644	110.6503	109.3923
6	-2220.075	15.19837	3.06E+43	108.4322	110.7904	109.2966
7	-2210.690	8.938151	3.44E+43	108.4138	111.1444	109.4147
8	-2185.343	20.51906*	1.92E+43	107.6354	110.7384	108.7727
9	-2177.997	4.897354	2.77E+43	107.7141	111.1895	108.9880
10	-2157.071	10.96125	2.39E+43	107.1462*	110.9939	108.5566

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Table 4: Johansen Cointegration Test Results

Hypothetised Number of Cointegrated Eigens	Trace Statistic	Prob.**	Max-Eigen Statistic	Prob.**
None*	51.43783	0.0000	35.35403	0.0003
At most 1*	16.08381	0.0407	14.7803	0.0414
At most 2	1.303501	0.2536	1.303501	0.2536

* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table 5: VEC Granger Causality Test Results

Null Hypothesis	Chi-Square Test Statistic	Prob.
Index does not Granger cause Buy	0.328017	0.5668
Sell does not Granger cause Buy	0.695300	0.4044
Buy does not Granger cause Index	**3.028838**	**0.0818**
Sell does not Granger cause Index	1.660582	0.1975
Buy does not Granger cause Sell	0.103625	0.7475
Index does not Granger cause Sell	0.011821	0.9134