

The Effects of Changes in Foreign Exchange Rates On ISE-100 Index

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In this work, I explore the relationship between changes in foreign exchange rates (Euro/TL, GBP/TL, JPY/TL, CHF/TL, USD/TL, CAD/TL, SA/TL) and the main composite index at Istanbul Stock Exchange by employing monthly data spanning from January 1999 and November 2011. Based on the Augmented Dickey Fuller and other techniques of time series analysis I find that all variables in the estimation framework are non-stationary at the initial level; the stationarity is achieved at a first difference level. The results indicate that changes in domestic U.S. Dollar and Canadian dollar are positively related to changes in ISE 100 while fluctuations in domestic interest rates and Saudi Arabia Riyal have a negative impact on the index. The study also discusses implications of these results on the portfolio and traditional approaches to estimation of returns.

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1. Introduction

Movements of a stock market by in large reflect the economic situation of a country. That being said in a globalised world, the narrative is a bit more complex as stock prices are affected by both the country's domestic economic situation and by foreign economic events. Given an increased level of international flows of goods and capital, it is likely that importance of the latter will continue to surge fuelling the volatility of the financial sector overall. Because stocks are risky assets, investors are keen to know what affects stock prices and how much these effects change the stock prices (İpekten and Aksu 2009).

To hedge themselves from risks and to get more return on their investments, individual and corporate investors, especially portfolio managers and hedge fund managers, are interested in factors that affect the stock market index. These factors also affect the value of the firms quoted in the composite indices (Derindere and Dizdarlar, 2008). Among the myriad of factors that affect the stock market, foreign exchange rates have become increasingly important in today's globalised world because of the international fund transfers between countries are becoming much more important in capital markets (Mumcu 2005).

Exchange rate is the price of one country's currency expressed in another country's currency. In other words, that it is the rate at which one currency can be exchanged for

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another. Exchange rate is a national and international political, social and economic indicator. In developed countries, it reacts quickly to events like war, terrorism, and also to the changes in the political situation as well as to main economic indicators like unemployment, interest rate. From a macro perspective, foreign exchange rate has an effect on the country's economy whereas from a micro perspective it affects the firms. Since the markets are becoming much more integrated, ISE 100 index is not only affected by the national economic, social and political environment but also by developments at the international markets.

There are two approaches for the relationship between the exchange rates and the stock market. One is a traditional approach and the other is a portfolio approach (Granger et al. 2000). According to the traditional approach, the changes in the exchange rate are a result of the imbalance between money demand and money supply. A change in the exchange rate affects both the international competitiveness and the international trade of a country. This affects the real income and the amount of production in the economy (Dornbusch and Fisher, 1980).

Since the value of a stock may be defined as the present value of the future cash flows, this value will reach an equilibrium point according to the economic environment. This means that according to the traditional approach, there is a positive relationship between the stock prices and the exchange rates; and the causality is from the exchange rate to the stock prices.

According to the portfolio approach, there is a negative relationship between the stock prices and the exchange rates; and the causality is from the stock prices to the exchange rate. An increase in the stock prices causes a valuation in the national currency. This pushes investors to sell the foreign securities in their portfolios and to buy stocks. The increase in the national money demand and supply causes an increase in the value of national currency and also causes decreases in the foreign currencies. Besides the direct effect, it also causes a pressure on the exchange rate (Stavarek, 2005). An increase in the stock prices triggers an increase in the money demand and also in the interest rates. Higher interest rates attract foreign portfolio investments. In this case, foreign portfolio managers sell foreign currencies and create demand for the national currency; this creates a downward pressure on the exchange rate. In contrast, in a decreasing stock market, foreign funds sell the national currency they hold and buy foreign currencies exerting an upward pressure on the exchange rate.

Investors want to get a return at least equal to the interest rate of a treasury bond, which is accepted as the risk free rate. As the interest rate increases, the interest rate used to calculate the value of a stock increases and the value of the stock decreases. When the interest rates increase in the wake of the increased yields of the fixed income securities, funds move from the stock market to the fixed income securities, thereby causing a decrease in the stock prices. In contrast, when the interest rates decrease, the attractiveness of the treasury bonds decreases. Funds move from fixed income securities to the stock market and the price of the stocks increase. It is reported in the literature during most of the stock market crashes, there had been huge increases in interest rates (İpekten and Aksu 2009).

This empirical study investigates the effects of the changes in the foreign exchange rates and interest rates on ISE 100 index changes. The relationship between the exchange rates and ISE is quite an important one from investors' perspective and has been studied in several researches. In most of them, USD has been used as the foreign exchange rate. Needless to say that ISE is not only affected from U.S. economy but also from other economies in the world. Therefore in this research, in addition to U.S. Dollar, the effect of

other foreign exchange rates on ISE is explored. These currencies are Euro, British Pound, Japanese Yen, Swiss Franc, Canadian Dollar, and Saudi Arabia Riyal. The choice of currencies reflects scope and scale of Turkish foreign trade.

In this research, data in between 1999:01-2011:11 periods is used. This period contains the recent national and international economic crisis. The aim of this paper is to contribute to a discussion on the relationship between foreign exchange rate and ISE 100 and to inform investors about such empirical links. Although the study is limited to seven above-mentioned currencies the models and empirical framework could be easily adjusted for other currencies in the future studies.

2. Literature Review

The past several decades, there has witnessed significant scholar efforts aimed to explore the relationship between ISE indices and foreign exchange rates. This section summarizes these articles.

Erdem, C., Arslan C.K., Erdem M.S. (2005) have studied the relationship between ISE and interest rate, inflation, industrial production, money supply (M1), exchange rate (USD/TL) in the period 1991:1-2004:1 using monthly data. Inflation and interest are found to be the factors affecting the volatility of ISE indices. Money supply (M1) had an effect on the volatility of financial index and foreign exchange rate had an affect on both ISE 100 and industrial index. The study reported no relationship between industrial production and the volatility of any of the indices.

Mumcu (2005) analyzed the relationship between ISE 100 and Treasury bond interest rate, money supply (M2), USD/TL, industrial production index, inflation and gold by using multiple linear regression and Granger causality test. For the period January 1990-December 2004, the most important factor affecting the ISE in descending order are treasury bond interest rate, USD/TL, industrial production index and money supply (M2). No significant relationship between ISE and inflation and gold was found. Granger causality test results showed that Treasury bond interest rates affect ISE 100 and ISE affects USD/TL and Treasury bond interest rates.

Ayvaz (2006) researched the relationship between the stock market and the foreign exchange rates by using time series analysis and monthly data. USD/TL, ISE 100 and sector stock indices were used in this study. In particular, the study features financial, industrial and service sector indices. For the service sector index, data for the period 1997:01-2004:12 were taken from Turkish Federal Bank. All other data is for the period 1991:01-2004:12. Cointegration test results showed the existence of a long term and consistent relationship between USD/TL and ISE 100 index, between USD/TL and financial index, and between USD/TL and industrial index. But, no relationship between USD/TL and service sector index is found. Different from the other studies, this study took into account the sector effects. In similar manner, Akay and Nargeleşkenler (2006) investigated the financial volatility in Turkey by using ISE 100 index closing prices and USD/TL selling prices. For the dollar exchange rate ARCH (2) model and for ISE 100 GARCH(1,2) model were used. By using ISE 100 and USD/TL for volatility estimates the authors reported that the volatility increased during economic crises. In a broader context, results indicated the importance of financial volatility's effect for the economy.

Using monthly data for the period 1986-2003, Kasman (2006) tried to find the effect of industrial production index, money supply (M1), inflation rate, USD/TL and oil prices on

ISE index. Results indicated that the volatility in money supply (M1) explained the volatility in stock market. The volatility in stock market to a large extent explained the volatility in the foreign exchange rate (USD/TL) and inflation rate. Industrial production index and USD/TL had significant effects on the volatility in stock market. Of the total volatility in the stock market, 6 % could be explained by the changes in the macroeconomic indicators used in the study. More recently, Dizdarlar and Derindere (2008) used multiple regression analysis with monthly data for the period 2005:01-2007:12 to study the effect of fourteen macroeconomic variables on ISE 100 index. As opposed to other studies, which predominantly utilize USD/TL, Dizdarlar and Derindere, use a synthetic exchange rate by calculating an arithmetic mean of USD/TL and EUR/TL. Study findings indicate that of the total changes in the ISE 100 index 55% could be explained by the changes in the exchange rate variable. Furthermore, ISE 100 and foreign exchange rate was found to be negatively related.

Pekkaya and Bayramoğlu (2008) researched the causality relationship between YTL/USD, ISE 100 index and S&P 500 index for the period 1990-2007. For this time period, the study reports Granger causality from ISE 100 and S&P 500 indices to foreign exchange rate. The causality relationship between foreign exchange rate and ISE 100 was found to be two-way. S&P 500 index affected the foreign exchange rate and ISE 100 index in one-way and not affected from these variables. According to the results of the Granger causality test after economic crisis, S&P 500 was found to be the affecting one and the exchange rate was found to be the one affected by the indices.

Demireli (2008), analysed the relationship between ISE 100 index and money supply (M2Y), inflation rate, interest rate, foreign exchange rate (USD/TL), and industrial production index. In this research, the author applies unit root test, regression analysis, correlation matrix and VAR model. Foreign exchange rate and volatility were found to be in positive relationship; inflation and volatility were found to be in negative relationship. ISE 100, volatility series were found to be less affected from the industrial production index and M2Y money supply than from the other macroeconomic variables used.

Türsoy, Günsel, Rjoub (2008), tried to empirically test the effect of thirteen macroeconomic variables on eleven portfolios comprised of 174 stocks from ISE industrial index, depending on the arbitrage pricing theory. Monthly data for the period 2001:01-2005:09 were used. The macroeconomic variables used were money supply (M2), industrial production index, crude oil prices, consumer price index, import, export, gold prices, foreign exchange rate, interest rate, GDP, unemployment rate, foreign currency reserves and so called market pressure index, which is defined by the authors as the index of exchange rate pressure on Turkish Lira. Using ordinary least square technique, some differences among the industry sector portfolios were observed. Foreign exchange rate was tested on 6 portfolios in this study.

Aslanoğlu (2008), examined the relationship between ISE 100 index and currency issued (emission volume), exchange rates and interest rates for the period 1999-2003. By using correlation and regression analysis the author reports a significant relationship between the currencies issued (emission volume) and ISE 100 index. The other factors that affected ISE were interest rates and exchange rate. Kandir (2008) also investigated the role of macroeconomic factors in Turkish stock returns for the period July 1997-June 2005. The study is very comprehensive as it relies on a long list of variables that included macroeconomic variables as the growth rate of industrial production index, change in consumer price index, growth rate of narrowly defined money supply, change in exchange rate, interest rate, growth rate of international crude oil price and return on the MSCI World

Equity Index. This study is limited to non-financial firms listed on the ISE. The analysis was based on stock portfolios rather than single stocks. For portfolio construction, four criteria were used: market equity, the book-to market equity, the earnings-to-price equity and the leverage ratio. Multiple regression model was designed to test the relationship between the stock portfolio returns and seven macroeconomic factors. Empirical findings revealed that exchange rate, interest rate and world market return affected all of the portfolio returns, while inflation rate was significant for only three of the twelve portfolios. On the other hand, industrial production, money supply and oil prices did not appear to have any significant effect on stock returns. Although the study does not specify a foreign exchange rate used in the study, it has been identified through communication with authors that it was USD/TL. In fact, the changes in USD/TL had a positive impact on the portfolio returns. Unlike other studies, by constructing different portfolios, the authors were able to take into account the firm specific features.

Using multiple regression method and monthly data for the period 1992-2006, Gençtürk (2009) examined the relationship between ISE and macroeconomic variables, such as treasury bond interest rates, consumer price index (CPI), money supply (M2), industrial production index, USD, gold prices for crisis periods and normal periods. As oppose to other studies, Gençtürk took into account the effect of crisis. Analysis indicated that during economic crisis periods ISE and CPI were significantly negatively related; ISE and M2 were significantly positively related. For the non-crisis periods, ISE was significantly related to all of the variables used in the study. ISE and CPI, gold, M2 were positively related; ISE and industrial production index, USD and Treasury bond interest rate were negatively related.

İpekten, O.B., Aksu,H.(2009) tried to determine both short and long term effects of the changes in Dow Jones index, foreign exchange rate (USD/TL), interest rate and gold on ISE index by bound test approach for the period 1999:01-2011:11. Results of this study indicated that the changes in the foreign stock markets had both short and long term effects on ISE, USD had only long term effects on ISE. In the short term, USD had no significant effect on ISE. Aydemir, O., Demirhan, E. (2009) investigated the causal relationship between stock prices in Turkey and exchange rates using data from 23 February 2001 to 11 January 2008. National 100, services, financials, industrials, and technology indices from Istanbul Stock Exchange were taken as stock price indices. By using different indices, the article attempts to take into account the effects of different sectors. The results of this study indicated that the existence of a bidirectional causal relationship between the exchange rate and all stock market indices. While the negative causality existed from national 100, services, financials and industrials indices to exchange rate, there was a positive causal relationship from technology indices to exchange rate. On the other hand, the authors found a negative causal relationship from exchange rate to all stock market indices. Once again, the study failed to report which exchange rate was used in the study. Upon request via email, the authors informed that the exchange rate used in this study was USD/TL.

Ulaş in 2010 examined the relationship between inflation, exchange rates and ISE. By using three month's closing inflation data, three month's closing US dollar and euro exchange rates and Istanbul Stock Exchange Market's three months' closing market prices in regression model the papers concluded that inflation did not have a significant effect on ISE, while foreign exchange rates had a statistically significant effect on ISE. USD and ISE were negatively related. In a similar vein of research, Büyükşalvarcı (2010) analysed the effects of seven macroeconomic variables (consumer price index, money market interest rate, gold price, industrial production index, oil price, foreign exchange rate and money supply) on ISE 100 index within the arbitrage pricing theory framework. Based on monthly data from

January 2003 to March 2010, the results of the multiple regression analysis indicated that interest rate, industrial production index, oil price, foreign exchange rate (USD/TL) had a negative effect on ISE 100 index returns while money supply positively influenced ISE 100 index returns. On the other hand, inflation rate and gold price did not have a significant effect on ISE 100 index returns.

Literature review indicated that when analysing the relationship between foreign exchange rates and ISE, most studies relied on USD/TL. In just two of the studies Euro/TL was also included in the analysis. The major contribution of the study is the fact that it encompasses in the analysis a significantly larger set of exchange rates. Given increased level of international transactions by Turkish firms, such contribution is quite notable. By using the data from official web sites of Istanbul Stock Exchange and Turkish Central Bank, the paper attempts to explore the research question ‘Do the changes in Euro/TL, GBP/TL, JPY/TL, CHF/TL, USD/TL, CAD/TL, SA/TL and the changes in interest rates affect ISE 100 index?’ As such the study aims to fill the gap in the literature about the effects of different foreign exchange rates on the ISE indices.

3. Data

This study investigates the effects of seven currencies and interest rate on ISE 100 index using an analytical research model. The secondary data used in the research, is obtained from the official web sites of ISE and Central Bank of the Republic of Turkey. I use monthly numbers for the period of 1999:01-2011:11.

The dependent variable is ISE 100 index and the independent variables are as follows:

AUD/TRY: 1 Australian Dollar/Turkish Lira

EUR/TRY: 1 Euro/ Turkish Lira

GBP/TRY: 1 British Pound/ Turkish Lira,

CHF/TRY: 1 Swiss Franc/ Turkish Lira

CAD/TRY: 1 Canadian Dollar/ Turkish Lira

SA/TRY: 1 Saudi Arabia Riyal/ Turkish Lira

JPY/TRY: 100 Japanese Yen/ Turkish Lira

INT: Monthly weighted time deposit rate

ISE 100 index was established in 1986 and it initially consisted of 40 firms’ stocks. Over the years, the number of stocks in the index rose up to 100. ISE 100 consists of selected stocks traded in the national market with the exception of the investment trust securities (Aslanoğlu, 2008). The study focuses on the ISE 100, because it is used as the basic index in the national market and it automatically includes ISE 30 and ISE 50 indices. It also incorporates stocks from several different sectors. The currencies chosen represent different economies in the world from different geographic locations. These currencies belong to the countries Turkey has trade with and are physically used in the foreign trade of Turkey.

The exchange rate data is accessed at the official web site of the Central Bank of the Republic of Turkey (Data, exchange rates, indicative exchange rates, vertical, including missing variables, then report option, as original frequency, constant, original observation).

Interest rate data is also from the official web site of the Central Bank of the Republic of Turkey (vertical, including missing variables, then report option, as original frequency, constant, original observation). Furthermore, ISE 100 index data is from the official web site of Istanbul Stock Exchange (data, index data, price indices, daily/historical, XU 100-ISE 100). The reason for choosing data for the period 1999:01-2011:11 is to cover several recent national and international economic crisis. Data for the dependent and independent variables are continuous. The operational definitions for the dependent and independent variables are as follows:

Table 1 List of variables and descriptions

Variables	Description
ISE 100 Index	End of the month ISE 100 index closing value for the period 1999:01-2011:11
USD/TRY	End of the month, 1 U.S.Dollar/Turkish Lira selling rate of Central Bank of the Republic of Turkey for the period 1999:01-2011:11
EUR/TRY:	End of the month, 1 Euro/Turkish Lira selling rate of Central Bank of the Republic of Turkey for the period 1999:01-2011:11
GBP/TRY:	End of the month, 1 British Pound/Turkish Lira selling rate of Central Bank of the Republic of Turkey for the period 1999:01-2011:11
CHF/TRY:	End of the month, 1 Swiss Franc/Turkish Lira selling rate of Central Bank of the Republic of Turkey for the period 1999:01-2011:11
CAD/TRY:	End of the month, 1 Canadian Dollar/Turkish Lira selling rate of Central Bank of the Republic of Turkey for the period 1999:01-2011:11
SA/TRY:	End of the month, 1 Saudi Arabia Riyal/Turkish Lira selling rate of Central Bank of the Republic of Turkey for the period 1999:01-2011:11
JPY/TRY:	End of the month, 100 Japanese Yen/Turkish Lira selling rate of Central Bank of the Republic of Turkey for the period 1999:01-2011:11
INT:	Monthly weighted time deposit rate for the period 1999:01-2011:11 (The weighted average of the maximum interest rates for deposits the banks have announced by the deposit amounts and the number of days)

The studies investigating the relationship between ISE and the exchange rate mostly used ISE 100 index and USD/TL. The reason for using end of month data for the operational definitions and the selling rates for the exchange rate is to compare the results of this study with the existing literature. The measurement unit for ISE 100 Index is the index value, for the currencies the exchange rate on TL basis, and for the interest rate deposit rate as percentage.

4. Methodology

I investigate the hypothesis the changes in Euro/TL, GBP/TL, JPY/TL, CHF/TL, USD/TL, CAD/TL, SA/TL and the changes in monthly weighted time deposit rate affect ISE 100 index. The hypothesis is modelled as:

$$ISE\ 100 = f(USD/TRY, EUR/TRY, GBP/TRY, CHF/TRY, CAD/TRY, SA/TRY, JPY/TRY, INT)$$

Since the effects of more than one independent and continuous variables on one dependent and continuous variable is investigated in the study, multiple regression analysis is utilized. The multiple regression model formed is as follows:

$$ISE_t = \beta_0 + \beta_1 USD/TRY_t + \beta_2 EUR/TRY_t + \beta_3 GBP/TRY_t + \beta_4 CHF/TRY_t + \beta_5 CAD/TRY_t + \beta_6 SA/TRY_t + \beta_7 JPY/TRY_t + \beta_8 INT_t + \epsilon_t$$

In this equation;

ISE_t : Dependent variable,

β_0 : Constant coefficient,

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8$: Coefficients to be estimated,

$USD/TRY_t, EUR/TRY_t, GBP/TRY_t, CHF/TRY_t, CAD/TRY_t, SA/TRY_t, JPY/TRY_t, INT_t$: Independent variables,

ϵ_t : Error term.

To be able to use this regression model, first of all I investigate the time series properties of data. Time series is achieved by sorting the values of a variable sequentially during a certain period. If a time series is stationary, the mean, variance and covariance of the series do not change over time. If it is not stationary, it has a trend. In such cases, running regular set of regression is likely to lead to a spurious regression. Classical regression models are designed for and assume that variables are stationary. Thus to get correct results, the nonstationary series should be converted to stationary ones when forming regression models.

5. Findings and Conclusion

For time series analysis, firstly we should assess the stationarity of the variables to be used. If the mean and variance of the series do not change over time and if the variance between the two periods is not dependent on the period used for calculations, we conclude that the time series is stationary. In other words, when we reject the null hypothesis of a unit root, there is stationarity. To test the stationarity of the data, I used the Augmented Dickey-Fuller (ADF) unit root test. By the use of ADF, we test the null hypothesis of unit root existence in the series.

$$\Delta Y_t = \alpha + \beta t + \phi * Y_{t-1} \sum_{i=1}^p \pi_i + \delta \Delta Y_{t-1} + e_t$$

If H_0 is rejected, we find out that the variable Y is stationary in its original level; if not it is not stationary in its original level. When the variable is not stationary in its original level, we should take its lagged differences till we reach stationarity. According to unit root tests for each variable, since all the variables are not stationary in their original levels (They have a unit root (I(0))), they become stationary when we take their first differences. The integration level for the series is 1 (I(1)). By taking the logarithmic differences of the daily closing values, we achieved logarithmic series. The stationarity of the Log series is tested by Augmented Dickey Fuller test and we concluded that they are stationary.

Table 2 Arch Analysis

	Coefficient	Std. Error	z-Statistic	Prob.
LNIMKB_1	0.697104	0.056484	12.34154	0.0000**
LNCHF	-0.552398	0.282794	-1.953355	0.0508
LNCAD	1.100361	0.314673	3.496842	0.0005**
LNUSD	2.332700	0.419728	5.557643	0.0000**
LNEUR	0.218673	0.340488	0.642235	0.5207
LNJPY	0.022886	0.024638	0.928882	0.3530
LNGBP	-0.144150	0.137470	-1.048598	0.2944
LNINT	-0.151736	0.050664	-2.994915	0.0027**
LNSA	-2.969293	0.534552	-5.554729	0.0000**
C	0.000198	0.000282	0.701269	0.4831
ARCH(1)	0.079426	0.055423	1.433092	0.1518
GARCH(1)	0.894954	0.065997	13.56052	0.0000
R-squared	0.974187			
Adjusted R-squared	0.972187			
S.E. of regression	0.124697			
Sum squared resid	2.207997			
Log likelihood	125.2142			
Mean dependent var	10.06247			
S.D. dependent var	0.747710			
Akaike info criterion	-1.470314			
Schwarz criterion	-1.233668			
Durbin-Watson stat	1.891229			

p ≤ 0.05 **

According to the results of the analysis, the equation is as follows:

$$\text{LNISE}_t = 0,697104\text{LNISE}_{-1} + 2,3327\text{LNUSD}_t + 0,218673 \text{LNEUR}_t - 0,14415 \text{LNGBP}_t - 0,552398$$

$$\text{LNCHF}_t + 1,100361 \text{LNCAD}_t + 0,022886 \text{LNJPY}_t - 2,969293 \text{LNSA}_t - 0,151736 \text{LNINT}_t$$

The results of the analysis (Table 2) indicate that CAD, SA,USD ve INT variables are statistically significant at 5% level. In other words, Canadian Dollar, Saudi Arabia Riyal, U.S. Dollar and interest rates have significant effects on ISE 100 Index. The coefficients of these variables indicate that Saudi Arabia Riyal and interest rates are negatively related to ISE 100 Index; Canadian Dollar and U.S. Dollar are positively related. The results indicate that the other exchange rates do not have a statistically significant effect on ISE 100 Index. ISE 100 Index is positively related to its previous period values.

Durbin-Watson test shows whether autocorrelation is present in the model. In this model, the result of Durbin-Watson test is close to 2; so there is no autocorrelation. Coefficient of determination (R^2) indicates what percentage of the change in the dependent variable is explained by the independent variables used in the model. In this model, $R^2 = 0.9742$, meaning that 97,42% of the changes in ISE 100 is explained by the independent variables in the model. The unexplained part (2,58%) belongs to the variables not included in the model and is included in the error term.

The positive relationship between Canadian Dollar, U.S. Dollar and ISE 100 supports the traditional approach, whereas the negative relationship between Saudi Arabia Riyal and ISE 100 supports the portfolio approach.

The total amount of import and export of Turkey with Saudi Arabia, Canada and U.S.A. are shown in Table 3. Also, import and export shares of these countries as percentage of the total trade of Turkey are displayed in Table 3.

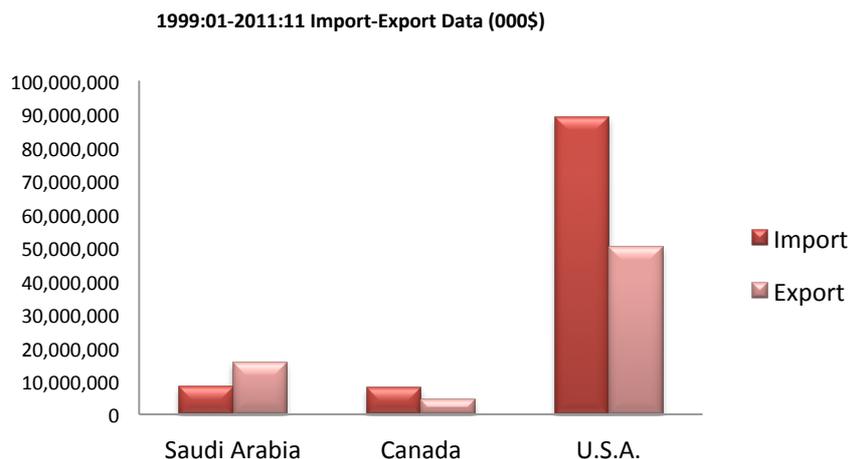


Figure 1.Consolidated import-export data for 1999:01- 2011:11

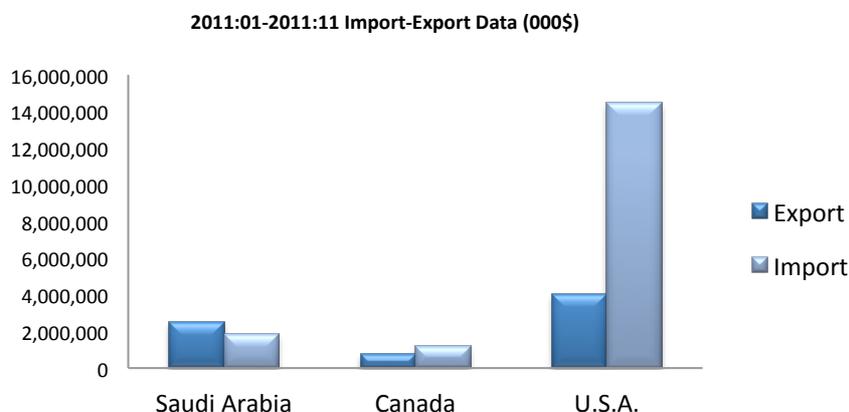


Figure 2. Import-export data for 2011:01-2011:11

In 2011, the total import of Turkey from Saudi Arabia, Canada ve U.S.A. is 220.232.528.000\$, the total export to the mentioned countries is 122.520.213.000\$. For the period of 1999:01-2011:11, the total import of Turkey from Saudi Arabia, Canada ve U.S.A. is 1.530.088.325.000\$, the total export to these countries is 969.013.500.000\$. Both for 2011 and for the period of 1999:01-2011:11, Turkey has mostly import based relationship with these three countries. Thus, ISE 100 might be affected from the changes in the currencies of these countries. In 2011,the import from Saudi Arabia has risen approximately 0,3% compared to the mean of the period of 1999:01-2011:11; the export to Saudi Arabia has risen approximately 0,6% compared to the mean of the period of 1999:01-2011:11. In 2011, the import from U.S.A. has risen approximately 0,7% compared to the mean of the period of 1999:01-2011:11; the export to U.S.A. has risen approximately 2% compared to the mean of the period of 1999:01-2011:11. For Canada, in 2011, the export has risen nearly 0,2% compared to the mean of the period of 1999:01-2011:11 (Table 3).

In this study, I tried to examine the effect of the changes in interest rates and seven exchange rates on ISE 100 index for the period of 1999:01-2011:11. The exchange rates are Euro/TL, British Pound/TL, Japanese Yen/TL, Swiss Franc/TL, Canadian Dollar/TL, Saudi Arabia Riyal/TL, U.S. Dollar/TL. These currencies belong to the countries Turkey has trade with and from different geographic locations and different size of economies in the world.

Table 3. Selected foreign trade data

	2011	%	1999:01-2011:11	%
Import (000\$)				
Saudi Arabia	1,859,670	0.84	8,271,999	0.54
Canada	1,182,506	0.53	7,948,797	0.51
U.S.A.	14,453,090	6.56	89,106,920	5.82
Total	220,232,528		1,530,088,325	
Export (000\$)				
Saudi Arabia	2,483,019	2.02	15,422,073	1.59
Canada	787,590	0.64	4,521,812	0.46
U.S.A.	4,023,854	3.28	50,134,961	5.17
Total	122,502,213		969,013,500	

The results of the empirical analysis indicate that Canadian Dollar, Saudi Arabia Riyal and U.S. Dollar have statistically significant effect on ISE 100 index. The ISE 100 index has a positive relationship with Canadian Dollar and U.S. Dollar, and a negative relationship with Saudi Arabia Riyal and monthly weighted time deposit rate. This implies that Saudi Arabia Riyal and interest (monthly weighted time deposit rate) are alternative investment tools for ISE 100 index. For the period of 1999:01-2011:11, Turkey mostly has an import based relationship with Saudi Arabia, Canada and U.S.A., implying that ISE 100 index is open to the effects of these countries' currencies. The results are informative for individual and corporate investors. By using currencies other than these seven, researchers may conduct further studies to investigate the relationship between other currencies and ISE.

References

- Akay, H.K., Nargeleçekenler, M. 2006. Finansal Piyasa Volatilitesi ve Ekonomi. *Ankara Üniversitesi Siyasal Bilgiler Fakültesi Dergisi* 61:4, 5-36.
- Aslanoğlu, S. 2008. İMKB-100 Endeksi İle Emisyon Hacmi, Döviz Kuru ve Faiz Oranları Arasındaki İlişki: Ampirik Bir Analiz. *Muhasebe ve Finansman Dergisi* 192-204.
- Aydemir, O., Demirhan, E. 2009. The Relationship Between Stock Prices And Exchange Rates Evidence From Turkey. *International Research Journal of Finance and Economics* 23, 207-215.
- Ayvaz, Ö. 2006. Döviz Kuru Ve Hisse Senetleri Fiyatları Arasındaki Nedensellik İlişkisi. *Gazi Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi* 8:2, 1-14.
- Büyükşalvarcı, A. 2010. The Effects of Macroeconomics Variables on Stock Returns: Evidence from Turkey, *European Journal of Social Science* 14:3/4, 404-416.
- Demireli, E. 2008. Etkin Pazar Kuramından Sapmalar: Finansal Anomalileri Etkileyen Makroekonomik Faktörler Üzerine Bir Araştırma. *Ege Akademik Bakış* 8:1.
- Dizdarlar, H.I., Derindere, S. Hisse Senedi Endeksini Etkileyen Faktörler: İMKB 100 Endeksini Etkileyen Makro Ekonomik Göstergeler Üzerine Bir Araştırma. *Yönetim/İstanbul Üniversitesi İşletme Fakültesi İşletme İktisadi Enstitüsü Dergisi* 19:61/2208, 113-124.
- Dornbush R., Fisher S. 1980. Exchange Rates and the Current Account. *American Economic Review* 70, 960-971.
- Erdem, C., Arslan C.K., Erdem M.S. 2005. Effects Of Macroeconomic Variables On Istanbul Stock Exchange Indexes. *Applied Financial Economics* 15, 987-994.

Gençtürk, M. 2009. Finansal Kriz Dönemlerinde Makroekonomik Faktörlerin Hisse Senedi Fiyatlarına Etkisi. *Süleyman Demirel Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi* 14:1, 127-136.

Granger C.W.J., Bwo-Nung H., Yang C., (2000). A Bivariate Causality between Stock Prices and Exchange Rates: Evidence from Recent Asia Flu. *The Quarterly Review of Economics and Finance* 40, 337-354.

İpekten, O.B., Aksu, H. 2009. Alternatif Yabancı Yatırım Araçlarının İMKB İndeksi Üzerine Etkisi. *Atatürk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi* 13:1, 413-423.

Kandır, S.Y. 2008. Macroeconomic Variables, Firm Characteristics and Stock Returns: Evidence From Turkey, *International Research Journal of Finance & Economics* 16, 35-45.

Kırbaş, S.K. 2006. Hisse Senedi Getirilerinin Oynaklığı İle Makroekonomik Değişkenlerin Oynaklığı Arasındaki İlişki. *İMKB Dergisi* 8:32, 1-10.

Mumcu, F. 2005. Hisse Senedi Fiyatlarını Etkileyen Makroekonomik Faktörler: İMKB Üzerine Bir Uygulama. *Yayınlanmış Yüksek Lisans Tezi, Süleyman Demirel Üniversitesi, Sosyal Bilimler Enstitüsü, İşletme Anabilim Dalı.*

Pekkaya, M., Bayramoğlu, F.M. 2008. Hisse Senedi Fiyatları Ve Döviz Kuru Arasındaki Nedensellik İlişkisi: YTL/USD, İMKB 100 ve S&P 500 Üzerine Bir Uygulama. *Muhasebe ve Finansman Dergisi* 163-176.

Sermaye Piyasası ve Borsa Temel Bilgiler Kılavuzu 2001. *İstanbul Menkul Kıymetler Borsası Yayınları*, 16.

Stavarek D. 2005. Linkages between Stock Prices and Exchange Rates in the EU and the United States. *Czech Journal of Economics and Finance* 55:3-4, 141-161.

Türsoy, T., Günsel, N., Rjoub, H. 2008. Macroeconomic Factors, the APT and the Istanbul Stock Market. *International Research Journal of Finance&Economics* 22, 49-57.

Ulaş, S. 2010. Enflasyon ve Döviz Kurunun Hisse Senedi Piyasasına Etkileri, İMKB'de Uygulaması, *Yayınlanmış Yüksek Lisans Tezi, Selçuk Üniversitesi, Sosyal Bilimler Enstitüsü, İktisat Anabilim Dalı, İktisat Bölümü.*