

**ISTANBUL BILGI UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES
DEPARTMENT OF FINANCIAL ECONOMICS**

**THE EFFECT OF TRADE DEFICIT ANNOUNCEMENTS IN
TURKEY ON USD/TRY EXCHANGE RATE**

**YASEMIN GÜLER BÜYÜKYAZICI
113621006**

DISSERTATION ADVISOR: ASST. PROF. SERDA SELİN ÖZTÜRK

December, 2015

**The Effect of Trade Deficit Announcements in Turkey on USD/TRY
Exchange Rate**

Türkiye’de Ticari Açık Duyurularının Dolar/TL Döviz Kuru Üzerine Etkisi

Yasemin Güler Büyükyazıcı

113621006

Tez Danışmanı: Serda Selin Öztürk

Jüri Üyesi: Engin Volkan

Jüri Üyesi: Umut Keskin

Tezin Onaylandığı Tarih: 11.09.2015

Toplam Sayfa Sayısı: 33

Anahtar Kelimeler (Türkçe)

- 1) Gayri Safi Yurtiçi Hasıla
- 2) Döviz Kuru
- 3) Enflasyon
- 4) Ticari Açık
- 5) Kriz

Anahtar Kelimeler (İngilizce)

- 1) Gross Domestic Product
- 2) Exchange Rate
- 3) Inflation
- 4) Trade Deficit
- 5) Crisis

**ISTANBUL BILGI UNIVERSITY
INSTITUTE OF SOCIAL SCIENCES**

**The Effect Of Trade Deficit Announcements In Turkey On Usd/TRY
Exchange Rate**

Yasemin Güler Büyükyazıcı

ISTANBUL DECEMBER 2015

Abstract

Exchange rate policy is considered as one of the powerful tools of economic regulation and the regulation of the external sector in particular. One of the aims of the exchange rate policy could be to affect the trade balance in a certain direction. Many theoretical models suggest that exchange rates are determined using macroeconomic variables such as interest rate, GDP, trade deficit, exchange rate, inflation, foreign and domestic money supplies, price levels, and balance of international payments and also this variables performance will analyse the structure of this ranking pre-crisis, crisis period, and post crisis periods in 2008. Therefore, this paper will first give an outline of what the theoretical connection is between these macroeconomic variables and the exchange rate. Results suggest that the dynamics of the real exchange rate changed significantly after the crisis. Although real interest rate and inflation were significant determinants of exchange rate before the crisis, they are not anymore after the crisis.

Keywords: Interest rate, GDP, Trade deficit, Exchange rate, Inflation, Crisis

Özet

Ekonomik düzenlemelerde kur değışikliđi politikası kayda değeri güçlü araçlardan biridir ve bununla birlikte dış sektör mevzuatının bir parçasıdır. Kur değışikliđi politikası amaçlarından biri dış ticaret dengesini belirli bir yönde etkilemesidir. Bu çalışmada Ticari açık ilanlarının döviz kuru üzerindeki etkisi ; regresyon modeli kullanılarak Türkiye için incelenmiştir. Küresel krizlerin zamanlaması dikkate alınmış olup, Türkiye örneđi üzerinden makroekonomik değışkenlerin Döviz Kuru üzerindeki etkileri hakkında veriler çıkarılmıştır. Döviz kuru krizden sonra anlamlı derecede değışmiştir. Faiz oranı, enflasyon döviz kurunu belirlemede krizden önce anlamlı bir faktör olsa da, krizden sonra değildir.

Anahtar Kelimeler: Tahvil, Gayri safi yurtiçi hasıla, Döviz kuru, Enflasyon oranı, Ticari açık, Kriz

ACKNOWLEDGEMENTS

First and foremost, I would like to express my sincere gratitude to my advisor Serda Selin Öztürk, for her patience, understanding, supervision and invaluable guidance. Her valuable comments helped my study to be far better. I feel indebted to her and also I am thankful for having the chance of working with her.

Very special thanks to my family for all their love and encouragement. I am grateful to my mother, my father, my brother, and lastly my husband Şükrü Büyükyazıcı for his limitless love, patience and support throughout my life. He encouraged me to achieve the end up this study. Their existence is a blessing for me. This thesis is dedicated to them.

I would like to thank my colleagues İbrahim Öz and Bedrettin Taha Deveci for their sincere friendships and continuous supports.

TABLE OF CONTENTS

I.	Introduction.....	1
II.	Literature Review.....	3
III.	Data and Methodology.....	10
	A. Data.....	10
	B. Methodology.....	12
IV.	Results.....	22
V.	Conclusions.....	25
VI.	References.....	26

LIST OF FIGURES

Figure 1: Shows the movements of real exch rate and interest rate during the whole period	20
Figure 2: Shows the movements of real exch rate and log trade balance during the whole period.....	20
Figure 3: Shows the movements of real exch rate and quarterly gdp during the whole period	21
Figure 4: Shows the movements of real exch rate and quarterly inflation during the whole period.....	21

LIST OF TABLES

Table 1: Descriptive Statistics of interest rate, gdp, log trade balance, quarterly inflation and real exchange rate for the whole period.....	14
Table 2: Summary statistics all macroeconomic variables for the pre-crisis period.....	16
Table 3: Summary statistics all macroeconomic variables for the crisis period.....	17
Table 4: Summary statistics all macroeconomic variables for the post-crisis period.....	17
Table 5: Macroeconomic variables correlation coefficients for the whole period.....	18
Table 6: January 2000 through October 2007 for pre-crisis period.....	23
Table 7: January 2000 through December 2014 for full sample period.....	23
Table 8: March 2009 through December 2014 for post crisis period.....	24

I. Introduction

The relationship between real exchange rate and trade balance has extensively been analysed in both theory and empirics. Earlier studies require the sum of the price elasticities of import demand and export supply of a country to be unity for a devaluation to affect trade balance positively (Marshall, 1923; Lerner, 1944). Most studies that examine price elasticities of trade have taken export supply to be infinitely elastic for any single country (Goldstein and Khan, 1978). Some others mention about a lag, stating that changes in the real exchange rate influence trade balance initially negatively but then positively after a certain time period, a theory called as J-curve (Bahmani-Oskooee and Artatrana, 2004). Akbostancı (2002) finds in her study covering the period 1987-2000 that depreciation of the currency improves the Turkish trade balance both in the short and long run.

The traditional approach to imports and exports is that they are imperfect substitutes for domestic goods. Although this approach is valid for imports of most developing countries, the case for exports is quite different. Lall (2000) points out that export structure is path dependent. The usual view for international trade is that quantity of exports is determined by the demand for exportable goods by the rest of the world, thus assuming infinite price elasticity.

Following Goldstein and Khan (1978), in a paper on the determinants of export supply and demand in Greece, Balassa et al. (1989) estimate a simultaneous equation model to assess the responsiveness of export supply and demand to price changes. They perceive the preference between

exporting and supplying the domestic market as a movement along the production possibility frontier caused by incentives. In most models of export supply, domestic (consumers') price index is used to reflect this preference between markets (see Goldstein and Khan, 1978; Khan and Knight, 1988; Care and Saxena, 2003). In a relatively recent paper on the factors determining India's export performance Sharma (2003) explicitly includes domestic demand as a determinant of export supply to reflect the market preference of producers and mention that a raise in domestic demand would decrease export supply.

Holly and Wade (1991) estimate export supply and demand relations for the UK using Goldstein and Khan type of export demand function and an export supply that depends on the attractiveness of export markets relative to domestic for producers and the "capacity of the domestic economy to supply tradables" reflected by differences in export and domestic prices.

Faini (1988) examines the impact of domestic demand pressure on export supply through changes in wages and thus find that Turkey's relatively elastic labor supply dampens the effect of domestic demand. In terms of the significant impact of relative prices on export supply, they suggest to use "an adequate measure" of real effective exchange rate to identify this impact clearly.

The study proceeds as follows, section 2 refers context of the literature, section 3 outlines the methodology, and Section 4 analyzes the data and the results of the analysis. Finally section 5 concludes the study.

II. Literature Review

Turkey has experienced a radical change in her foreign trade strategy in 1980. From this point of view, examining the history of the Turkey's foreign trade within two separate time periods (pre-and post-1980 period) is common place in the literature. In the pre-1980 period, fixed exchange rate regimes and import-substitution policies were prevalent in the Turkish economy. On the other hand, following fixed exchange rates caused an overvaluation of the Turkish lira from time to time. This, in turn, induced Turkey to face balance of payments crisis and to devalue its currency for several times in the pre-1980 period. However, with the stabilization program that came into effect in the January 24th 1980, Turkey left the import-substitution policies for the sake of adopting export-oriented industrialization policies and entered a new era of liberalized foreign trade. The aim of these policies was to support the industrial sectors that Turkey had relatively higher competitive power within the world market. This meant a structural change in Turkey's foreign trade policy. Not only exports would be promoted but also imports would be liberalized to a large extent. In the post-1980 period, the exchange rate policy was also changed in accordance with a more liberalized financial system. These decisions included not only short-term measures for economic stability but also a development strategy that was required to be maintained in the long-term. For this reason, the January 24th decisions were, in general, a turning point for Turkey in terms of economic policies. The literature on the empirical studies of the relationship between exchange rates and foreign trade is rich and varied. Generally, the role of exchange rates in affecting the trade

balance or, more specifically exports and imports is examined empirically in different groups of studies. There is a vast amount of the literature focuses on the direct link between those variables. For now, we attempt to make a brief review studies of this kind in case of Turkey. Kale (2001), in her article, uses quarterly data for the period 1984 :(I)-1996(II) and examines the relationship between the balance of trade, the real exchange rate and domestic and foreign income for the Turkish economy. The results of her cointegration analysis imply that a real depreciation improves the Turkish balance of trade in the long run. She also finds that an increase in the domestic income, in the long run, has an unfavorable effect on the trade balance. This result is in accordance with the postulates of the absorption approach that a rising income increases the demand for imports and weakens the positive impacts on the trade balance. Akbostancı (2002), too, uses the quarterly Turkish data in the period of 1987-2000 and studies the long-run behavior of the trade balance and real exchange rate through cointegration analysis. She also uses the generalized impulse-response analysis in order to estimate the response of trade balance to real exchange rate shocks and thinks that it brings further insight to the short-run dynamics of the trade balance in general (Akbostancı, 2002: 5). Her analysis exhibits a long-run relationship between the trade balance and real exchange rate. The results show that the Marshall-Lerner condition holds for Turkey in the long-run, supporting the idea that a real depreciation of Turkish lira improves the trade balance. A similar study carried out by Şimşek et al. (2007) uses quarterly data for the period 1987(I)-2006(III) and investigates the main factors that affect Turkish trade deficits.

Findings of their cointegration analysis show that there exists a long run relationship between the trade deficits and real effective exchange rates. So they conclude that real effective Exchange rates can be used effectively to reduce Turkish trade deficits in the long-run. Barışık and Demircioğlu (2006), on the other hand, use the monthly data and test the relationships between exports, imports and the exchange rates in Turkey during the 1980-2001 period. The results obtained from Engle-Granger and Johansen cointegration tests confirm the long run relation of these variables. They also apply Granger causality test and conclude that there exists a stronger causality from exchange rates to imports relative to exports. Ata and Arslan (2003), unlike the former studies, use the annual data for the period 1980-2000 and test the relationship between the volume of foreign trade and the exchange rate for Turkey. By employing cointegration and Granger causality test, they find a stable long-run relationship between these two variables. Also, their results indicate that depreciation of Turkish lira positively affects the volume of trade. Similarly, Togan and Berument (2007) consider the annual data for the period 1970-2005 and adopt Johansen's cointegration estimation method in their study. The results show that the trade balance improves following a real depreciation of the domestic currency, as indicated by the Marshall-Lerner condition. So they conclude that current account sustainability for the Turkish economy would require a significant depreciation of the real effective exchange rate (Togan and Berument, 2007: 190). Halicioğlu (2008), on the other hand, uses bilateral data unlike the formers and tests the validity of the Marshall-Lerner condition for Turkey and her 13 trading partners. He applies

a different ARDL-based (Autoregressive Distributed Lag) cointegration procedure, which is also known as bounds testing, upon the data over 1985:(I)-2005:(IV) period. His results provide evidence of a positive response of the trade balance with only two of the trading partners (UK and USA) in the long-run, which in turn support the validity of the Marshall-Lerner condition. Irhan et al. (2011) also apply the same bounds testing methodology for the quarterly data over the period 1990: Q (I) - 2007: Q (III) and try to analyze the determinants of the Turkish trade balance. Their estimation results indicate that real exchange rate depreciations improve the trade balance in a strong and significant way, and that domestic real income affects the trade balance negatively, and so, support the evidence for both the elasticity and absorption approaches. There are also studies which use different econometric procedures other than cointegration but yield similar results. Among them, the study of Arslan and Wijnbergen (1993) rests upon simulation analysis. They investigate the driving forces behind what they call “the Turkish export miracle” in the 1980- 1987 periods. Simulation results suggest that the striking increase in the export growth was mainly due to the sustained depreciation of the Turkish lira resulted from the macroeconomic policies and trade reform of the post-1980 periods. Aydın et al. (2004) estimate the export supply and import demand for the Turkish economy based on the quarterly data covering the period from 1987:(I) to 2003:(IV). They use both single equation and vector auto regression (VAR) frameworks. Their results indicate that imports can be explained to a wide extent by the real exchange rate and the national income. They take it as an indicator of the fact

that the effects of the real exchange rate on trade deficit basically work through the imports. So, they reach the conclusion that a real depreciation of Turkish lira will reduce the size of the trade deficit by decreasing the volume of imports significantly, although it will not induce a large increase in exports. Baldemir and Keskiner (2004) investigate the response of the trade balance to changes in three major macroeconomic variables (i.e. real exchange rate, money supply, real GDP) of the Turkish economy for the period 1987- 2001. Their study is quite different from the others in the sense that it is based on a panel data analysis that investigates bilateral trade between Turkey and her five major trading partners (namely; Germany, Italy, U.K., Holland and U.S.A). They find that the trade balance negatively responds to any increase in the real income while the depreciation of the domestic currency causes a positive response of it. Yazıcı (2008), on the other hand, investigates and compares the response to the exchange rate changes of trade balances of three Turkish sectors; agriculture, manufacturing and mining based on the quarterly data from 1986:(I) to 1998:(III). He employs a polynomial distributed lag model in the analysis. Findings from his sector-based analysis reveal a similar pattern of reaction to the exchange rate change in the short run, however, long-run or overall response of trade balance differs across the sectors; while trade balances of both manufacturing and mining improve in the long run, and agricultural trade balance worsens as a result of domestic-currency depreciation. The second group of studies selected, on the other hand, consists of the examples that yield negative results in terms of the exchange rate – foreign trade relationship. Like the previous studies, most of them are based

on cointegration analysis. The study of Brada et al. (1997), among them, is of particular importance in the sense that they use the quarterly data for the period 1969 :Q1 - 1993 :Q4. From this perspective, like Togan and Berument (2007), they include the pre-1980 data into their analysis and examine the responsiveness of Turkish trade balance to real devaluations both in the pre-1980 and in the post-1980 period. The cointegration results of their standard trade model refer to that for the pre-1980 period, there seems to be no role for the real exchange rate in affecting Turkey's trade balance. However, in the post-1980 period, the real exchange rate, domestic and foreign income have significant impacts on the balance of trade in the long run, reflecting the effect of liberalized trade regime on this relationship. Fidan (2006), similarly, uses a data set from 1970 to 2004 on annual basis and investigate the dynamic interactions of the agricultural export and import, and the real effective exchange rate. He uses the impulse-response functions, Granger's causality as well as Johansen's cointegration for estimation. He finds that the effect of the real effective exchange on the agricultural export and import is quite weak, especially in the short run, compared to the long-run. Similar to the studies of Fidan (2006) and Yazıcı (2008), Albeni et al. (2005) investigate the effects of real exchange rates on the exports of the Turkish manufacturing industry. Based on the monthly data from 1997:Q1 to 2003:Q9, the estimation results of their sectoral analysis indicate that there exists a statistically significant relationship between real exchange rates and the exports only for 8 out of 22 manufacturing sectors.

Karagöz and Doğan (2005) also use monthly data for the period 1995:(1) - 2004:(6) and analyze the relationship of export and import variables with the exchange rate. Their cointegration results point to no econometric relation between the exchange rate and each of these foreign trade variables while the impact of 2001 devaluation on them is found to be significant. Yamak and Korkmaz (2005) attempt to determine the effect of real exchange rate changes on the trade balance with regard to different commodity groups by using the monthly data for the period of 1995:(01)-2004:(04). The results obtained from the Granger causality test suggest no long-run relationship between real exchange rate and trade balance. In addition, they find that in the short-run, a real appreciation of the Turkish lira increases the trade deficit by worsening the trade balances of consumption and capital goods. In a similar study, Gül and Ekinçi (2006) investigate the interactions between the real exchange rates and the export and import by using the monthly Turkish data for the period 1990:(01)-2006:(08). They find a unidirectional causality from the export and import to the real exchange rates. Their findings suggest that the real exchange rate cannot be used as an effective policy tool in trade balance adjustments. In Peker's study (2007), the long run and short run relationship between the trade balance and changes in the real effective exchange rate of Turkey is examined for the period 1992:(I)-2006:(IV) based on the quarterly data. Findings from the cointegration test do not support the empirical validity of the Marshall-Lerner condition, indicating that devaluations do not improve the trade balance in the long run. He also sets up an error-correction model and reports that the short run effects of the real effective exchange rate change

on the trade balance are not significant either. Similarly, Binatli and Sohrabji (2009) use quarterly data from 1999 : (I) to 2008 : (III) And analyze the exchange rate elasticity of Turkish imports and exports by the help of cointegration. They find that the exchange rate elasticity is negative for both exports and imports indicating that depreciation of the Turkish lira will have a negative effect on them. Hepaktan (2009), on the other hand, uses the quarterly data for the period 1980–2008 and test the validity of the Marshall-Lerner condition based on the fractional cointegration analysis. Like Peker (2007), he reports that the Marshall-Lerner condition doesn't work properly for Turkey in the long run. More recently, Yazici and İslam (2011) investigate the short-run and long-run impact of real exchange rate changes on the trade balance of Turkey with 15 European Union (EU) countries. By using the quarterly data for 1982:(I) to 2001:(IV) period and the bounds testing approach to the cointegration, they find that the exchange rate has no significant effect on the trade balance of Turkey with EU (15) while domestic income has significant negative effect on it. Yapraklı (2011), too, employs bounds testing approach and investigate the effects of exchange rate policies on foreign trade deficit of Turkey. Based on the monthly data for the 2001:(III)-2009:(VI) period, their analysis yield no statistically significant effect by real effective exchange rate both in the long run and in the short run.

III. Data and Methodology

A. Data

This research has been carried out in order to investigate the effect of trade deficit announcement in Turkey on USD/TRY exchange rate and this

section summarizes the definition of the data used in this thesis. The data's covering the period from the first quarter of 2000 year to the fourth quarter of 2014. (2000:Q1-2014:Q4).

This data has been collected from the Central Bank of Turkey and Turk Stat. For the calculation of real exchange rate, quarterly CPI values have been obtained from monthly CPI data of Turkey which was taken from OECD Statistics. All series have quarterly data between 2000:Q1-2014:Q4. But real interest rate and real exchange rates are daily data we use the end of the month rate for these variables. After the necessary conversions, we are taking exchange rates as the dollar amount for 1 Turkish liras in to our model.

Real exchange rate = (nominal exchange rate (USD/TRY bid) * (Price Level of US) / (Price Level of Turkey)

We have taken four price indices into account for the econometric estimations. These are; Real Interest Rate (R), Gross Domestic Product (GDP), Trade Balance (TB) and Inflation (I). The difference among the baskets included in the selected indices will reveal a better understanding of underlying dynamics of Real exchange rates.

Real Interest Rate (R) represents that has been adjusted to remove the effects of inflation to reflect the real cost of funds to the borrower, and the real yield to the lender. Nominal Interest rate shows the benchmark bond rate in Turkey.

$Real\ Interest\ Rate = (1 + Nominal\ Interest\ Rate) \div (1 + Inflation\ (Annual)) - 1$

Gross Domestic Product shows that the total market value of all final goods and services produced in a country in a given year, equal to total consumer,

investment and government spending, plus the value of exports, minus the value of imports.

Trade Balance is the calculation of a country's exports minus its imports.

Inflation is an upward movement in the average level of prices.

In Turkey, exports has been less than the imports which is one of the main structural problems of Turkish economy. Trade balance figures takes negative values because of this situation. However, in our model trade balance figures are evaluated in logarithmic scale. We are using the absolute value of the Trade Balance figures because of being compatible with logarithmic scale. With this conversion, in our model trade deficit amount has been added to calculations.

Price levels are based on data from the end of the last quarter of 1999 to the end of 2014. Price level has been determined as 100 for the end of 1999 Q4. Price level of the each quarter has been obtained by product of the price level in previous quarter and CPI of the current quarter. The formula of this operation is below.

$$PriceLevel(t) = PriceLevel(t-1) * CPI(t) \quad \text{Price level of 1999 Q4} = 100$$

B. Methodology

In this study, the effects of all macroeconomic variables (interest rate, gdp, log trade balance, quarterly inflation) are the aim. Firstly, we add FDI (Foreign Direct Investment) variable. But this variable changed the model. If

we add this variable, the model will not be optimal. So this model is optimal for us.

The model used in this study is a simple linear regression analysis based on the ordinary least square method (OLS)

Estimation model for Real Exchange Rate (RER) is as follows:

$$\mathbf{RER = f(R, GDP, LOGTB, QI) -- (I)}$$

Econometrically, the above equation can be stated thus:

$$RER_t = \alpha_0 + \alpha_1 R_t + \alpha_2 GDP_t + \alpha_3 LOGTB_t + \alpha_4 QI_t + \varepsilon_t \text{----- (II)}$$

ε_t Represents the error term at time t

$RER_{(t)}$ - Real Exchange Rate at time t

$R_{(t)}$ - Real interest Rate at time t

$GDP_{(t)}$ - Gross Domestic Product at time t

$LOGTB_{(t)}$ - Logarithmic Trade Balance at time t

$QI_{(t)}$ - Quarter Inflation at time t

In Table 1, the results for the whole period are reported, which are January 2000 through December 2014. The mean and standard deviation have been calculated for each variable taken for the analysis and it is tabulated below for the whole period.

Table 1: Descriptive Statistics of interest rate, gdp, log trade balance, quarterly inflation and real exchange rate for the whole period.

Full Sample Period: January 2000 through December 2014

	R	GDP	LTB	QI	RER
Minimum	-0,193	16,725	7,514	-0,003	0,289
Maximum	0,743	31,805	10,292	0,195	0,791
Average	0,069	24,131	9,315	0,037	0,416
Median	0,058	24,499	9,418	0,023	0,374
Std. Dev	0,122	4,653	0,723	0,038	0,118

The lowest interest rate in the period from 2000:Q1-2014:04 was -0,193 and the highest interest rate was 0,743. The median of the interest rate in this period was 0,058 with a standard deviation of 0,122. Fluctuation on interest rate is at high levels because of the economic crisis. In 2001 high interest rates affected the Turkish economy negatively. As illustrated in the first graph highest levels were observed in the beginning of 2001.

The lowest gdp in the period from 2000:Q1-2014:04 was 15,218 and the highest gdp was 33,530. The median of the gdp in this period was 24,343 with a standard deviation of 4,999. GDP data shows the increasing trend in the all over the period of 2001-2014

The lowest LTB in the period from 2000:Q1-2014:04 was 7,514 and the highest LTB was 10,292. The median of the LTB in this period was 9,418 with a standard deviation of 0,723. Growing economy of Turkey lead to increase in domestic demand and volume of foreign trade. Expanded volume brought higher trade balance deficits. Despite of the high deficit fluctuation is not so high. But decreasing in oil prices is expected to affect trade balance deficit positively.

The lowest QI in the period from 2000:Q1-2014:04 was -0,003 and the highest QI was 0,195. The median of the QI in this period was 0,023 with a standard deviation of 0,038. Turkey succeeded the decrease in inflation rates. Lower inflation lead to low real exchange rates in the environment of more stable economy. Turkey has been one of the riskiest countries, among the emerging economies when coming against the crisis because real interest

rates are still very high despite of the decrease from 2002 to 2014. The reason for the high rate is the dependency to foreign investments.

The lowest RER in the period from 2000:Q1-2014:04 was 0,289 and the highest RER was 0,791. The median of the RER in this period was 0,374 with a standard deviation of 0,118. Real exchange rate figures reached to highest levels in 2001 crisis. After the passing crisis period real exchange rates decreased sharply.

Table 2: Summary statistics all macroeconomic variables for the pre-crisis period.

Pre-Crisis Period: January 2000 through October 2007

	R	GDP	LTB	QI	RER
Min	-0,193	15,218	7,514	0,003	0,310
Max	0,743	27,772	9,778	0,195	0,791
Average	0,112	20,501	8,834	0,053	0,487
Median	0,099	20,035	8,918	0,036	0,446
Std. Dev.	0,156	3,447	0,622	0,047	0,127

Table 3: Summary statistics all macroeconomic variables for the crisis period

Crisis Period: November 2007 through February 2009

	R	GDP	LTB	QI	RER
Min	0,057	20,84	8,390	0,008	0,289
Max	0,107	28,010	9,965	0,040	0,381
Average	0,074	24,58	9,479	0,022	0,324
Median	0,075	24,45	9,683	0,028	0,312
Std.Dev.	0,018	2,243	0,555	0,013	0,034

Table 4: Summary statistics all macroeconomic variables for the post-crisis period

Post-Crisis Period: March 2009 through December 2014

	R	GDP	LTB	QI	RER
Min	-0,015	23,467	9,338	-0,003	0,304
Max	0,048	33,530	10,292	0,057	0,383
Average	0,007	29,086	9,940	0,019	0,347
Median	0,004	29,108	10,002	0,016	0,342
Std. Dev.	0,017	2,560	0,260	0,014	0,023

The correlation coefficient is a measure of how two data series are closely related. In particular, the correlation coefficient measures the direction and extent of linear association between two variables. A correlation coefficient can have a maximum value of 1 and a minimum value of -1. The study found strong relationship between real exchange rates and macroeconomic variables used in the study.

Table 5: Macroeconomic variables correlation coefficients for the whole period

CORRELATION	R	GDP	LTB	QI
RER	0,476	-0,703	-0,849	0,809

We find that, variables are effected both its own values and the others variables occur shocks. The effects of changes inflation and interest rates on exchange rate are more high level. Therefore exchange rate has one of the important factors for stabilization inflation and interest rates. Besides, it is also seen that, the effects of increasing risk premium connected with public debt on interest rates.

The interest rates declined after 2001 economic crisis. Since there was a decline in both interest rates and import prices. The maximum decline is observed in the inflation rate. This is because of the fact that the new government has been making novel arrangements in the economy. The Central Bank of the Republic of Turkey has aimed at a policy which includes price stability and financial stability. When evaluating the situation, according to price stability, one sees that the global price increases resulted in stable inflation declines after 2001.

As a positive effect of the 2001 economic crisis in Turkey that had practiced in a deep crisis environment and has knowledge about dealing with crisis. The floating exchange rate regime, implemented as a precondition for the inflation

targeting regime since 2001, has made a significant contribution to the stability of the Turkish economy. Until the 2008 global crisis, Turkey was almost ready for a global crisis as the Turkish government has fulfilled various stabilization programs. As a result of these problems, Turkey has a better public finance balance and is now more experienced than before the crisis.

Turkey is an emerging economy that has been subject to economic and financial re-engineering process for about two decades in order to secure economic growth and financial stability. Furthermore, this process has been interrupted with substantial crisis. The first important crisis was the 1994 one which was the signal of the forthcoming economic turmoil. Although, an IMF lead stand – by program was followed, the November 2000 and February 2001 crisis were experienced. The conditions of the Turkish economy at that time could be best defined with high regulation, high interest rates, monitored foreign exchange operations, limited foreign asset ownership, and low competition, barriers to foreign investment, insufficient liquidity, chronic inflation and trade deficit.

Figure 1: Shows the movements of real exch rate and interest rate during the whole period

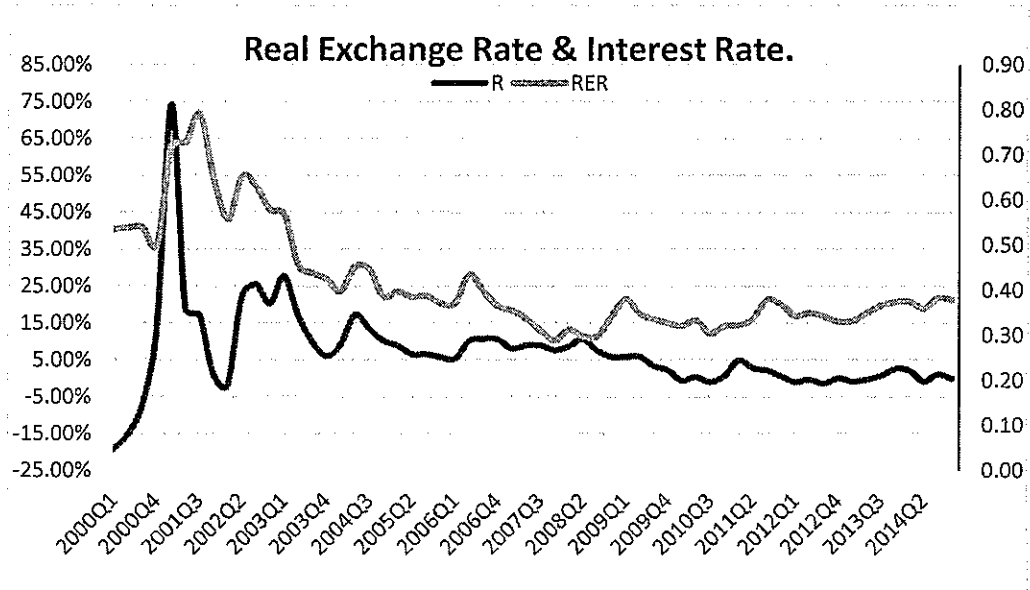


Figure 2: Shows the movements of real exch rate and log trade balance during the whole period

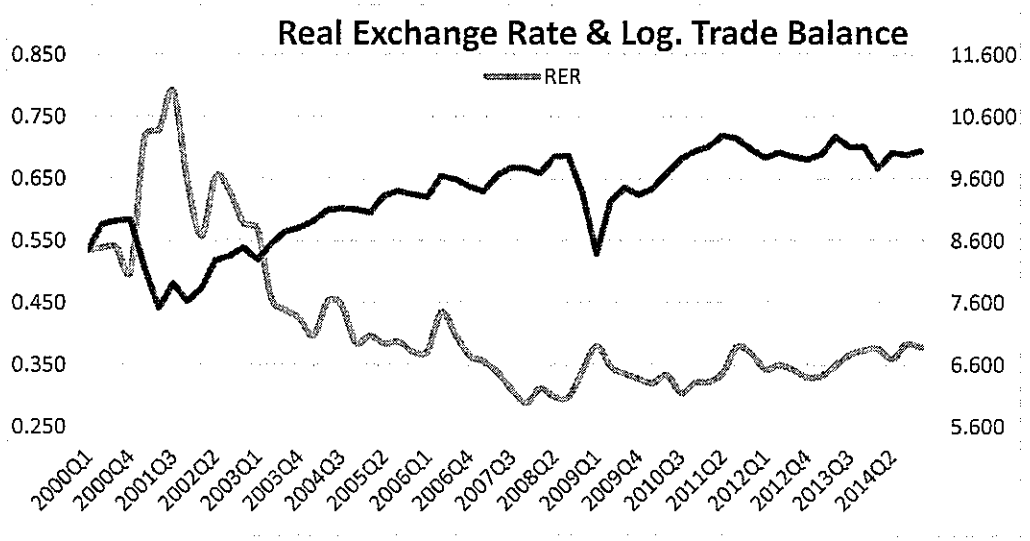


Figure 3: Shows the movements of real exch rate and quarterly gdp during the whole period

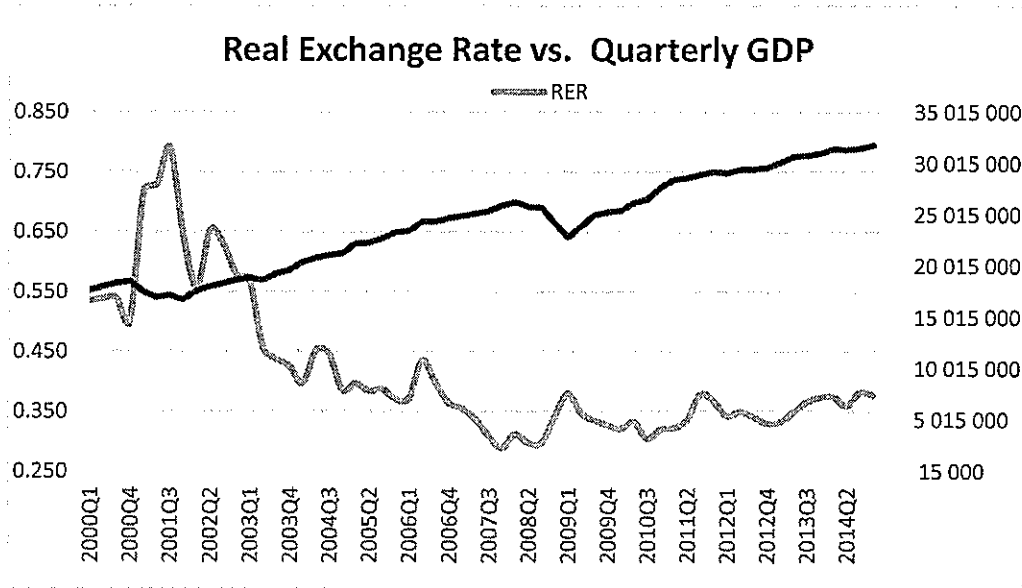
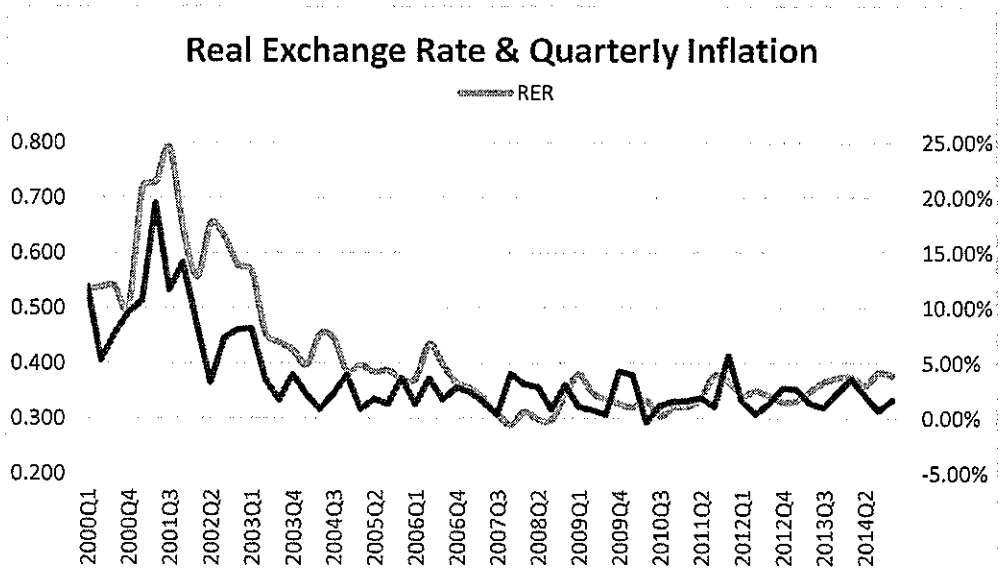


Figure 4: Shows the movements of real exch rate and quarterly inflation during the whole period



IV. Results

Main results of the analysis can be summarized as follows. For the pre-crisis period other than GDP all the variables are significant at 5% significance level. In terms of the significant of the effects they are the same with the whole data results. For real interest rate and trade balance effects are also similar in term of magnitude but for inflation it is 2/3rd of the whole period amount. R^2 is almost the same and around 0,85. Table 6 explains all the results for the pre-crisis period.

All the variables except GDP are significant at 5% but GDP is also significant at 10%. Result suggest that real interest rate, gdp and inflation have positive effect on real exchange rate. When these variables increase, gets more valuable. On the other hand trade balance has as a negative effect which suggests that Turkish Lira gets more valuable when trade balance increases as we expect. Moreover, R^2 shows that these variables explain around 83 percent of real exchange rate. Table 7 explains all the results for the full sample period.

For the post crisis period real interest rate and inflation are insignificant. GDP is significant but has a small positive effect on real exchange rate. The effect of trade balance is less than half of its effect for the pre-crisis and whole data periods .Furthermore R^2 decreases to 0, 48. Table 8 explains all the results for the post crisis period.

Table 6: January 2000 through October 2007 for pre-crisis period

Variable	Pre-crisis		
	Coefficient	Standard error	P-value
c	1,538	0,295	0,000***
R	0,158	0,065	0,022 **
GDP	0,000	0,000	0,577
LTB	-0,133	0,038	0,002 ***
QI	0,858	0,368	0,028 **
R²	0,849		

Note: “***” represents significance at 1% level, “**” represents significance at 5% level and “*” represents significance at 10% level

Table 7: January 2000 through December 2014 for full sample period

Variable	Full sample period		
	Coefficient	Standard error	P-value
c	1,302	0,183	0,000***
R	0,173	0,059	0,005 ***
GDP	0,000	0,000	0,056 *
LTB	-0,117	0,025	0,000 ***
QI	1,204	0,260	0,000 ***
R²	0,829		

Note: “***” represents significance at 1% level, “**” represents significance at 5% level and “*” represents significance at 10% level

Table 8: March 2009 through December 2014 for post crisis period

Variable	Post-crisis		
	Coefficient	Standard error	P-value
c	0,632	0,116	0,000***
R	-0,107	0,144	0,464
GDP	0,000	0,000	0,001 ***
LTB	-0,052	0,016	0,003 ***
QI	-0,030	0,297	0,921
R²	0,475		

Note: “***” represents significance at 1% level, “**” represents significance at 5% level and “*” represents significance at 10% level

Results suggest that the dynamics of the real exchange rate changed significantly after the crisis. Although real interest rate and inflation were significant determinants of exchange rate before the crisis, they are not anymore after the crisis. Furthermore, R^2 also suggests after the crisis there are new determinants of exchange rate which are not included in the made.

V. Conclusions

In this thesis I try to examine macroeconomic variables such as interest rate, GDP, trade deficit, inflation, on exchange rates and also this variables performances analyzed the structure of this ranking pre-crisis, crisis period, and post crisis periods in 2008. Furthermore, by using Regression model I divided the sample period into three sub period's pre crisis, post crisis and whole data. These results suggest that, by analyzing the model based on the subperiods, we gain useful information about the dynamics of the real exchange rate and its significances. These dynamics are different in the pre- and post-crises periods. We also see that which variables are significant on exchange rate before crisis and after the crisis. It is seen that dynamics of the real exchange rate changed after the crisis.

VI. References

- AKBOSTANCI, E. 2002. "Dynamics of the trade balance": *The Turkish J-curve*, ERC Working Papers.
- ARDIC, O P. 2006. "Output, the Real Exchange Rate, and the Crisis in Turkey, Topics in Middle Eastern and North African Economies, MEEA" Online Journal, Volume VIII.
- BAHMANI-OSKOOEE, M. And R. ARTATRANA 2004. "The J-curve a literature review", *Applied Economics*, 36, 1377-1398.
- BALABAN, N. 2009. "Global Economic Crisis and Turkey". *Journal of Ankara*, 40, 124-128.
- BERUMENT, H. and PASAOGULLARI, M. (2003). "Effects of the real exchange rate on output and inflation: evidence from Turkey, *Developing Economies*," 41(4), 401-35.
- BİLGİLİ, E. 2000. "Reel Döviz Kuru ve Ekonomik Büyüme" *İktisat İşletme ve Finans*, 176, 56-73
- CELASUN, O. "The 1994 currency crisis in Turkey, *Macroeconomics and Growth Group*" Development Research Department, World Bank, 1998.
- CİZRE, Ü. YELDAN, E. 2005. "The Turkish Encounter with Neo-liberalism: Economics and Politics in the 2000/2001", *Review of International Political Economy*, 12 (3), 387-408.
- ÇAPOĞLU, G. 2004. "Anatomy of a Failed IMF Program", *Emerging Markets, Finance and Trade*, 40(3), 84-100
- EL-GAMAL, M., İNANOĞLU H. 2005. "Inefficiency and Heterogeneity in Turkish Banking: 1990-2000", *Journal of Applied Econometrics*, 20, 641-664.
- FAINI, R. 1988. "Export Supply, Capacity, and Relative Prices, World Bank, PPR Working Papers", No.WPS 123, Washington.
- GOLDSTEIN, M. and M. S. Khan 1978. "The Supply and Demand for Exports: A Simultaneous Approach, *Review of Economics and Statistics*", 60, pp. 275-286.
- GÜNALP, B, ÇELİK, T. 2006. "Competition in the Turkish Banking Industry", *Applied Economics*, 38 (11), 1335-1342.
- GÜNÇAVDI, Ö. and KÜÇÜKÇİFÇİ, S. 2005, "Financial Reforms and the Decomposition of Economic Growth: An Investigation of the Changing Role of Financial Sector in Turkey", *Review of Middle East Economics and Finance*, 3 (1), 63-86.

GÜNAY, N. and TEKTAŞ, A. 2006. "Efficiency Analysis of the Turkish Banking Sector in Pre-crisis and Crisis Period: A DEA Approach", *Contemporary Economic Policy*, 24 (3), 418-431.

OZATAY, F. 2000. "The 1994 currency crisis in Turkey" *Journal of economic policy reform*

JENKİNS, G. "Government pride and populism threaten to deepen recession in Turkey" *Turkey Analyst*, vol. 2, no. 5, 13th March, 2009.

KAMİN, S., ROGERS J. 2000. "Output and the Real Exchange Rate in Developing Countries: An Application to Mexico" *Journal of Development Economics*, 61, 85-109

KEYDER, N. 2001. "The Aftermath of the Exchange Rate – Based Program and the November 2000 Financial Crisis in Turkey", *Russian and East European Finance and Trade*, 37 (5), 22-44.

KHAN, M. S. and M. D. Knight 1988. "Important Compression and Export Performance in Developing Countries", *Review of Economics and Statistics*, 70, pp. 315-321.

KİPİCİ, A.N., KESRİYELİ M. 1997. "The Real Exchange Rate Definitions and Calculations", *Central Bank of the Republic Of Turkey, Research Department Publication No: 97/1*

LERNER, A. 1944. "The Economics of Control", *Principles of Welfare Economics*, Macmillan, New York.

MARSHALL, A. 1923. "Money, Credit and Commerce", MacMillan, London.

UGURLU, E. 2006. "Reel Döviz Kuru ve Ekonomik Büyüme:" *Türkiye*, Unpublished Msc. Dissertation, Istanbul Technical University

YELDAN, E. 2002. "Behind the 2000/2001 Turkish crisis: Stability, credibility and governance for whom?" *Bilkent University, Department of Economics, Ankara, Turkey*

YILDIRIM, C. 2002. "Evolution of Banking Efficiency with an Unstable Macroeconomic Environment: the Case of the Turkish Commercial Banks", *Applied Economics*, 34, 2289-2301.