AN ECONOMETRIC ANALYSIS ON THE RELATIONSHIP OF ECONOMIC LIBERALIZATION WITH REAL EXCHANGE RATE

Ekonomik Liberalizasyonun Reel Döviz Kuru ile Olan İlişkisine Yönelik Ekonometrik Bir Analiz

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Abstract

The volatility in the real exchange rate may have a negative impact on many macroeconomic variables, primarily interest and inflation. The ability of economic managements to prevent such negative effects is directly proportional to their knowledge of the reasons for the volatility in the real exchange rate. When the literature on the subject is examined, mainly the studies on the relationship between openness and economic growth stand out. However, it is seen that there are not many study that dealing with the relationship between openness and the real exchange rate. Based on this, the aim of the study is to contribute to the literature in this sense by analyzing the effects of Turkey's openness on the real exchange rate. In the study using Autoregressive Distributed Lag (ARDL) time series method, quarterly data between 2004Q1-2018Q4 periods are used. The cointegration test result obtained from the study, taking a higher value than the upper value of the critical value of the F statistic shows that there is a long run cointegration relationship between the variables. The obtained results indicate that the coefficient of Turkey's long run financial and trade openness creates different effects on the real exchange rate. In addition, it is seen that the coefficients of both variables are statistically significant.

Keywords: Economic liberalization, real exchange rate, ARDL boundary test approach

Jel Codes**:** F14; F15; F31;

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Öz

Reel döviz kurundaki oynaklık başta faiz ve enflasyon olmak üzere birçok makroekonomik değişken üzerinde olumsuz etki gösterebilmektedir. Ekonomi yönetimlerinin bu tür olumsuz etkileri önleyebilme kabiliyeti, reel döviz kurundaki oynaklığın nedenleri hakkındaki bilgi birikimleri ile doğru orantılıdır. Konuyla ilgili literatür incelendiğinde ağırlıklı olarak dışa açıklık ve ekonomik büyüme arasındaki ilişkiye yönelik çalışmalar öne çıkmaktadır. Ancak dışa açıklık ile reel döviz kuru arasındaki ilişkiyi ele alan çok fazla çalışma olmadığı görülmektedir. Bundan yola çıkarak hazırlanan çalışmanın amacı, Türkiye'nin dışa açıklığının reel döviz kuru üzerindeki etkilerini analiz ederek literatüre bu anlamda katkı sağlamaktır. Gecikmesi Dağıtılmış Otoregresif Model (ARDL) zaman serisi yönteminin kullanıldığı çalışmada, 2004Q1-2018Q4 dönemleri arası üçer aylık veriler kullanılmıştır. Çalışmadan elde edilen eş bütünleşme testi sonucu, F istatistiğinin kritik değerin üst değerinden daha yüksek bir değer alarak değişkenler arasında uzun dönemli eş bütünleşme ilişkisinin olduğunu göstermiştir. Elde edilen sonuçlar, Türkiye'nin uzun vadeli finansal ve ticari açıklık katsayısının reel döviz kuru üzerinde farklı etkiler oluşturduğunu göstermektedir. Ayrıca her iki değişkenin katsayılarının istatistiksel olarak anlamlı olduğu görülmüştür.

Anahtar Kelimeler: Ekonomik liberilizasyon, reel döviz kuru, ARDL sınır testi yaklaşımı

Jel Kodları: F14; F15; F31;

1. Introduction

In the early 1980s, technological developments in the field of communication resulted in the "Globalization" phenomenon, which has emerged as a result of the expansion of the information and information network. Globalization has spreaded to almost every area of life with its economic, social and cultural dimensions. The concept of 'Globalization', which has a very common usage area, can also be expressed as an economic openness in a broader sense. Economic openness is examined under two subheadings; commercial openness and financial openness (Özcan et al., 2018:61). The commercial liberalization movements increased with the spread of the neo-liberal economic thought during 1980s. Moreover, the financial liberalization policies that have intensified since the 1990s can be seen as the

economic reflections of the increasing globalization movements. In this process, many countries adopted financial openness as an economic policy together with commercial openness, and they made revision in interest and exchange rate policies and diversity in financial instruments. They have also implemented many stimulating arrangements to attract foreign direct capital to their countries (Çeştepe et al., 2018:2).

With the January 24 decisions, Turkey is one of the countries that tried to integrate its economy into the economic globalization process by implementing commercial liberalization policies since the 1980s and financial liberalization since the 1990s. As a result of financial economic crises during 1990s and 2000s, issues like high levels of foreign trade deficits, interest and exchange rate imbalances and rising external debts have emerged. Therefore, the number of studiesfor the impact of commercial liberation on Turkey's economy has increased in the literature. In this context, the aim of the study is to seek answers for the question of which direction and proportion of financial and commercial deficits affect real exchange rate figures in Turkey.

The study consists of a total of five sections after the introduction section. In the first part, theoretical and conceptual analysis on the subject has been carried out. The second section contains literature review by evaluating previous studies which has similar research focus of this study. After the third section includes information on data, model and methodological infrastructure. The empirical application findings were presented in the fourth section. In the last part of the study, the results and recommendations are discussed.

2. Theoretical and Conceptual Framework

The concept of globalization, which is expressed as a process of changing from an isolated world to an integrated world, is defined as a long run shift towards more international cooperation in the exchange of economy, politics, cultural values and information (Makarova et al., 2019:112). Giddens (1990) describes globalization as the condensation of social relations around the world that connect remote localities or local events.

One of the factors that make up the economic dimension of globalization is financial liberalization. Financial liberalization is defined as an integration in financial markets and the removal of barriers to international capital flow. The removal of these obstacles can be expressed in two different ways, narrow and broad. In a narrow sense, financial liberalization is defined as lifting restrictions on market interest rates and leaving the determination of those to be loaned to the functioning of a free market mechanism. In a broad sense, with its narrow meaning, it is expressed as freedom in entering financial markets for all firms that meet the criteria, granting transaction freedom to banks and removing barriers to international capital flow (Özel, 2012:26). The level of financial liberalization of a country is determined by the financial openness indexes generated by data from that country. Although there are different methods, the most frequently used financial openness index is created with the formula [(Gross Private Capital Inflows + Gross Private Capital Outflows) / GDP] x 100 (Aizenman, 2008:373; Buch et al., 2005:754).

One of the important elements that make up the second economic dimension of globalization is commercial liberalization. Commercial liberalization is defined as the liberalization process of international trade by removal of the restrictions and obstacles on both foreign trade of goods and services (Dağdelen, 2004:6). When the literature on the subject is examined, although many different methods are preferred to measure the level of commerical openness, the most popular of these can be said to be the method calculated with the formula [(Export + Import) / GDP] x100. (Alesina and Wacziarg, 1998: 315; Alcala and Ciccone, 2004:613; Aizenman, 2008:373).

One of the most important approaches, which was found as a result of examining theoretical basics of the study, is the Balassa-Samuelson approach developed by Balassa (1964) and Samuelsen (1964). This approach emphasizes the importance of sectoral balance (tradable goods and non-tradable goods) in determining the exchange rate. The study examines long-term exchange rate changes by comparing efficiency between goods traded and non-traded. According to the results of the model, the increase in productivity of traded goods to

non-traded goods may cause an increase on the real exchange rate (Zakaria and Ghauri, 2011:207).

When the approaches to the relationship between financial and commercial openness and real exchange rate are analyzed, it is seen that another economic model related to the subject is the redux model proposed by Obstfeld and Rogoff (1995). Obstfeld and Rogoff (1995) consider a two-country system in which rational expectations, nominal rigidities and monopolistic competition assumptions are valid, with the help of a dynamic general equilibrium model based on micro foundations. The focal point of this model developed by Obstfeld and Rogoff (1995), is the effects of monetary shocks on the real money balance and output level. In a market dominated by flexible prices, a permanent monetary shock does not affect the level of output, it only causes a price increase in the rate of increase in the money supply. That is, increases in money supply have no real effects and do not bring the output level to optimal level. However, if prices are rigid in the short term, monetary policy may have real effects. In case of stiff prices in the short term, the increase in money supply will lead to a decrease in nominal interest rates, and this will lead to an increase in exchange rates (Obstfeld and Rogoff, 1995).

Another model was revealed by the study of Hau (2000). In the first part of his modeling, Hau (2000) examine the effects of different degrees of trade integrations on real exchange changes in the face of monetary and real shocks in a two-country model with nominal wage / price rigidities. The result showed that if two countries imported a larger percentage of their domestic consumption, both monetary and real shocks would have a more limited impact on the real exchange rate. In other words, it has been stated that further integration will lead to more stable real exchange rate volatility. In order to support the theory empirically, the second part used data from 1980 to 2000 to create real effective (trade-weighted) exchange rate volatility measurements for 54 countries. The result showed a strong and negative relationship between trade openness (measured by the share of GDP import) and real effective exchange rate volatility (Hau, 2000).

Another important study on the real exchange rate effects of financial opennes was put forward by Sutherland (1996). In the model created by including the concept of financial market integration in the Redux model, it is stated that increasing financial integration will increase the volatility of both nominal and real exchange rates and reduce the volatility of interest rates. It has been stated that in the event of a product demand shock, financial integration will increase debt levels in response and reduce the volatility in nominal and real exchange rates (Calderon and Kubota, 2018).

3. Literature Review

Different countries and methods were used in studies researching relationship of financial and commercial globalization with exchange rate. It has resulted in different results due to both the methodical (methodological?) differences used and the differences in the economic structures of these countries. When the general literature on the subject is examined, it shows that the increase in the trade openness creates more flexibility in the total price adjustment. It also shows that increases in integration have stabilized by reducing the effect of nominal or real shocks on real exchange rate fluctuations (Obstfeld and Rogoff, 1995, 1996; Hau, 2000). However, some study results show that economic openness has a positive effect on real exchange rate fluctuations, while others have a negative relationship. The summary table of literature, which contains examples of studies carried out both in Turkey and in countries outside Turkey, is given in the table below.

Table 1: Literature Summary

Author(s)	Method	Period	Results
Le (2003)	Panel Data Analysis	1970-1995	The results show that the real exchange rates decreased after the countries followed an outward looking economic policy.
Işık et al. (2005)	Panel Data Analysis	1988-2000	According to the results, it is emphasized that economic openness negatively affects the effect of monetary policy on exchange rates.
Jimoh (2006)	Vector Error Correction Model (VECM)	1960-2000	The results of the study show that the trade liberalization program implemented in Nigeria between 1986 and 1987 resulted in a decrease of approximately 13 percent in the real

			exchange rate. It is also stated that with the liberalization, the real exchange rate has become 17% more sensitive to trade openness.
Zakaria and Ghauri (2011)	Generalized Method of Moments (GMM)	1972-2010 (Q1-Q4)	The results show that Pakistan's trade openness has a statistically significant and positive effect on the real exchange rate, causing the national currency to depreciate.
Yapraklı and Kaplan (2015)	Panel Data Analysis	1995-2013	According to the analysis results, exchange rate volatility; It is negatively affected by the variables of trade openness and financial openness. In addition, it is seen that the effect of trade openness is higher than financial openness on exchange rate volatility.
Nkalu et al. (2016)	Ordinary Least Square (OLS)	1984-2013	It is stated that the trade openness in Nigeria has a positive effect of approximately 59% on the exchange rate volatility.
Kilicarslan (2018)	GARCH Model FMOLS Method	1974-2016	Trade openness increases the real effective exchange rate volatility.
Vogiazas et al. (2018)	Generalized Method of Moments (GMM)	1995-2015	It is stated that openness to trade plays a key role in the real effective exchange rate in both country groups.
Calderon and Kubota (2018)	Ordinary Least Square (OLS) Method and Panel Data Analysis	1975-2005	It is stated that countries that are more integrated into international goods and services markets experience more stable exchange rate fluctuations, and financial openness increases fluctuations in real exchange rates.
Randa et al. (2019)	Simultaneous Equation Model Approach	1970-2017	The results show that the real exchange rates in Indonesia are positively affected by the economic openness, while the real exchange rate in the Philippines has affected the economic openness.

In summary, when the current study results using different countries and methods are analyzed, it can be said that there is a consensus that openness has an effect on real exchange rates. However, it is not possible to talk about a consensus on the direction of change. In this context, it can be stated that openness increases the volatility in the real exchange rate negatively in some countries and positively in some countries, causing different attractions on the economic policies implemented.

4. Econometric application

4.1. Data Set and Model

Quarterly data between 2004Q1-2018Q4 periods is used in the study. A total of three variables are used in the econometric analysis, where Turkey's financial and commercial openness rates are independent and real effective exchange rate data is dependent variable. Although there are different methods for calculating commercial and financial openness ratios, the most preferred financial and trade openness indices are used. These indices are calculated using the formula [(Export + Import) / GDP] x100 for commercial openness (Aizenman, 2008:373; Alesina and Wacziarg, 1998:315) and the [(Gross Private Capital Inflows + Gross Private Capital Outflows) / GDP] x 100 formula for financial openness (Aizenman, 2008:373; Buch et al., 2005:754). Import and export data belonging to Turkey from Turkey Statistical Institute, private capital input and output data from the database of Turkey Central Bank and finally real effective exchange rate data (RER) was obtained from the database of the American Central Bank (FRED). All the data used in the study were included in the analysis with their logarithmic forms, and model estimates were made through the equations given below.

$$LNRER_{Ef_t} = \alpha_0 + \alpha_1 LNFIN_{Open_t} + \alpha_2 LNTRD_{Open_t} + \varepsilon_t \quad (1)$$

$LNRER_{Ef}$ shows real effective exchange rate changes figures in Turkey, $LNFIN_{Open}$, financial openness rates belonging to Turkey, $LNTRD_{Open}$, commercial openness rates belonging to Turkey. α_1 and α_2 symbolize the elasticity coefficients of financial openness and commercial openness, respectively, and ε_t symbolizes the term error.

The increase in the real effective exchange rate will mean an increase in value of the Turkish Lira, while the decline in the real effective exchange rate means impairment in Turkish Lira (The Central Bank of Republic of Turkey, 2017).

4.2. Methodology and Empirical Findings

4.2.1. Unit Root Analysis

Long run deterministic tendency and problems with heteroscedasticity make it difficult to work with a number of data. In case of working with such data, spurious regression problem may be encountered. For this reason, determining the stationarity levels of these series before they are included in the analysis is important for the reliability of the Works (Ukav, 2018:605-617). Therefore, Augmented Dickey Fuller (ADF) and Phillips Perron (PP) unit root tests are applied to all series primarily in the study. With the unit root test, 'the series are not stationary' null hypothesis has been tested against 'the series are stationary' alternative hypothesis. The ADF test, put forward by Dickey and Fuller in 1979, is estimated by the following modellings (Vergil and Erdoğan, 2009:35-57).

Model 1: No intercept and no trend

$$\Delta Y_t = \forall \Delta Y_{t-1} + \sum_{i=1}^{P} \alpha_i \, \Delta Y_{t-1} + \mu_t \qquad (2)$$

Model 2: Intercept and no trend

$$\Delta Y_t = \alpha_0 + \forall \Delta Y_{t-1} + \sum_{i=1}^{P} \alpha_i \, \Delta Y_{t-1} + \mu_t \qquad (3)$$

Model 3: Intercept and trend

$$\Delta Y_t = \alpha_0 + \alpha_1 \mathrm{t} + \forall \Delta Y_{t-1} + \sum_{i=1}^{P} \alpha_i \, \Delta \mathrm{X}_{t-i} + \mu_t \qquad (4)$$

The ADF unit root test results, which enable the non-stationary null hypothesis to be tested against the alternative hypothesis where it is stationary, are compared with the critical values in the table developed by MacKinnon. Lower value than those critical values achieved means that null hypothesis cannot be rejected, which means that the series are not stationary. Otherwise, it is decided that the null hypothesis is rejected and the alternative hypothesis is accepted, in other words, the series are stationary.

Considering the autoregressive and moving average elements, in ADF unit root test may have different problems related to error terms and fixed variance that are not related to each other. In Philips and Perron (1988) unit root test, heteroscedasticity and serial correlation are present (Kızılkaya, Sofuoğlu and Çoban, 2016:265). Considering all of these factors, Philips-Perron (PP) test is applied to all series along with ADF test in order to reach accurate and reliable results as a result of unit root tests.

4.2.2. ARDL Cointegration Test

In the second stage, ARDL Boundary Test Approach is implemented in order to test the cointegration relationship between the variables passing the stationarity test. With this test, the null hypothesis 'there is no co-integration between the series' has been tested against the alternative hypothesis 'there is a co-integration between the series'. ARDL Boundary Test Approach has become a frequently preferred test in the cointegration analysis in last period studies. This approach is an approach that allows the cointegration test if all of the series are stationary at the first differences or level values, except for the second differences. Also, in this approach, even though some series are stationary in their level values and others are stationary at their first differences (mixed structure), does not constitute an obstacle to the realization of the cointegration test and provides a significant advantage (Ümit, 2016:265). The cointegration test is estimated with the help of equation number (5) given below.

$$\Delta LNRER_{Ef_t} = \gamma_0 + \sum_{i=1}^{p} \gamma_{1i}\, \Delta LNRER_{Ef_{t-1}} + \sum_{i=0}^{p} \gamma_{2i}\, \Delta LNFIN_{Open_{t-1}} + \sum_{i=0}^{p} \gamma_{3i}$$
$$\Delta LNTRD_{Open_{t-1}} + \gamma_4\, RER_{EF_{t-1}} + \gamma_5\, FIN_{Open_{t-1}} + \gamma_6\, TRD_{Open_{t-1}} + \mu_t \qquad (5)$$

In model 5, which is adapted to the study and shows the long run cointegration relationship, Δ shows the first differences of the series and p is the lag length. In addition, RER_{Ef_t} symbolizes dependent variables and other variables symbolize independent variables. The hypothesis equations made compatible with the study are given below;

$H_0: \gamma_4 = \gamma_5 = \gamma_6 = 0$ (No cointegration)

$H_0: \gamma_4 \neq \gamma_5 \neq \gamma_6 \neq 0$ (There is cointegration)

The obtained F value is compared with the table values produced in Peseran et al. (2001), the fact that the obtained value is lower than the table value means that the zero hypothesis cannot be rejected because there is no cointegration relationship between the series. Alternative tests are applied if it takes a value between the lower and upper values in the table. But if it takes a value higher than the upper value the null hypothesis is rejected by providing evidence that there is a cointegration relationship (Narayan and Smyth, 2004:332-342).

4.2.3. ARDL Model Estimations

After seeing the long run cointegration relationship, the ARDL model estimate, which is not similar to the cointegration test and whose lag lengths are determined independently, is estimated by the equation shown below.

$$LNRER_{Ef_t} = \beta_0 + \sum_{i=1}^{p} \beta_{1i}\ LNRER_{Ef_{t-1}} + \sum_{i=0}^{r} \beta_{2i}\ \Delta LNFIN_{Open_{t-1}} + \sum_{i=0}^{s} \beta_{3i} + \Delta LNTRD_{Open_{t-1}} + \mu_t \quad (6)$$

In equation (6), the maximum lag length has determined at 8 (quarterly data). While LNRER refers to the dependent variable, all other variables symbolize the independent variables, p, r and s lag lengths. Serial correlation, which is of great importance in terms of the robust and reliable model infrastructure, whether there are modeling error, heteroscedasticity and the normal distribution of error terms were tested with Breusch-Godfrey, Ramsey Reset, Breusch-Pagan-Godfrey and Jarque-Bera diagnostic tests, respectively. The determination of the structural breaks of the model or in other words, whether the parameters have a stable structure is investigated with the help of Cusum and Cusum Square tests.

4.2.4. Error Correction Model

After the model prediction stage, Error Correction Model is established to determine short run relationships between the series. In addition, the Error Correction Term (ECT) coefficient obtained as a result of the residues formed after the model estimation is determined with the help of the model in question. The sign of the coefficient in

question is expected to be negative and statistically significant. This coefficient is an important indicator in terms of showing how much the short run incompatibilities in the model have reached the balance over the long run (Bulut, 2017:23). The Error Correction Model using the first differences of the series and showing the short run relationship between these series is estimated by the following equations.

$$\Delta LNRER_{Ef_t} = \theta_0 + \sum_{i=1}^{p} \theta_{1i} \Delta LNRER_{Ef_{t-1}} + \sum_{i=0}^{r} \theta_{2i} \Delta LNFIN_{Open_{t-1}} + \sum_{i=0}^{s} \theta_{3i} + \Delta LNTRD_{Open_{t-1}} + \vartheta ECT_{t-1} + \mu_t \quad (7)$$

LNRER, exchange rate variable of Turkey, LNFIN, while financial openness variable and LNTRD, represents the commerical openness variable. The Δ symbol shows the first difference of the series. While μ_t symbolizes the error term, ECT shows the Error Correction Term. The symbol ϑ represents the Error Correction Term coefficient, and the value of this coefficient is expected to be statistically significant and the sign of the coefficient is negative.

4.3. Empirical Evidence

The ADF and PP unit root test results performed are shown in the table 2 below;

Table 2: Result of the Unit Root Test

Variables	**ADF(I(0))**		**Phillips-Perron (I(0))**	
	Intercept	Intercept/Trend	Intercept	Intercept/Trend
FIN_{Open}	-3.22**	-3.37*	-4.63***	-4.74***
TRD_{Open}	-1.81	-0.20	-1.72	-1,02
RER_{Ef}	-0.42	-1.45	-0.49	-1.41
Variables	ADF(1(1))		Phillips-Perron (1(1))	
	Intercept	Intercept/Trend	Intercept	Intercept/Trend
FIN_{Open}	-	-	-	-
TRD_{Open}	-3.07**	-3.84**	-11.26***	-12.04***
RER_{Ef}	-7.11***	-7.51***	-7.11***	-8.20***
Significance Level	Critical Values		Critical Values	
	Intercept	Intercept/Trend	Intercept	Intercept/Trend
1%	-3.52	-4.08	-3.52	-4.07
5%	-2.90	-3.47	-2.90	-3.47
10%	-2.59	-3.16	-2.59	-3.16

Note: Note: (***), (**) and (*) indicate 1%, 5% and 10% significance level, respectively.

According to the unit root analysis results obtained; Both the PP test and the ADF test show that, financial openness series are stationary in the level values (I(0)). All other variables become stationary when their first differences (I(I)) are taken. It has been observed that there is a mixed structure in the stationarity levels of the series, so it is concluded that the long run cointegration relationship between the series can be tested with the ARDL Boundary Test Approach. The results of the cointegration test performed are given in Table 3.

Table 3: ARDL Boundary Test Results (F Test and Critical Values)

k	F Statistic	Critical Values (%1)	Critical Values (%5)
2	4.99**	I(0)-I(I)	I(0)-I(I)
		4.13-5	3.1-3.87

Note: (**) indicates 5% significance level.

When the F statistic value is compared with the lower and upper critical values at the level of 5% significance, it is seen that the obtained value is above the upper critical values. This result implies strong evidence that there is a long run cointegration relationship between the series, meaning that the null hypothesis is rejected which has indicated that there is no cointegration. After the unit root and long run cointegration tests, the model estimation results in which the maximum lag length is determined as 8 (Quarterly data) is given in the table number 4.

Table 4: ARDL(1,8,1) Model Estimation Results

Variable	Coefficient	t-Statistic
$\mathrm{RER}_{\mathrm{Ef}}(-1)$	0.83***	11,21
$\mathrm{FIN}_{\mathrm{Open}}$	0.003	0.18
$\mathrm{FIN}_{\mathrm{Open}}(-1)$	0.07***	3.50
$\mathrm{FIN}_{\mathrm{Open}}(-2)$	-0.01	-0.58
$\mathrm{FIN}_{\mathrm{Open}}(-3)$	0.003	0.16
$\mathrm{FIN}_{\mathrm{Open}}(-4)$	0.02	0.87
$\mathrm{FIN}_{\mathrm{Open}}(-5)$	-0.02	-0.92
$\mathrm{FIN}_{\mathrm{Open}}(-6)$	-0.0004	-0.02
$\mathrm{FIN}_{\mathrm{Open}}(-7)$	0.10***	4.46
$\mathrm{FIN}_{\mathrm{Open}}(-8)$	0.05**	2.53
$\mathrm{TRD}_{\mathrm{Open}}$	0.12	1.47
$\mathrm{TRD}_{\mathrm{Open}}(-1)$	-0.31***	-4.08
C	0.42***	2,83

Note: (***) and (**) indicate 1% and 5% significance level, respectively

According to the ARDL Model estimation results, where optimum lag lengths (1.8.1) is determined, It has been observed that the variables representing the exchange rate, financial openness and trade openness are statistically significant in the first lagged value. When the diagnostic test results are examined, which are important for the robust and reliable model infrastructure, it is seen that all the obtained statistical values are higher than 0.05%. These results that are given in Table 5 provide important evidence that there are no diagnostic problems such as serial correlation, modeling error, heteroscedasticity and normal distribution.

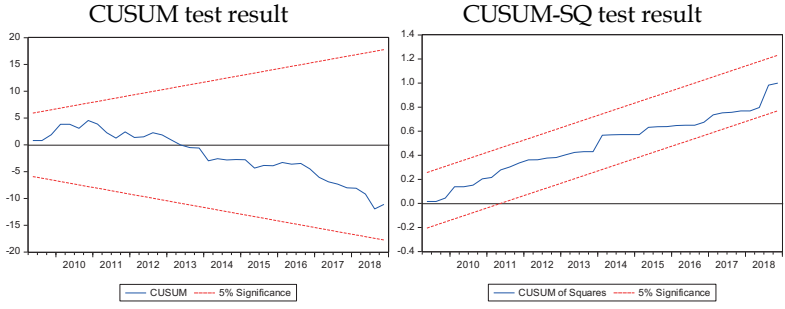
Table 5. Results of Diagnostic Tests

Diagnostic Tests	Statistic	Probability
R-squared	0.92	-
Adjusted R-squared	0.89	-
Prob(F-statistic)	0,000	-
Breusch –Godfrey Serial Corelation Test	1.12	0.34
Ramsey Reset Test	2.47	0.10
Jarque- Bera Normality Test	0.08	0.96
Breusch –Pagan Godfrey Heteroskedasticity Test	1.56	0.14

The determination of the structural breaks of the model or in other words, whether the parameters have a stable structure is investigated with the CUSUM and CUSUM Squares tests. Both the CUSUM test and the CUSUM of square test show that there is no

structural break in the model. This result has shown that the parameters of the model have a stable structure. The graphs showing the CUSUM and CUSUM of square test results are given below.

Figure 1. ARDL CUSUM and CUSUM-SQ Graphs



In the next stage, Error Correction Model is established in order to determine the short run relationships between the series, and the estimation results are given in table 6.

Table 6: Error Correction Model Coefficient Estimation Results

Variable	Coefficient	t-Statistic
$D(FIN_{open})$	0.003	0.19
$D(FIN_{Open}(-1))$	-0.13***	-3.30
$D(FIN_{Open}(-2))$	-0.15***	-4.11
$D(FIN_{Open}(-3))$	-0.14***	-4.11
$D(FIN_{Open}(-4))$	-0.13***	-3.88
$D(FIN_{Open}(-5))$	-0.14***	-5.15
$D(FIN_{Open}(-6))$	-0.15***	-5.65
$D(FIN_{Open}(-7))$	-0.05**	-2.67
$D(TRD_{Open}(-1))$	0.12	1.62
$ECM(-1)$	-0.17***	-4.64

Note: (***) and (**) indicate 1% and 5% significance level, respectively

The error correction model results show that changing Turkey's level of commercial outward openness in the short run does not have a statistically significant effect on the real effective exchange rate. It is observed that the change in the level of financial openness has been seen to have a statistically significant and negative effect on the real effective exchange rate in all lags except for the level value. In other

words, the increase in Turkey's financial outward opening in the short term leads to a decrease in the Turkish Lira and an increase in the real exchange rate. Error Correction Coefficient is important in terms of showing at what rate of short run incompatibilities have reached balance in the long run. The Error Correction Term (ECT) coefficient sign obtained from model based residues is found negative, and it is statistically significant. This results show that approximately 17% of the shocks occurring in the short run in model came to balance in the next period (after one quarter period).

Table 7: Long Run Coefficient Estimation Results

Variable	Coefficient	t-Statistic
$D(FIN_{Glob})$	1.18***	2.79
$D(TRD_{Glob})$	-1.15*	-1.90
C	2.47***	4.96

Note: (***) and (*) indicate 1%and 10% significance level, respectively.

In the last stage of the study, the long-term coefficient and statistics is examined. The results show that the trade openness variable has a statistically significant and negative effect on the real effective exchange rate in the long run. According to this result, a 1% increase in Turkey's trade outward opennes leads to a loss of 1.15% in the value of the Turkish Lira or a 1.15% increase in the real exchange rate. The variable in financial outward openness has a statistically significant on the real effective exchange rate in the long run, but this time it has been seen to have a positive effect. According to this result, a 1% increase in Turkey's financial outward opennes leads to a 1.18% increase in the value of the Turkish Lira or a 1.18% depreciation in the real exchange rate.

5. Conclusion and Recommendations

In the study, the effects of liberalism on the real effective exchange rate in the commercial and financial sphere between 2004 and 2018 periods in Turkey is examined. The short run coefficient findings obtained from the study shows that, Turkey's level of commercial outward openness has no statistically significant effect on the real effective exchange rate. The level of financial outward openness causes the Turkish Lira to fall in the short run and the real exchange rate to rise. This result is statistically significant and supports short run results from the study carried out by Obstfeld and Rogoff (1995).

The findings of the long run coefficient of commercial and financial outward openness obtained vary. The long run results of the commercial openness coefficient have shown that a 1% increase in Turkey's trade deficit has led to a loss of 1.15% in the Turkish Lira, leading to an increase in the real exchange rate. This result supports some similar study results in the summary of the literature (Balassa and Samuelsen, 1964; Zakaria and Ghauri, 2011; Nkalu et al., 2016). When the reasons for this result are taken into consideration within the scope of the study, it is necessary to take a look at the characteristic structure in the volume of foreign trade in Turkey. When the volume of foreign trade in Turkey is examined, it is seen that imports are more than continuous exports over the years. One of the most important reasons for this is that increasing exports and imports due to the importation of intermediate goods belonging to many products. On the other hand, the increasing incomes cause the goods that cannot be met from domestic markets to be imported intensively. Therefore, the increase in imports compared to exports causes intense foreign exchange outflow and it is thought that there is volatility in real exchange rates due to the foreign exchange shortage. In addition, ıt is thought that the emphasis on domestic production of imported goods may prevent volatility that may occur in real exchange rates.

The findings of the short-term financial outward openness coefficient obtained from the study show that the level of financial outward openness causes decrease in the value of the Turkish Lira in the short term, and an increase in the real exchange. The fact that short

run speculative capital inflows and outflows in the past caused many macro economic imbalances in Turkey as a result of foreign exchange crises supports the results of the short run financial outward openness coefficient obtained. It is thought that this result also once again demonstrates the need for capital markets in Turkey to be put on solid foundations against speculative capital inflows.

The long run results of the financial outward openness coefficient have shown that the 1% increase in Turkey's financial outward opennes led to a 1.18% increase in the Turkish Lira, leading to a decrease in the real foreign exchange rate. This result supports some similar study results in the summary of the literature (Sutherland, 1996; Yapraklı and Kaplan 2015; Calderon and Kubota 2018). With this result, it is thought that long-term capital inflows in Turkey, rather than short-term capital inflows, can cause a more stable exchange rate volatility by balancing real exchange rate increases caused by commercial opennes.

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