TESTING J-CURVE EFFECT ON TRADE BALANCE IN TURKISH ECONOMY[1]

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Abstract

This study researches the effects of changes in the exchange rate on the trade balance after the transition to the floating exchange rate in the Turkish economy. For this purpose, ARDL and ECM models have been developed by using quarterly data from 2003 through 2018. The starting point of the research is to examine the validity of the J-Curve theory in the Turkish economy. According to the results of the analysis of the main model used in the study, there is no J-Curve effect on the trade balance in the related period. The results state that the effect of changes in exchange rates on the foreign trade balance is limited. The main reason for that is the high usage of imported intermediate goods and inputs in production. The results of analysis show that the fundamental structural problem of Turkey's economy is the usage of imported intermediate goods and inputs. Therefore, the effect of the exchange rate on trade balance differs from theoretical expectations. The main policy result of the study is that foreign trade balance might be improved by increasing the usage of domestic intermediate goods and inputs in production.

Keywords: Trade Flows, Real Effective Exchange Rate, ARDL model, Cointegration

JEL Classification: C32, F31, F41

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1. Introduction

The diversity of needs has led people and countries to establish exchange relationships with each other. Countries trade among each other for various reasons. Foreign trade is divided into two parts: Import and export. Communities market what they produce and import what they do not have an advantage in producing. The concepts of export and import are two critical determinants of a national economy. The main factor which affects imports and exports is the change in the exchange rates. In other words, it shows the price of the currency of one country in terms of the other countries' currency, where the trade is performed accordingly. In addition, the exchange rate also affects overall macroeconomic stability in an economy.

Different factors have an impact on foreign trade deficits. Changes in import and export of the country determine the trade deficit. These changes are also related to imported and exported goods and service prices. These prices fluctuate as a result of a change in exchange rates. Trade balance problems affect multiple macroeconomic variables within the economic system. Especially for developing countries, it is essential to keep the foreign trade balance under control because the balance in trade reflects not only the countries' trade among each other, but also it is an indicator that reflects the reputation of the countries' financial terms.

Emerging economies should reduce their trade deficits in order to have a balanced and sustainable economic growth. This study examines the relationship between the exchange rate and foreign trade in Turkey. We investigate the effects of exchange rate changes on the trade balance.

When the Turkish economy switched to a floating exchange rate system, exchange rates affected the trade balance. Thus, we studied the impact on the Turkish economy case. At the same time, we investigate the J-Curve effect on foreign trade balance.

The scope of this study is to examine the main determinants of the trade balance in the Turkish economy after introducing the floating exchange rate regime. In the second part, we present a literature review. The third part describes the data set, the methodology, and gives empirical results. The final section concludes the study with some policy notes.

2. Literature Review

Bahmani-Oskooee et al. (2015) explain the short and long-term effects of currency depreciation in trade balance and the J-curve effect for trade relations among U.S. and her six trade partners. The analysis estimates the nonlinear ARDL model using quarterly data over the period 1971 to 2013. The result of analysis shows the J-curve effect support in five trade partners. Non-linear approach shows us that in most cases the effects of exchange rate changes are asymmetric.

Yeshineh (2016) researches the short and long-run relationships of trade balance in Ethiopia. The analysis is estimated using the ARDL approach of co-integration and error correction model using annual data for the period 1970 to 2011. The result shows that exchange rate depreciation is positively related to the trade balance in the short and long-term. The results show that exchange rate play a faint role in determining the behaviour of the trade balance in Ethiopia. Balance of budget, income and money supply have a strongest impact on the trade balance.

Nusair (2017) reveals the J-curve phenomenon for 16 European transition economies (Bulgaria, Croatia, Czech Republic, Macedonia, Hungary, Poland, Romania, Slovakia, Slovenia, Estonia, Latvia, Lithuania, Armenia, Georgia, Russia, and Ukraine). The analysis estimates the linear and nonlinear ARDL model using quarterly data over the period 1994 to 2015. The result of the analysis shows that when the linear ARDL model is used, they do not find evidence for the J-curve phenomenon. Besides, when the nonlinear ARDL model is used, they find support for the J-curve phenomenon for Armenia, Bulgaria, Croatia, Hungary, Georgia, Poland, Romania, Russia, Slovakia, Slovenia, the Czech Republic, and Ukraine.

Nazlioglu and Erdem (2011) explore the role of exchange rate on bilateral trade balance on Turkey's fresh fruits and vegetables with 14 trading partners (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, The Netherlands, Portugal, Spain, Sweden, and United Kingdom) in the European Union. The study is estimated by the method of ARDL and employs quarterly data over the period 1995:1 to 2007:2. As a result of the study, there is an evidence of the J-curve effect in two cases (Belgium and France) in the short run. In the long run, the exchange rate has a positive impact on the trade balance in 7 out of 14 cases (Belgium, Denmark, France, Greece, Italy, Sweden, and the United Kingdom).

Okay, Baytar and Saridoğan (2012) analyze the effects of the real effective exchange rate on the trade balance for Turkish economy. The study is estimated by using the VEC model and they employ monthly data over the period 2003:1 to 2010:12. As a consequence of the analysis, the real effective exchange rate negatively affects the current account balance in the long term. Furthermore, according to the impulse response function is determined that there exists a J-Curve effect on Turkey's economy.

Cambazoğlu and Karaalp (2012) examine the trends in Turkey’s terms of trade over the thirty years. The analysis estimates Vector Auto-Regression (VAR) model using monthly data over the period from 1982 to 2011. The result of the investigation finds that the Prebisch-Singer thesis is not valid for Turkey and Turkish exports are affected by imports, which indicates the import dependency of Turkish exports.

Bal and Demiral (2012) mention the short- and long-term relationship between Turkey and Germany, with bilateral trade in the real trade balance with the euro exchange rate. The analysis uses the co-integration test and the VEC model. They employ the monthly data from 2001:1 to 2012:9 periods. The conclusion states that the J-Curve effect occurs for the trade between Turkey and Germany.

Ari and Cergibozan (2017) review the determinants of the trade balance in the Turkish economy. The study uses the Vector Error Correction model. They apply quarterly data over the period 1987:1 to 2015:2. The outcome of the study shows that an increase in the real effective exchange rate improves the trade balance in the long-run, while it does not affect the trade balance in the short-run. Besides, an increase in domestic and foreign income has negative effects on the trade balance. The results find that the J-Curve effect does not occur in the Turkish economy.

This study differs from others because we calculate the foreign GDP as a weighted index comprising the major trading partners with a trading volume of the Turkish economy.

3. Empirical Analysis

Long-term analyses are required to understand how variables affect each other in the economy. The variables we use for these analyses are non-stationary and follow the trends. However, the variables must be stationary due to the basic principles of the time series. We consider a more recent econometric approach ARDL (Autoregressive Distributed Lags) model to set up our model regardless of the stationarity of the variables.

The ARDL model includes both lags of independent variables and the dependent variable. In its general form, with p lags of y and q lags of x, an ARDL (p, q) model can be written as (Hill *et al.,* 2011) below:

$$y_t = \delta + \theta_1 y_{t-1} + \cdots + \theta_p y_{t-p} + \delta_0 x_t + \delta_1 x_{t-1} + \cdots + \delta_q x_{t-q} + v_t$$

The ARDL bounds testing approach was developed by Pesaran et al. (2001). ARDL model is used to determine the long-term relationships between variables. Thus, this approach can test the existence of the co-integration relationship between the series with different degrees of stationarity. In other words, the main advantage of the ARDL bounds test is that it can be applied regardless of whether the variables included in the analysis are I (0) or I (1). Another advantage of this model is that it uses the unrestricted error correction model (UECM) and can provide statistically more reliable results than standard co-integration tests. Narayan and Smyth (2005) mentioned that the UECM is likely to have better statistical properties than the two-step Engle–Granger method because, unlike the Engle–Granger method, the UECM does not push the short-run dynamics into the residual terms. The applicability of the ARDL model to small sampling studies is more reliable than that of Engle-Granger and Johansen co-integration tests. This model helps to catch long and short-term causality relations (Pesaran et al., 2001; Narayan and Smyth, 2005).

The ARDL boundary test approach consists of three phases. In the first stage, the long-term relationship between the variables included in the analysis is tested. In the case of a co-integration relationship between these variables, long and short-term elasticity are obtained in the following stages, respectively. In the first stage of the ARDL boundary test approach, UECM is created. The value "p" in the model refers to the appropriate lag length. The appropriate lag length is determined by considering the Schwartz Bayesian Criterion (SBC) and Akaike Information Criteria (AIC) for the long-term ARDL model. After determining lag length in the ARDL boundary test approach, the existence of a co-integration relationship between variables. The second step is taken by rejecting the basic hypothesis as a result of the F test. In the following section, this model is estimated by the OLS technique. In the third and final phase, the ARDL model is estimated for the short-term relationship between the variables. The error correction term variable in the model is the previous value of the residual series obtained from the long-term ARDL model. The coefficient for this variable shows how long the imbalance in the short term can be corrected in the long term (Narayan and Narayan, 2005). The empirical equation below is developed to analyse the determinants of the trade balance:

$$TB_t = \alpha + \beta_1.REER_t + \beta_2.GDP_t^h + \beta_3 GDP_t^f + u_t \quad (1)$$

where *TB* is trade balance, *REER* is real effective exchange rate, GDP_t^h is domestic output, and GDP_t^f is foreign output. α is constant and β_1, β_2, and β_3 are estimated elasticities of trade balance to real effective exchange rate, domestic output, and foreign output respectively. u_t is the disturbance term.

ARDL model discriminates between dependent and explanatory variables. The specified model of the trade balance for Eq. (1) can be written as the error correction representation of ARDL model:

$$\begin{aligned}\Delta TB_t = \alpha_0 &+ \sum_{i=1}^{\rho_1}(\beta_{1,i}.\Delta TB_{t-i}) + \sum_{j=0}^{\rho_2}(\beta_{2,j}.\Delta REER_{t-j}) \\ &+ \sum_{k=0}^{\rho_3}(\beta_{3,j}.\Delta GDP_{t-k}^h) + \sum_{l=0}^{\rho_4}(\beta_{4,l}\Delta GDP_{t-l}^f) + \lambda_1.TB_{t-1} \\ &+ \lambda_2 REER_{t-1} + \lambda_3.GDP_{t-1}^h + \lambda_4.GDP_{t-1}^f + \eta_t\end{aligned} \quad (2)$$

where Δ is the first difference operator. α_0 is the intercept (drift component), and η_t is the error term. *i,j,k,l* are lag orders for the relevant variables. λ_i's are long-term coefficients. The null hypothesis in the Eq. (2) is $\lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = 0$. It states that there is no long-run relationship in the model.

For the estimation, we use quarterly data for the period of 2003Q1-2018Q4. Table 1 presents dataset used in the estimation of the model.

Table 1

Definitions and Sources of Variables

Name	Variable	Definition	Data Source
TB	Trade Balance	The ratio of Turkey's export value to import value.	Federal Reserve Bank of St. Louis
REER	Real Effective Exchange Rate	The weighted geometric average of the prices in Turkey relative to the prices of its 45 trade partners.	Federal Reserve Bank of St. Louis
GDP^h	Gross Domestic Production for Home Country	Turkey's real gross domestic product index.	Federal Reserve Bank of St. Louis
GDP^f	Gross Domestic Production for Foreign Countries	The sum of real GDP indices of 23 trading partners after each of index is multiplied by their respective percentage of volume in trading with Turkey (USA, UK, Japan, Germany, Italy, France, Greece, Spain, Switzerland, Poland, Sweden, Belgium, Netherland, Czech Republic, Austria, Hungary, Romania, Bulgaria, China, Russia, India, Korea, and Israel).	Federal Reserve Bank of St. Louis and Central Bank of the Republic of Turkey

Note: GDP^f was calculated by the authors. Quarterly GDP data is only available for these 23 countries.

Table 2 presents descriptive statistics of the series used in the model. Natural logarithms of all variables are taken. LNTB, LNRER, LNGDPH, and LNGPF are logarithms of the trade balance, real effective exchange rate, domestic output, and foreign output, respectively.

Table 2

Descriptive Statistics of Variable Series

	LNTB	LNRER	LNGDPF	LNGDPH
Mean	-0.412244	4.650815	4.719379	4.351220
Median	-0.426094	4.670130	4.700726	4.321899
Maximum	-0.099500	4.849840	5.020745	4.748520
Minimum	-0.604647	4.134686	4.422449	3.904379
Std. Dev.	0.089276	0.125246	0.179971	0.245044
Skewness	0.806411	-1.467853	-0.013703	0.025465

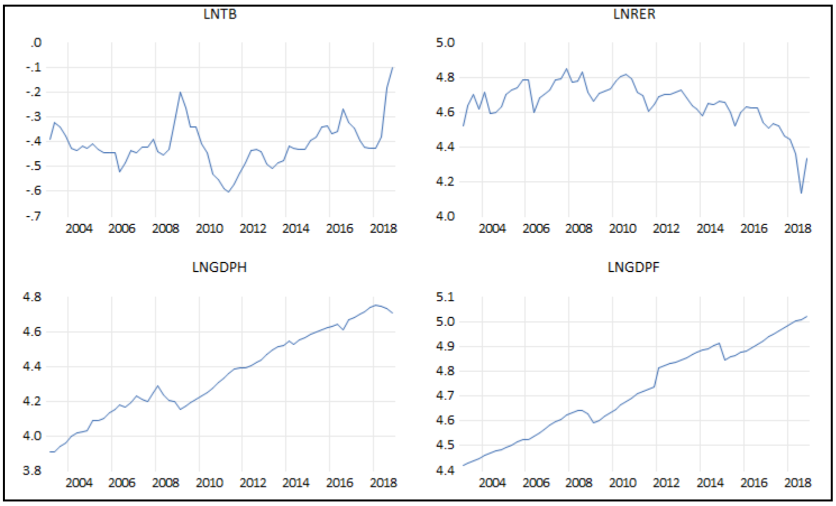
	LNTB	LNRER	LNGDPF	LNGDPH
Kurtosis	5.006999	6.533359	1.666241	1.856891
Jarque-Bera	17.67797	56.27465	4.745769	3.491442
Probability	0.000145	0.000000	0.093211	0.174519
Sum	-26.38362	297.6521	302.0403	278.4781
Sum Sq. Dev.	0.502126	0.988251	2.040533	3.782949
Observations	64	64	64	64

Source: Authors' calculations by using Eviews 10.5.

Figure 1 shows the graphs of the variables used in the study. According to the figure, foreign GDP and domestic GDP follow an upward trend depending on the economic growth process. The trade balance and the real effective exchange rate fluctuates.

Figure 1

Graph of Series Level



Source: Eviews 10.5; authors' calculations.

Before starting the analysis, we employ some unit root tests to ensure that the variables are not integrated order of I(2). These tests are Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP). The results of the tests are reported in Table 3 and Table 4.

All variables are converted into logarithmic form, and "Δ" shows their first difference. Table 3 and table 4 show LNGDPF, LNGDPH, LNRER, and LNTB variables are stationary in the first-difference, the order of integration of LNGDPF, LNGDPH, LNRER, and LNTB are I(1).

Table 3

Augmented Dickey-Fuller (ADF) test results

Augmented Dickey-Fuller (ADF) Test					
	t-statistic	**Prob.**	**1%**	**5%**	**%10**
Δ LNGDPF	-7.071924***	0.0000	-4.113017	-3.483970	-3.170071
Δ LNGDPH	-6.760955***	0.0000	-4.113017	-3.483970	-3.170071
Δ LNRER	-4.692241***	0.0021	-4.137279	-3.495295	-3.176618
Δ LNTB	-5.551309***	0.0001	-4.113017	-3.483970	-3.170071

*Note: ***, ** and * show significance level respectively 1%, 5%, and 10%*
Source: Eviews 10.5; authors' estimations

Table 4

Phillips-Perron (PP) test results

Phillips-Perron (PP) Test					
	t-statistic	**Prob.**	**1%**	**5%**	**10%**
Δ LNGDPF	-7.071924***	0.0000	-4.113017	-3.483970	-3.170071
Δ LNGDPH	-6.737547***	0.0000	-4.113017	-3.483970	-3.170071
Δ LNRER	-11.36251***	0.0000	-4.113017	-3.483970	-3.170071
Δ LNTB	-5.531480***	0.0001	-4.113017	-3.483970	-3.170071

*Note: ***, ** and * show significance level respectively 1%, 5%, and 10%.*
Source: Eviews 10.5; authors' calculations

In Table 5, we calculated F-statistic value (14.33828) is greater than the 10%, 5%, 2.5%, and 1% significance levels. So, the null hypothesis is rejected. It is found that there is a co-integration relationship between the variables. Therefore, it is possible to state that there is a long-term relationship among the LNTB, LNRER, LNGDPH and LNGDPF.

Table 5

F-Bounds test statistic

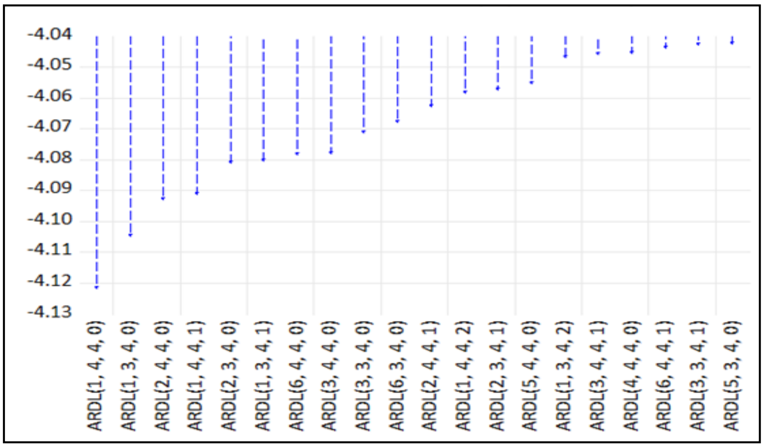
F-Bounds Test Statistic	**Value**	**Significance level**	**I(0)**	**I(1)**
		Asymptotic: n=1000		
F-statistic	14.33828	10%	2.37	3.2
k	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66

Source: Eviews 10.5; authors' calculations

Figure 2 shows the optimal model of ARDL for the Akaike Information Criteria. The first step of the ARDL model is the determination of the appropriate lag length. At this stage, variables are tested with different lag combinations and the model that gives the lowest value according to the information criteria is selected as the appropriate model. In this study, the optimal lag length was determined as 4 considering the minimum (AIC) value.

Figure 2

Model selection criteria (AIC)



Source: Eviews 10.5; authors' calculations

We estimated the ARDL model, and we used Akaike Information Criteria for optimal lag length. The model's maximum lag order is 4. ARDL (1, 4, 4, 0) is shown the optimal lag length select based on (AIC). ARDL model explains the co-integration relationship between variables.

Table 6

Autoregressive Distributed Lags (ARDL) model estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNTB(-1)	0.430037***	0.058755	7.319183	0.0000
LNRER	-0.146183*	0.076154	-1.919573	0.0610
LNRER(-1)	-0.062564**	0.029703	-2.106325	0.0405
LNRER(-2)	0.026420	0.116265	0.227244	0.8212
LNRER(-3)	-0.114210	0.079584	-1.435078	0.1579
LNRER(-4)	-0.121575**	0.059931	-2.028580	0.0482
LNGDPH	-0.928500***	0.139525	-6.654708	0.0000
LNGDPH(-1)	-0.269015	0.164767	-1.632698	0.1092

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNGDPH(-2)	0.030138	0.148404	0.203083	0.8399
LNGDPH(-3)	0.655353***	0.144028	4.550181	0.0000
LNGDPH(-4)	0.635530***	0.130795	4.858964	0.0000
LNGDPF	-0.231300**	0.090627	-2.552227	0.0140
C	0.925527	0.252178	9.230528	0.0000

R-squared	0.906512	**Mean dependent var**	-0.415820
Adjusted R-squared	0.027774	**S.D. dependent var**	0.090837
S.E. of regression	0.036256	**Akaike info criterion**	-4.140293
Sum squared residuals	137.2088	**Schwarz criterion**	-3.962797
Log likelihood	48.67486	**Hannan-Quinn criterion**	-3.962797
F-statistic	0.000000	**Durbin-Watson stat**	1.737171

*Note: ***, ** and * shows significance level respectively 1%, 5%, and 10%.*
Source: Eviews 10.5; authors' calculations

In Table 6, LNTB is the dependent variable, and LNRER, LNGDPH, and LNGDPF are explanatory variables. Our model accounts for approximately 90% of trade balance performance. The real effective exchange rate, gross domestic product for Turkey, and gross domestic product for foreigners explain 90% of Turkey's trade balance.

When we look at the long-term effects, the trade balance increases by 0.43% with a one-quarter lag enhance the trade balance by 1%, which is significant at 10%, 5%, and 1% significance level. The effect of a rise of 1% in the real effective exchange rate on the trade balance is 0.14%, which is significant at a 10% significance level. After one quarter, its effect reduces to 0.06%, which is significant at 10% and 5% significance levels. In the fourth quarter, its effect is 0.12%, which is significant at 10% and 5 % significance levels. When domestic GDP increases by 1%, the trade balance reduces by 0.92%, which is significant at 10%, 5%, and 1% significance levels. After the third quarter lag, raise by 1% in domestic GDP increase the trade balance by 0.65%, which is significant at 10%, 5%, and 1% significance levels. In the fourth quarter, the rise in domestic GDP increases the trade balance by 0.63%, which is significant at 10%, 5%, and 1% significance levels.

According to the results of the ARDL model, domestic income has a significant effect on trade balance when compared to other variables. The effect of domestic income on the trade balance is changing from negative to positive over time. The effect of the real effective exchange rate on the trade balance keeps negative over time. This means that the J-Curve does not occur. In other words, the effect of the real effective exchange rate on trade balance does not turn into positive over time. The foreign GDP has no long-term impact on the trade balance.

In this method defined a dynamic relationship between variables I (0), which involve a cointegrating relationship known as the short-term error correction model. The error correction model (ECM) is a consistent method for combining long and short-term effects. We derive the short-term dynamic parameter from the error correction model (ECM) estimation, which is related to the long-term estimation.

The most appropriate step in determining the ARDL model is short-term dynamics. In order to determine the short-term dynamics, it is necessary to determine the parameters of the error correction model. Conditional error correction model, including short term dynamics:

$$\Delta Y_t = \delta + \beta e_{t-1} + \sum_{i=1}^{p} \theta \Delta Y_{t-1} + \sum_{i=0}^{q} \delta_1 \Delta X_{t-i} + u_t \quad (3)$$

The "e_{t-1}" in the Eq. (3) is a term lag of the error term derived from the long-term equation, and this variable is called the error correction term. For the error correction model to succeed, the coefficient of error correction term must be negative. Besides, this coefficient should be statistically significant. As a result, a negative error correction term indicates how long it will take to correct the deviation in the long-term relationship between variables.

Table 7.

Error Correction Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Δ LNRER	-0.146183***	0.053568	-2.728942	0.0089
Δ LNRER(-1)	0.209364***	0.077697	2.694624	0.0097
Δ LNRER(-2)	0.235785***	0.073210	3.220646	0.0023
Δ LNRER(-3)	0.121575*	0.070137	1.733388	0.0896
Δ LNGDPH	-0.928500***	0.166627	-5.572312	0.0000

Δ LNGDPH(-1)	-1.321021***	0.196958	-6.707124	0.0000
Δ LNGDPH(-2)	-1.290883***	0.214653	-6.013821	0.0000
Δ LNGDPH(-3)	-0.635530***	0.215353	-2.951103	0.0049
CointEq(-1)*	-0.569963***	0.064622	-8.820022	0.0000
R-squared	0.758423	**Mean dependent var**	0.004641	
Adjusted R-squared	0.720529	**S.D. dependent var**	0.050435	
S.E. of regression	0.026663	**Akaike info criterion**	-4.273626	
Sum squared resid.	0.036256	**Schwarz criterion**	-3.959475	
Log likelihood	137.2088	**Hannan-Quinn crit.**	-4.150744	
Durbin-Watson stat	1.737171			

*Note: ***, ** and * shows significance level respectively 1%, 5%, and 10%.*
Source: Eviews 10.5; authors' calculations

Table 7 shows the estimate of the short-run coefficients of the ARDL model. In the short-run, Turkey's real income has a negative and significant impact on Turkey's trade balance with a one, two, and three-quarter lag. The real effective exchange has a positive and significant impact on Turkey's trade balance with a one, two, and three-quarter lag.

The error correction term has a negative sign and is statistically significant. It means that the deviations from the balance are eliminated in the long term. The estimated value of this coefficient is -0.569963; this shows the speed of adjustment from the short-run towards the long-run. The speed of adjustment after one period is 56.9% and it will take two quarters to reach new equilibrium.

When we look at the effects in the short term, all variables except the third quarter lag of the real effective exchange rate are statistically significant at 10%, 5%, and 1% level. The third quarter lag of the real effective exchange rate is significant at the 10% level.

In the short run, a 1% increase in the real effective exchange rate reduces the trade balance by 0.14%. The effect of the real effective exchange rate on the trade balance 0.20% after a one-quarter lag. After two and three-quarter lag, the trade balance enhances by 0.23%, and by 0.12 % respectively. When domestic GDP increases by 1%, the trade balance reduces by 0.92%. The effects of raise in domestic GDP on the trade balance are 1.32% for one-quarter lag, 1.29% for two-quarter lag, and 0.63% for three-quarter lag.

Table 8

Diagnostic Results for the Model

	F-statistic	Prob.
Serial Correlation	0.893199	0.4763
Heteroskedasticity	2.180515	0.0287

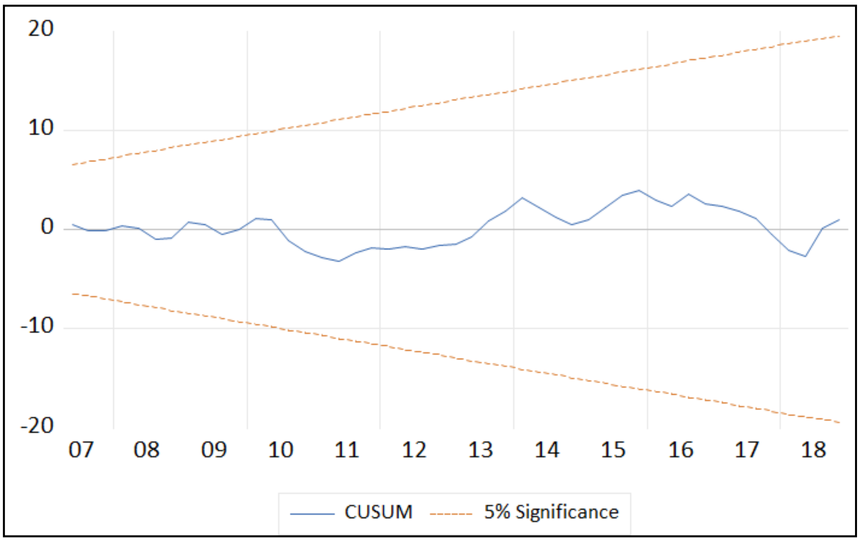
Source: Eviews 10.5; authors' calculations

Table 8 provides the diagnostic test results of the estimated ARDL (1, 4, 4, 0) model. Accordingly, in the estimated model, there is no serial correlation problem. Because, model calculating by the Newey-West HAC Consistent Covariance, the damage caused by estimating the variances made by the heterogeneity in the model can be eliminated with White's Heterostic-consistent variance estimates.

In Figure 3 and Figure 4, CUSUM and CUSUMSQ graphs are used to determine whether the estimated ARDL model has structural break of variables, using the squares of reversible error terms and thus investigating the structural break of variables.

Figure 3

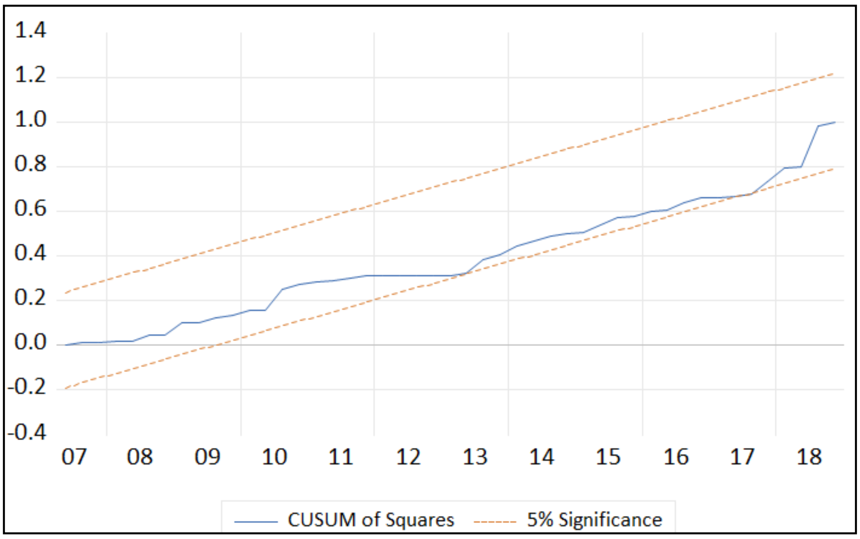
Graph of Cumulative Sum



Source: Eviews 10.5; authors' calculations

Figure 4

Graph of Cumulative sum of Squares



Source: Eviews 10.5; authors' calculations

If the CUSUM and CUSUMSQ statistics remain within critical bounds at a 5% significance level, the null hypothesis that the coefficient in the ARDL model is stable will be accepted. If the CUSUM plots are out of bounds, the null hypothesis, defending the stability of the coefficients, will have to be rejected.

When the CUSUM and CUSUMSQ graphs are examined, it shows that there is no structural break in the series.

4.Conclusion

This study aims to examine the validity of the J-Curve hypothesis using a reduced form trade balance model for Turkey. ARDL model was employed to examine the short-run and the long-run responses of the trade balance to the real effective exchange rate, domestic production, and income of foreign trade partners. Unlike previous studies, we developed a new weighted index to define foreign GDP more realistically.

The results of the error correction model show that the trade balance has negative relationship with the real effective exchange rate and domestic GDP in the short run. The results of the ARDL model show that the trade balance has a negative relationship with the real effective exchange rate, domestic GDP, and foreign GDP in the long run.

The effect of the exchange rate on trade balance differs from theoretical expectations. The most important reason for that is the heavy dependency of the Turkish economy on imported intermediate goods and inputs (oil and natural gas). The rising imports of intermediate goods and inputs seem to be main driver of economic growth in Turkey. Therefore, the high growth rates are always associated with rising current account deficits.

The main policy implication of the findings of the study is that Turkey should find a better way to improve the trade balance, particularly decreasing its manufacturing sector's heavy reliance on imports. Obviously, that requires the adoption and implementation of new growth policy basically should depend on increasing the productivity of its resources.

The study can be improved as a future research by investigating the bilateral relationship between the current account deficit and exchange.

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