



## DETERMINANTS OF JORDAN-TURKISH BILATERAL TRADE BALANCE

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### ABSTRACT

**Purpose** - This paper explores empirically the determinants of the bilateral trade balance for Jordan-Turkish economy, and the impact of the free trade agreement between Jordan and Turkey on the Jordanian-Turkish trade balance.

**Methodology** - The study used Autoregressive Distribution Lag (ARDL) model to estimate the long run relationship between Jordanian- Turkish bilateral trade balance and its determinants during the period from 1978 until 2017.

**Findings** - The result of the analysis found that the real effective exchange rate has a positive effect on the trade balance in the long run, and negative effect on the trade balance in the short run, while the relative money supply and relative GDP have a weak effect on the trade balance in the short and long run. Also, the result points out that the impact of the free trade agreement is insignificant on the trade balance in the long run, which supports the position of the Jordanian government, which has revoked the work in this agreement.

**Conclusion** - The most important policy implication to be concluded from these empirical findings is that devaluation of Jordan Dinar against Turkish Lira can be used to accomplish an improvement in the trade balance of Jordan against Turkey. However, increasing the relative money supply or relative income will not achieve the desired goal.

**Keywords:** Trade balance, free trade, ARDL, Jordan, Turkey.

**JEL Codes:** F14, F53.

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### 1. INTRODUCTION

In order to stimulate the economy and encourage economic development, Jordan sought to liberalize its markets to open up to the regional and international economies. In order to achieve this, it signed a number of agreements with various countries, particularly those with larger economies.

At the end of 2009, Jordan signed a free trade agreement with Turkey and entered into force in 2011. The agreement includes the framework for the development of bilateral trade relations between Jordan and Turkey through the establishment of a free trade zone, which includes customs duties, quotas, anti-dumping and anti-monopoly.

In 2018, the Jordanian government announced that the free trade Agreement with Turkey did not achieve the desired results, but on the contrary, contributed to the increase in trade balance deficit for the Turkish side, and the failure of the Turkish side to make a difference in the volume of Turkish investment flows into Jordan, Which prompted the Jordanian government to terminate this agreement. This decision created a debate between the economic sectors about its effects on the Jordan- Turkish trade balance and on the economic performance in general.

In literatures, there are three approaches to explain the difference in the trade balance deficit between countries. Which are the Elasticities, Absorption, and Monetary approach. Each of these approaches depend on different factors. The Elasticities

approach is based on the devaluation currency to improve the trade balance, while the Absorption approach is based on the effect of the income and the relative price on the trade balance, and the Monetary approach proposes that the monetary factors have an effect on the trade balance.

The aim of this paper is to explore empirically the determinants of the bilateral trade balance model for Jordan-Turkish economy during the period from 1978 until 2017, and the impact of the free trade agreement with Turkey on the Jordanian-Turkish trade balance.

To achieve the objective of the study in determining the factors that appear to affect the Jordanian- Turkish trade balance, the paper follows several studies that use the ARDL model to analyze the Jordanian- Turkish bilateral trade balance during the period from 1978 until 2017, Unrestricted Error Correction model (UECM) of the ARDL used to determine a stable long-run relationship between trade balance and its determinants. One of The ARDL features is that it has the potential to be applied in the case of small samples, regardless of the degree of integration of the variables. This paper is different from other relevant studies, as we use the ARDL model to analyze the bilateral trade balance between Jordan and Turkish specifically.

This paper consists of five sections. The first section is introduction, in the second section presents the theoretical background and the relevant studies. Section three discusses the model used in the analysis. The fourth section gives empirical analyses and the final section include the conclusion.

## **2. LITERATURE REVIEW**

There are several Approaches to confirm the determinants of the trade balance, which are Elasticity, Absorption, and the Monetary approach. The Elasticity approach, which forms its origin by Bickerdike (1920), Robinson (1947) and Metzler (1948), supports the view that the exchange rate is the determinant of the trade balance (Ogbonna, 2011). This effect can be verified by the Marshal-Lerner condition. Accordingly, devaluation will improve the trade balance only if the total elasticity of imports and exports to the exchange rate is greater than one. If the total of the elasticities is less than one, the value of the currency will improve the trade balance, but by a small percentage, not enough to achieve the desired effect. After Marshall Lerner's condition, there was the J-Curve effect that discusses the relationship between the real exchange rate and the trade balance. It indicates that the deterioration of the trade balance resulting from the devaluation of a given currency may be temporary and may cause only a short-term problem, then improves later to a higher level than it was before the currency devaluation process took place (Bahmani-Oskooee and Ratha, 2004).

Absorption approach suggests that any improvement in the trade balance requires an increase in revenues over total domestic spending. In other words, the economy is analyzed from the point of view of the total expenditure. Thus, any improvement in the trade balance is assumed to require an increase in domestic revenues over the total expenditure, and it analyzes the direct effects of exchange rate changes on relative prices and income and their impact on the trade balance (Duasa, 2007). The Monetary approach also suggests that the trade balance is essentially a monetary phenomenon, and imbalances in the trade balance, reflect the imbalance in the money market (Prais, 1961; Mundell, 1971). So the trade balance is analyzed from the point of view of the supply and demand of money. If people demand more money than the central bank supplied, the demand will be met by the inflow of money from abroad, in this case, the trade balance will improve. If the central bank supply more money than demanded, the surplus will be eliminated by outflows of money to other countries and this will worsen the trade balance.

In the empirical side, there have been numerous studies that attempt to determine the factors that affect the trade balance. Kyereme (2002), who examined the determinants of the trade balance between the United States and Australia over the period 1965-1998, 1975-1998, found that the relative price is the most important determinants of the trade balance, followed by the lending rate, the GDP ratio, the money supply ratio, and real exchange rate.

Shawa and Shen (2013) based on data for the period of 1980 to 2012, found that foreign direct investment and human capital development as well as consumer spending and government expenditure are the most important determinants of Tanzania's trade balance. In addition, Duasa (2007) employed ARDL approach in Malaysia during the period 1974 to 2003, she concluded that money supply and income play a major role in determining the long-run behavior of Malaysian trade balance as compared to the exchange rate.

On the Turkish side, Cergibozan and Ari (2017) study the determinants of the trade balance in the short and long term over the period 1987-2015. They found that in the appreciation of the real exchange rate in the long-run increases the trade balance, as well as an increase in domestic income, while an increase in foreign income reduces the trade balance. In the short run, the increase in the real exchange rate has no effect on the trade balance, while both domestic income and foreign income

negatively affect the deterioration of the trade balance. The study of Celik and kaya (2010) aimed to analyze the dynamics of bilateral trade of Turkey with seven countries (France, Germany, Netherlands, Italy, Japan, United States, United Kingdom) using cross-sectional data during the period 1985 to 2006. The results showed that there is a long-run relationship between real exchange rates and real income with the trade balance, as the devaluation of the Turkish currency will improve the trade balance of Turkey.

In Jordan, the study of Abu-Lila and Jdaitawi (2015) aimed to measure the price and income elasticity of Jordan's foreign trade with the most important trading partners (The Arab countries, the United States, China and India) in order to determine the effect of both income and relative prices and the real exchange rate on the Jordanian trade balance during the period (1980-2013). The main findings of the study were, that the results show a high price elasticity of Jordanian exports to these countries, and therefore, the lower the relative prices of exports will lead to an increase in Jordanian exports and improve the trade balance.

Alhanom (2016) examined the determinants of Jordan's trade balance during the period (1970-2010), He found that foreign income is an important determinant of the trade balance in the long run, unlike domestic income and real exchange rate which appear insignificant determinant of the trade balance in either short or long run. In the same context, the study (Al-Sawaie, 2017) examined the short and the long run relationship between the balance of trade, income, money supply, and the real effective exchange rate of Jordan during the period 1976-2013. The results show that the money supply and the income, play a strong role in determining the behavior of the trade balance, and the exchange rate improves the trade balance.

### 3. MODEL SPECIFICATION

The main objective of this study is to investigate the effect of the relative GDP, the relative real exchange rate, and the relative money supply on the trade balance between Jordan and Turkey. This paper modifies the model used by (Kyereme, 2002; Duasa, 2007) which adapt the three approaches (Elasticities, Absorption and Monetary) to identify the determinants of the trade balance. We introduce a dummy variable to identify the effect of Jordan-Turkey free trade agreement on the trade balance. The modified model can be written as follows:

$$LTB = c + LGDP + LMs + LREER + DU + e_t \quad (1)$$

Where:

LTB: is the logarithm of trade balance between Jordan and Turkey.

LGDP: is the logarithm of the real gross domestic product of the Jordan relative to that of Turkey.

LMs: is the logarithm of relative money supply in Jordan relative to that of Turkey.

LREER : is the logarithm of relative Jordan Dinar relative to Turkish Lira real effective exchange rate.

DU: is a Dummy variable equal to 1 for the years when the free trade agreement between Jordan and Turkey is valid, and 0 if not.

$e$  : is the error term.

In terms of methodology, the paper adopts the framework that was developed by Pesaran and Shin (1995, 1999) and extended by Pesaran et al (2001) by using Autoregressive Distribution Lag (ARDL) Model to estimate the long run relationship between the dependent variable and the independent variables. This modern model has a numerous advantages, which make it preferable to other models in estimating the long run co integration relationship, one of the main advantages is that it has a potential to be applied in the case of small samples, regardless of the degree of integration of the variables.

The determinants of the Jordanian-Turkish trade balance will be estimated through a model that measures the long-term relationship between the variables of that model, to examine the existence of that long run relationship, the bound co integration test will be used. To apply the bound test procedure for the equation (1), the Error Correction version of the ARDL model is given respectively by the Unrestricted Error correction representation (UECM) of the ARDL as follows:

$$\begin{aligned} \Delta LTB = & \alpha + \sum_{i=1}^m \beta_1, i \Delta LTB_{t-i} + \sum_{i=0}^n \beta_2, i \Delta LREER_{t-i} + \sum_{i=0}^o \beta_3, i \Delta LGDP_{t-i} + \sum_{i=0}^p \beta_4, i \Delta LMs_{t-i} + \sum_{i=1}^q \beta_5, i \Delta DU_{t-i} + \delta_1 LTB_{t-1} \\ & + \delta_2 LREER_{t-1} + \delta_3 LGDP_{t-1} + \delta_4 LMs_{t-1} + \delta_5 DU_{t-1} \\ & + \varepsilon_t \end{aligned} \quad (2)$$

Where  $\Delta$  denotes first difference,  $\alpha$  is constant and  $\varepsilon_t$  is white noise errors.

As a pre request to perform ARDL model, stationary of the variables must be tested to ensure that all variables stationary on I (0), I (1), and there are no variables integrated of order (2) or more. The next step is to estimate the long run relationship using ARDL approach, which involves two steps: the first step is to examine the existence of the long run relationship among all variables in the estimated equation by using the bound co integration test based on critical value. If we find a long run relationship, then we will go to the second step, which is estimating the long and short run coefficients of the equation.

Various diagnostic tests have to be applied to confirm the validity of the model, we implement various residual tests, starting with the Breusch-Godfrey LM test for serial correlation, white and ARCH tests for heteroscedasticity, Jarque-Bera test for Normality of data, and Ramsey's RESET to test the functional form misspecification. Also, CUSUM and CUSUMQ test the stability of the long-run parameters.

#### 4. EMPIRICAL RESULTS

The study used annual data over the period 1978-2017. The data was collected from the Central Bank of Jordan and from the World Bank database.

##### 4.1. Unit Root Test

To examine the stationary properties of the included Time series, we will use the Augmented Dickey-Fuller (ADF) as well as the Phillips Peron (PP) tests, as presented in table (1). As shown from the table, all variables are integrated at the first difference I (1), except the LTB integrated at the level I (0).

**Table 1: Unit Root Test**

Variables	Tests	Level		First difference		Order of integration
		Intercept	Intercept & trend	Intercept	Intercept & trend	
LTB	ADF	-3.2347 **	-3.3606	-7.6604*	-7.6197*	I(0)
	PP	-3.1838**	-3.3370	-7.9768*	-8.0082*	
LREER	ADF	-2.2214	-2.5669	-6.7645*	-5.0385*	I(1)
	PP	-2.1777	-2.5546	-6.7645*	-6.6729*	
LRGDP	ADF	-1.6712	-2.0016	-5.3826*	-5.3045*	I(1)
	PP	-1.7868	-2.2947	-5.3826*	-5.3045*	
LMS	ADF	-1.0047	-2.6434	-5.6720*	-3.0596	I(1)
	PP	-1.0976	-2.7948	-5.6623*	-5.6071*	

ADF: Augmented Dickey-Fuller test statistic. PP: Phillips-Perron test statistic.

Note: \*, \*\* indicates significant at 1%, 5% level, respectively

##### 4.2. ARDL Results

To estimate the coefficient of the long run relationships and associated error correction model (ECM) using the ARDL model, the order of distributed lag on the dependent variables were selected by the Akaike information criterion (AIC), which selects an ARDL (3,4,1,4,4,) for the variable included in the model.

##### 4.2.1 Cointegration Analysis (Bound Testing)

In order to examine the long run co integration relationship among the variables, , the bound test using calculated F-statistics from the joint significance of lagged levels of the variables employed to confirm the presence of co integration. The result of the Wald test (F-statistics) is presented in the Table (2).

**Table 2: Bound Testing**

Dependent Variable: LTB Log of Trade Balance Jordan Turkey	Wald test (F-Statistic) Calculated Value	
$LTBJT = f(Lreer, Lrgdp, Lms, du)$	7.735661*	
Significance level Unrestricted Intercept and no Trend No. of Regressors (k) = (4)	Lower Critical Bounds (LCB) I(0)	Upper Critical Bounds (LCB) I(1)
1%	3.74	5.06
5%	2.86	4.01
10%	2.45	3.52

\* Significant at 1%.

\*\*Pesaranet. al. (2001), Table Cl. Iii: case III: Unrestricted Intercept and no Trend

It is observed in Table (2) that there is a co integration among the trade balance and the explanatory variables, and the real GDP the explanatory variables, where that the F statistics calculated in the table is higher than upper critical value statistically significant at less than 1% level. Since the existence of the co integration relationship is determined by this way, the process of the estimation of Autoregressive Distributed lag (ARDL) models began in order to search the long and short-term relationships

#### 4.2.2 Short and Long-Term Analysis

The estimation result of the long run ARDL model is presented in Table (3) which shows the long run coefficients.

**Table 3: Estimated Long Run Coefficients Using the ARDL Approach**

Long Run Coefficients				
Dependent Variable: LTB	Coefficient	Std. Error	t-Statistic	Prob.
LREER	1.452	0.352	4.118	0.001
LMS	1.150	0.579	1.985	0.067
LGDP	-1.797	0.924	-1.944	0.072
DU	0.259	0.301	0.860	0.404
C	-1.822	1.695	-1.075	0.300

The variable of REER is found to have positive and statistically significant at the 1% level, implying that in the long run, the greater the relative exchange rate by 1% will lead to a rise in the trade balance deficit by 1.452%. In the short run (Table 4), the relative exchange rate has a negative effect on the trade balance, as 1% increase in the relative exchange rate, will lead to decrease in the trade deficit by 1.096%. All other coefficients were statically insignificant in the short run.

The coefficients of relative money supply MS and relative GDP was at a low level of significance compared with the Real exchange rate REER, at less than 10% significance level. Despite the signs of those coefficients, accordance with the theoretical and the empirical assumption of absorption and monetary approaches, which indicates that the real exchange rate of the Jordanian Dinar against the Turkish Lira, is the main variable in the interpretation of the behavior of trade balance between Jordan and Turkey in the long and short term, Which is in line with the economic theory, as the high exchange, the rate of the Jordanian Dinar in the long term will increase the competitiveness of the Turkish product to the Jordanian product in the Jordanian and Turkish market, which will lead to a decrease in Jordanian exports to the Turkish market (due to an increase in the cost of the Jordanian product) and replace the Turkish products instead of Jordanian imports, In addition to the substitution of Turkish imports instead of national products in the Jordanian economy (due to the lower cost).

In the short term, the increase in the Jordanian Dinar exchange rate against the Turkish Lira will lead to an increase in the purchasing power of the Jordanian Dinar from the Turkish products (increase in Jordanian consumption) and the decrease in the purchasing power of the Turkish Lira, Which will lead to an increase in the value of the invoice for Turkish imports from Jordan, and therefore, a decrease in the value of the bill of Jordanian imports from Turkey, thus reducing the short-term Jordanian-Turkish trade deficit.

The estimation result also points out that the impact of dummy variable (The free trade agreement between Jordan and Turkey) is a positive statically insignificance on the trade balance in the long run. This indicates that the free trade agreement does not affect the trade balance between the two countries. It is worth noting that the positive relationship (non-significant) is consistent with the economic theory in the liberalization of international trade. This result also supports the position of the government, which has revoked the work in this agreement.

In the short term, it was noticed that the coefficient of the dummy variable (free trade agreement) is significant at a low statistical level of less than 10%. Therefore, the increase in the liberalization of Jordanian-Turkish trade by 1% will increase the Jordanian-Turkish trade deficit by 0.632%. Which indicates that the trade relationship between the two countries for the benefit of the Turkish side, which its economy characterized by large size and high productivity compared to the Jordanian economy.

The Error Correction term (ECT) indicates the direction and the speed of the adjustment in the model due to any short run disequilibrium by examining sign and the statistical significance of the ECT. The appearance of ECT with a negative and significance makes sure, that an integrated long run relationship can be attained among the variables in the model, so the correcting of short run deviation of trade balance from the long run equilibrium needs 1.088 years.

$$Cointeq = LTB - (1.4530 * LREER + 1.1506 * LMS - 1.7971 * LGDP + 0.2597 * DU - 1.8224)$$

**Table 4: Error Correction Representation ARDL Model**

Co integrating Form				
Dependent Variable:	D(LTB)			
Selected lags**	ARDL(3,4,1,4,4)			
Regressor	Coefficient	Std. Error	t-Statistic	Prob.
D(LTB(-1))	0.367	0.145	2.531	0.024
D(LTB(-2))	0.157	0.137	1.147	0.270
D(LREER)	-1.096	0.373	-2.931	0.010
D(LREER(-1))	0.370	0.451	0.819	0.426
D(LREER(-2))	-0.250	0.398	-0.629	0.539
D(LREER(-3))	-0.893	0.305	-2.925	0.011
D(LMS)	-0.390	0.834	-0.467	0.647
D(LGDP)	0.815	0.726	1.122	0.280
D(LGDP(-1))	0.431	0.531	0.811	0.430
D(LGDP(-2))	-0.801	0.482	-1.659	0.119
D(LGDP(-3))	1.343	0.455	2.950	0.010
D(DU)	0.632	0.349	1.811	0.091
D(DU(-1))	0.456	0.453	1.005	0.331
D(DU(-2))	-0.835	0.457	-1.825	0.089
D(DU(-3))	1.051	0.382	2.746	0.015
CointEq(-1)	-0.919	0.167	-5.475	0.000

\*\* : Selected basd in Akaike information criterion (AIC).

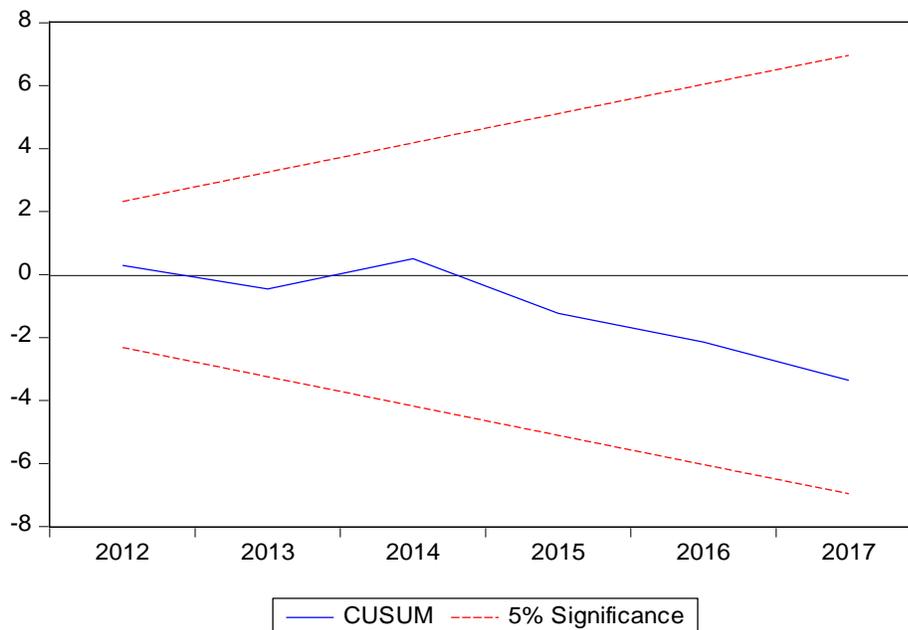
The ARDL model passes the standard diagnostic tests as shown in Table 5 , which was by the rejection of the null hypothesis which indicates that the residual data is normally distributed through Jarque-Bera Test with a probability of 0.625 no serial correlation detected through LM Test with a probability of 0.439, no heteroscedasticity through white test with a probability of 0.883, no autoregressive conditional heteroscedastic through the ARCH test with a probability of 0.468, and finally the Ramsey RESET Test indicates that there is no problem in the model identification.

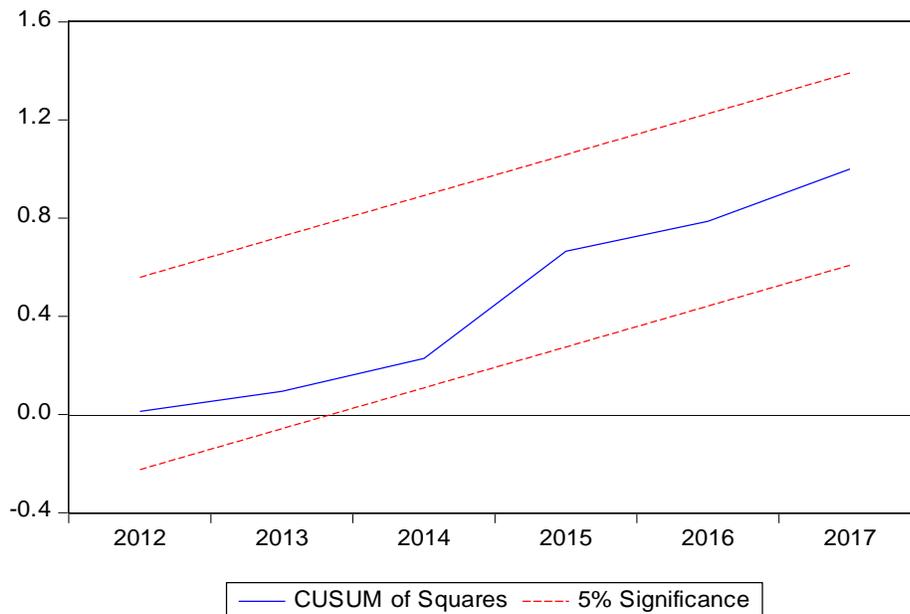
**Table 5: Diagnostic Test**

Diagnostic Test	value	Probability
Breusch-Godfrey Serial Correlation LM Test	0.882	0.439
Heteroscedasticity Test: White	0.562	0.883
Normality: Jarque-Bera Test	0.939	0.625
Autoregressive Conditional Heteroscedasticity (ARCH) Test	0.539	0.468
Ramsey RESET Test	0.770	<b>0.395</b>

#### 4.2.3 Stability of the Parameters

To examine the stability of the long-run parameters together with the short-run dynamics to ensure the robustness of our result, cumulative sum (CUSUM) and the cumulative sum of square (CUSUMQ) is used. A graphical representation of CUSUM and CUSUMQ statistics are provided in figure (1) and figure (2) respectively. If the plot of CUSUM and CUSUMQ remains with the 5% critical bound, then the null hypothesis is that all coefficients that are stable cannot be rejected. The plots indicate that none of the straight lines (drawn at the 5% level) are crossed by CUSUM and CUSUMQ, so they are within the boundaries and therefore these statistics confirm the stability of the long run coefficients of the estimated equation.

**Graph 1: Plot of CUSUM Statistics for Stability Test**

**Graph 2: Plot of CUSUMQ Statistics for Stability Test**

## 5. CONCLUSION

This study aimed to explore empirically the determinants of the bilateral trade balance model for Jordan-Turkish economy, and the impact of the free trade Agreement with Turkey on the Jordanian-Turkish trade balance covers the period from 1978 to 2017. The study used Autoregressive Distribution Lag (ARDL) model to estimate the long run relationship between the dependent variable and the independent variables.

Based on the modified model which adapt the three approaches (Elasticities, Absorption and Monetary) to identify the determinants of the trade balance. The result of the analysis found that the real effective exchange rate has a positive and statistically significant effect on the trade balance in the long run, and negative effect on the trade balance in the short run, in a way that supports the existence of the J-Curve effect of the elasticity approach.

The result also showed that the relative money supply (MS) and relative GDP have a weak effect on the trade balance in the short and long run, which indicates that the absorption and monetary approach not valid for explaining the bilateral trade balance deficit between Jordan and Turkey. The estimation result points out that the impact of the free trade agreement between Jordan and Turkey is insignificant on the trade balance in the long run, which supports the position of the government, which has revoked the work in this agreement.

The most important policy implication to be concluded from these empirical findings, is that devaluation of Jordan Dinar against Turkish Lira can be used to accomplish an improvement in the trade balance of Jordan against Turkey. However, increasing the relative money supply or relative Income will not achieve the desired goal.

For the further studies, Data from different countries like (Saudi, Palestine, Britain, etc., or EU countries, Asian countries, Arab countries, etc.) can be taken instead of one country into trade balance. Moreover, instead of total export and import values as aggregate, specific sector data (industrial, and etc.) values may be used in determining the determinants of trade balance.

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