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ANALYSIS OF THE CURRENT ACCOUNT IN THE BALANCE OF PAYMENTS WITH VECTOR ERROR CORRECTION METHOD: TURKEY IN THE PERIOD OF 2003- 2017

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ABSTRACT

International economic relations driven by the prevailing dominant mode of production should be analysed based on its current nature. Such an analysis is crucial in the course of domestic and foreign economic policies of the country depending on the place of a country in the international economic arena. The present study is based on the current account analysis, one of the most important items of the balance of payments. The model used in the study provides the possibility to analyse the relationships between different variables. The results indicated that the current account deficit increases during the period of obtaining the resources required for the growth phase. However, the results also implied that the transformation of current account deficit into a permanent problem could be avoided with gaining competitive advantage, achieving international market share and protecting it, strengthening the domestic currency, ensuring that external problems will not have long term effects on domestic economy, and achieving more important strategic targets.

KEYWORDS: *Current account deficit, terms of trade, openness, VAR, VECM*

I.INTRODUCTION

Current accounts, which is one of the main items of the balance of payment of a country's foreign economic relations, has very significant impacts on the macroeconomic balance of the country because of its constituent items. Balance of payments is defined as a form of registration recording all economic transactions conducted by the residents of the country with the residents of foreign countries in a certain period of time (Seyidoğlu, 2009). The transactions carried out on the balance sheet reflects the current value characteristics (Seyidoğlu, 2009).

The balance of payments consists of three items. They can list with descriptions as follows (Krugman et al 2017):

1-***Current Account***: Records consisting of import and export of goods and services. There are three sub-accounts in the current account:

- **Goods account** where import and export of goods are recorded,
- **Service account** in which foreign tourism, overseas transportation, overseas consultancy, foreign insurance and banking, license fees, rents and commissions, foreign official service, and international construction transactions are recorded.
- **Income accounts** where international interest and profit share payments, foreign debt interest payments, foreign domestic company profits, domestic residents' foreign direct investment profits, and foreign loans are recorded.

2- ***Capital Account***: Transaction records of wealth transfer between countries.

3-Financial Account: Transaction records of the purchase and sale of financial assets (Official reserves, omissions of net errors).

Current account and capital account total (deficit) are balanced with financial account. While the current account and capital accounts are autonomous accounts, the financial account is a straightener account.

The current account, which is the subject of the study, is a calculation-based item closely related to the macroeconomic balance of the country. In this respect, the analysis of the factors affecting the current account balance is important and selected as the subject of this study. Current account and macroeconomic equilibrium can be explained within the framework of GDP and GNP calculations. The sum of the market value of all final goods and services produced in a given period of time is expressed as GDP and the addition of investment revenues from abroad and unilateral transfers from foreigners along with the exclusion of the outgoing investment incomes and unilateral transfers of foreigners is defined as GNP (Gerber 2017).

Table 1: Components of Current Account

	CLAIMS	DEBT
Goods and Services	*Export*	*Import*
Investment Income	*Foreign investment income*	*Investment income payments to foreigners*
Unilateral Transfers	*Transfers from abroad*	*Transfers to foreigners*

Source: Gerber, ibid., p. 181.

When the balance of income that can be expressed as national income is established in terms of the obtaining and using and internal balance is regulated, internal savings, public deficit and external deficit balance can be created and thus the situation called "triple deficit" in the literature can be analysed. In the deficit calculations, it is wrong to always conclude that the result is bad, the final remark of *good* or *bad* should be declared case by case (Gerber 2017).

Consumption (C) + Investment (I) + G (Government Reel Expenditures) + Current Account Deficit (CA)

=

Consumption (C) + Saving (S) + Tax (T)

GNP = C + I + G + CA ..... Ways to earn revenue

GSMH = C + S + T ..... Ways to use revenue

(S – I) + (T– G) = CA

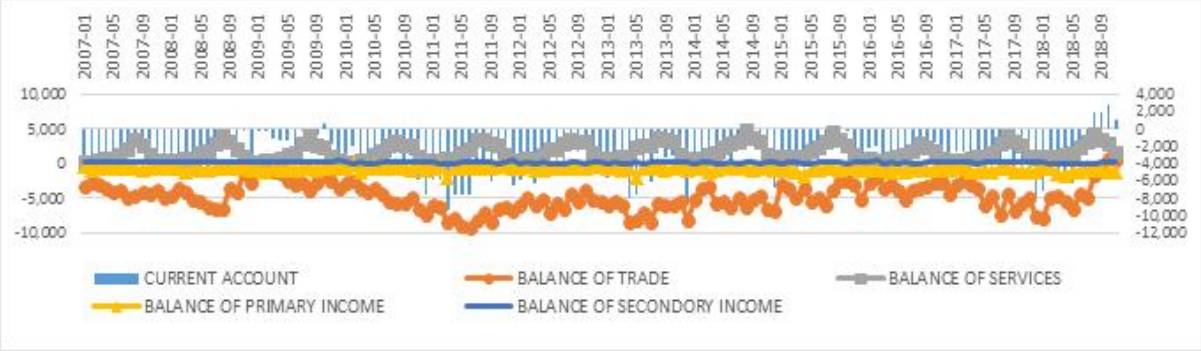
Domestic savings / investment balance — Balance of Public Deficit

External Deficit Balance

Current account deficit balance is composed of the difference between real public and private savings and real investments. Therefore, private and public sector consumption-reducing policies increase the national savings and have positive effects on account deficit balance whereas policies supporting investments have negative effects (Ketenci et al 2014). When private savings and investments are equal, the current account and state budget are balanced and the increase in the budget deficit leads to an increase in the current account deficit due to the increase in interest rates, capital flows, and the appreciation of the domestic currency (Ketenci et al 2014).

Prior to analysis of the current account balance in Turkey which is the subject of the current study, it is crucial to examine the elements of the current account balance between 2007-1/ 2018-11 in the form of contribution to the total balance. This demonstration will contribute to the interpretation of the results of the future empirical analyses. The figures (1-2-3) below provides detailed information regarding -the current situation and following tables provide details about the services.

Figure 1: Current Account Balance of Components Distribution Status (2007-1/2018-11)



Source: The Central Bank of the Republic of Turkey, Electronic Data Delivery System, https://evds2.tcmb.gov.tr/, accessed: 02.02.2019

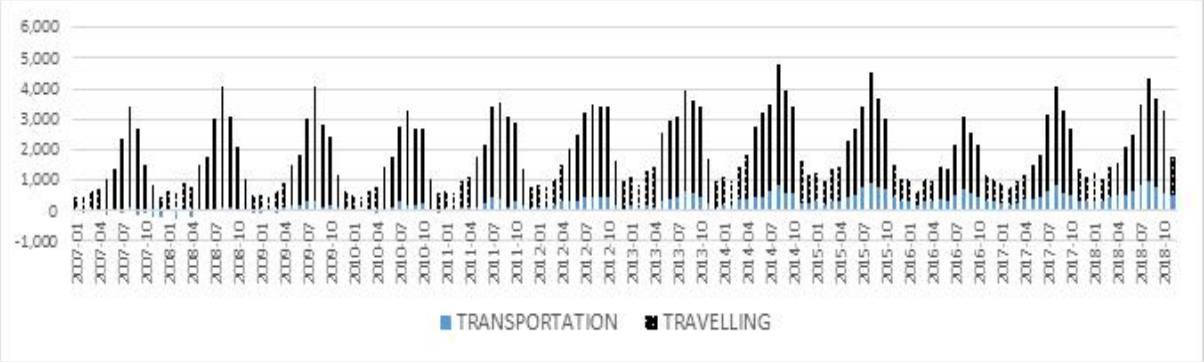
Figure 1 indicates the balance account distribution in the framework of the components of the current account. Except for the last four months of 2018, an import-weighted structure which means a deficit in the foreign trade balance is present. The positive direction of balancing of the account of the current account deficit seems to be sourced from the balance of services and to a lesser degree from the balance of secondary income.

Figure 2: Current Account Calculation Service Balance Expense Items - 1 (2007-2018)

Source: The Central Bank of the Republic of Turkey, Electronic Data Delivery System, https://evds2.tcmb.gov.tr/, accessed: 02.02.2019

Figure 2 shows positive and negative contributions to the expense item in the services account which is the balancing account in the current account. Goods and repair maintenance services within these items are included in the figures starting from the first month of 2011. When the contributions are examined, it is determined that insurance, financial services, and repair maintenance services reduce the expenses whereas construction services increase the expenses.

Figure 3: Current Account Calculation Service Balance Expense Items - 2 (2007-2018)



Source: The Central Bank of the Republic of Turkey, Electronic Data Delivery System, https://evds2.tcmb.gov.tr/, accessed: 02.02.2019

In Figure 3, two items that contribute positively to the expense item in the services account are shown. In these items, the travel service has an intensive positive contribution to the expense.

II.THEORETICAL FRAMEWORK

The literature review will be done in two respects. The first concept of current account deficit will focus on the determinants of the deficit and the contents of the research conducted on this subject, while the second will include the empirical research method in the current study and its implications.

A-THEORETICAL LITERATURE

A significant increase is observed globally in the current account imbalances until the global economic and financial crises in the mid-1990s (Darvas 2015). These imbalances have been one of the most important macroeconomic research areas of the 2000s, especially due to the current large account deficit (based on 6% of GDP) in the US (Geerolf and Grjebine 2013). In many developing countries such as Turkey, the current account deficit and deficit financing problem exists and therefore, the design of the clear policy is very important for both determining the causes of the deficit and eliminating it (Bayraktutan and Demirtaş 2011). The current account of a country is determined based on the expected discounted present value of the share of the future in the world GDP according to the current period share and it is expected that a country with increasing income compared to other countries will borrow today and make a deficit in its current account (Abbasoðlu et al 2017).

Current account balance is a very important indicator for a country's economy. Realizations of current account balance affect the macroeconomic performance of a country and provide information on macroeconomic policies along with the status of other autonomous shocks (Kwalingana and Nkuna 2009). When imbalance occurs, it is necessary to investigate whether these imbalances are structurally normal and sustainable, and whether structural policy moves are necessary to prevent financial crises (Kwalingana and Nkuna 2009). The positive or negative effects of the current account deficit on the economies of the country depend on the sources, size and financing of the such deficit as well as the quality and sustainability of financing (Yalç1nkaya et al 2018). In this context,

- Current account deficit due to external trade imbalance implies weakening the competitive advantage,
- Current account deficit from saving-investment imbalance indicates increases in investments and economic growth performances when the domestic level of savings is considered and decrease in the savings and the lack of regulation in the institutional/financial structure when the level of domestic investment is considered (Yalç1nkaya et al 2018).

Current account balance is also measured by the change in the net foreign asset position, which is linked to monetary flows between resident and non-resident in an economy (Unevska and Jovanovic 2011). For example, in developing countries, while low savings rates are the data, convergence to developed economies may only be possible by investing in large-scale investments financed from abroad (Unevska and Jovanovic 2011). However, it is not possible for the current account deficit to be financed continuously by external debt or melting international reserves, thus require macroeconomic policy arrangements. The current account deficit does not require policy arrangements in all cases. For example, the aforementioned deficit may have been caused by a temporary imbalance due to a decline in export prices. As a result, it is necessary to conduct continuous research in order to determine the sustainable level and to ensure the current account balance through policy measures (Unevska and Jovanovic 2011). Therefore, there are many studies on the sustainability of the balance.

There are different theoretical models used in the literature. These models allow different tests on the factors underlying the imbalances in the current account and the determination of the strength of the relationship between the factors related to current account fluctuations (Kwalingana and Nkuna 2009). There are two basic approaches (Kwalingana and Nkuna 2009):

i) Elasticities Approach: According to Goldstein and Khan 1985, exchange rate and trade movements are based on the current account deficit.

ii) Merger Approach: It considers the current account deficit position as a result of benefits maximization of economic units for generations. It is also referred as the Generation Approach to Current Account (GACA) and makes an analysis from the perspective of saving-investment (Kwalingana and Nkuna 2009). This approach has been

developed by Obstfeld and Rogoff (1994) and according to the model, current account is shaped by deviations from the production, consumption, government expenditures, and permanent interest rates of the world and the country's net foreign asset position is also important (Unevska and Jovanovic 2011). A development of Obstfeld and Rogoff's model came from Milesi-Ferretti and Razin (1996). According to their model, the sustainable level of the current account is related to the level of debt payability. That is, the external debt will remain stable without increasing and thus the country's future budget constraint will be reliable. The long-term trade surplus, which the borrower should have in order to keep the debt/production ratio constant, depends on real growth, real interest rate, and real exchange rate (Unevska and Jovanovic 2011). A close analysis of generational approach is the structural current account model. According to this model, the current account, which is considered as the difference in savings and investments, is a result of the differences in structural macroeconomic variables that affect the savings-investment balance (Debelle and Faruqee, 1996; Chinn and Prasad, 2000; Calderon et al., 2002; Aristovnik, 2006b, 2007; Herrmann and Winkler, 2008; Vamvakidis, 2008) (Unevska and Jovanovic 2011).

The recent empirical studies examine the current account balance within the framework of the GACA approach, which is generally related to the saving-investment relationship (Kwalingana and Nkuna 2009). It is stated that the studies do not reveal a convincing finding for the developing countries as the determinants of current account balance (Kwalingana and Nkuna 2009). Based on the empirical studies performed, it is necessary to explain the parameters used in the models.

Fiscal balance (expected effect is positive) (FB) and terms of trade (expected effect is positive) (TOT) are commonly used parameters in models (Darvas 2015). In Ketenci et al., (2014), The budget balance (BB), gross fixed capital (GFC), savings (S) and real effective exchange rate (REER) parameters were used (Ketenci et al 2014). Based on Debelle and Faruqee (1996), Calderon et al (2002) and Chinn and Prasad (2003), Kwalingana and Nkuna (2009) used parameters such as the terms of trade (TOT), real effective exchange rate (REER), fiscal deficit (FD), external debt stock (DEBT) and the indicator of openness to international trade (OPEN) (Kwalingana and Nkuna 2009). In the study conducted in 2011, Unevska and Jovanovic preferred the parameters included financial stability (MD), openness to international trade (OPEN), real effective exchange rate (REER) and terms of trade (TOT) (Unevska and Jovanovic 2011). Bayraktutan and Demirtaş (2001) used related literature from Calderon, Chong and Loayza (2000), Aristovnik (2006), Aristovnik (2007), Morsy (2009), Chin and Prasad (2000), Debelle and Faruqee (1996) and considered three separate models and analysed following parameters: Gross domestic product (annual percentage change, GDP), money supply/GDP (LM2), indicator of openness to international trade (LOP), public expenditure/GDP (GOV), world growth rate (%, WGR) , world interest rate (RG) and terms of trade (TOT), relative income (RY), investments/GDP (INV), world growth rate (%, WGR) (Bayraktutan and Demirtaş 2011).

Summarizing the findings of various studies related to the subject of interest will be invaluable to compare the results.

Unevska and Jovanovic (2011) emphasized the importance of structural reforms regarding the sustainability of the current account balance, measures to increase domestic savings in cases where the level of savings is low, to ensure appropriate conditions for new investments, to try to overcome the weakening and imbalance in foreign trade by producing high value-added products along with the necessity of reducing import dependency (Unevska and Jovanovic 2011).

Yalcinkaya et al., (2018) state that based on the 2008 economic crisis and the international liquidity expansion, short-term capital inflows to Turkey's economy facilitated the access to foreign savings, performed a faster growth due to the countries' internal economic conditions, and eliminated the necessity of the domestic savings-investment gap while the it also caused excessive appraisal of national money and the continuous increase of current account deficit (Yalç1nkaya et al 2018). In the same study, it was stated that short and long term policy measures should be developed and implemented in order to eliminate export-import differences and decrease current account deficits for sustainability of current account (Yalç1nkaya et al 2018).

Abbasoðlu et al. (2017) tried to develop a model that will allow to calculate the amount of growth needed in the GDP of a country that will reduce the current account deficit and the model is tested in Turkey in 2015. In addition to the correct estimation of growth, the model suggested to take into account issues such as inflation for the countries like Turkey which are depending on short-term borrowing and foreign fund inflows (Abbasoðlu 2017).

In Yalta and Saðlam 2016, foreign capital flows in terms of the sustainability of the current account deficit were examined and it was emphasized that this type of financing should not be considered as a basis for financing the current account deficit and that domestic investment environment should be sustained in developing countries (Yalta ve Saðlam 2016).

On the sustainability of the current account deficit, Romano and Razvan (2009) found no sustainability due to the structure of debt and receivables transactions in Romania (Romano and Razvan 2009).

In a study conducted in 2014, Ketenci et al. found that the current account had a long term relationship with real effective exchange rate, interest rate, and financial balance variables across the new EU member countries (Ketenci et al 2014).

Geerolf and Grjebine (2013) reported housing prices as a very basic determinant of the current account deficit (Geerolf and Grjebine 2013).

In 2010, Hoffmann reported that there were permanent global shocks as the main determinant of the current account deficit in China and such shocks are related to the decrease in the global interest rates. The same report also stated that the shocks also lead to permanent increases in China's current account, and that the current account deficit and non-tradable goods contributed to the strong positive directional relationship between themselves and the expected price changes (Hoffmann 2010).

In the study carried out by Duman (2018), it was emphasized that the export and import series have long-term co-integration relationship, so that the current account deficits are sustainable in the long term. Nonetheless, sustaining the account deficits in long run requires an increase in the foreign

currency revenues which implies the reduction of imports and the increase in exports that would depend on the encouragement of the domestic production of intermediate high value added goods (Duman 2018).

B-EMPIRICAL LITERATURE

Different methods were used in a number of studies related to the determinants of the current account deficit and/ or the sustainability of the current account balance according to the nature of the analyses carried out. Empirical application methods of some other studies not mentioned in the theoretical literature section because of the theoretical distance from the main goal of this study mainly employed the vector autoregressive (VAR) models. A small part of such studies also accommodated panel data analysis.

III.WORKING DATA AND APPLICATION METHOD

In this study, we aimed to analyse the current account balance or various parameters that are thought to affect current account deficit within the framework of various parameters. For this purpose, important variables which could affect the comments were selected by examining the previous studies. The variables to be used in the study are:

The dependent variable, Current Account

Balance…….....CAB
Real effective exchange rate…….....REER
External debt stock …….....DEBT
Gross fixed capital formation…….....GFC
Openness to international trade (export+import/GDP)
…….……OPEN
Terms of trade (export price index/import price index)
…….. TOT

The dependent variable is the current account balance (CA) for the period of the study discussed indicates a current account deficit in Turkey. Comments will be made according to this basic finding.

PARAMETERS	SOURCE	TERM
CAB	TCMB, EVDS	2003 Q1 – 2017 Q4
REER	BIS	2003 Q1 – 2017 Q4
DEBT	HM, KFGM	2003 Q1 – 2017 Q4
GFC	TUİK	2003 Q1 – 2017 Q4
OPEN	TCMB, EVDS	2003 Q1 – 2017 Q4
TOT	TUİK	2003 Q1 – 2017 Q4

In the study, vector autoregressive model (VAR) was preferred. In general, Vector Autoregressive Model (VAR) is an informative method used to examine the relationships between the parameters examined within the scope of the model and to provide policy predictions and decisions within the framework of these relations (Çaşkurlu 2007). It is stated that the model is effective in testing the dynamic relations between variables (BölükbaşI ve Peker 2017) and is more successful than structural multiple estimation methods (Greene 1997).

The VAR model is based on the association of the internal variables with the lagged values of the other variables in both its own and the model for a certain period of time, thus eliminating the internal and external variable distinction in the model (Ertek 1996). VAR models differ from traditional models in terms of the absence of any internal or external distinction of the variables to be used in the model, the lack of zero constraints, and the lack of a necessity to be based on a definite economic theory (Köse 1998). Depending on the predictions in the models, policy tests and interpretations can be made using variance decomposition and effect-response functions. The variance decomposition gives the priory answer to the question of which other variable has more effect on the variable that is thought to be more internal, while the other variable, which is thought to be more internally important while effect-response function indicates the state of balancing of the policy proposals to be selected within the framework of the model (Köse 1998).

VAR models have some shortcomings including simplicity, lack of internal and external variable determination, independence from the economic theory, sensitivity in choosing the length of delay, the sensitivity of the series to stability, and the need to interpret the results of the effect-response function. On the other hands, ease of predictability and successful predictions compare to than other econometric models are the positive aspects (Gujarati 2001).

A-EMPIRICAL ANALYSIS AND FINDINGS

Under this heading, firstly VAR analysis pre-test results, effect-response functions, and variance decomposition will be used to evaluate the direction and degree of relationships between variables.

1.Pre-Test Results

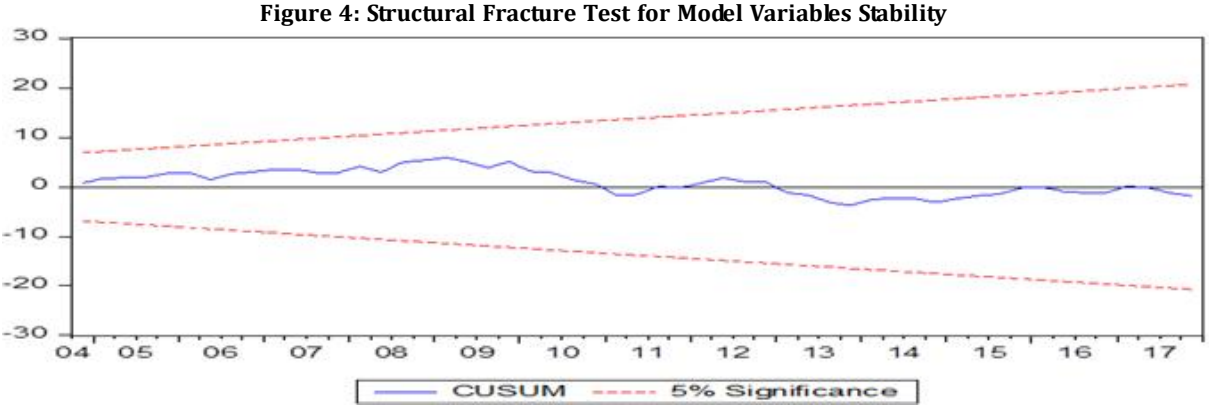
Before the analysis, the current balance, the terms of trade and the openness to international trade variables, which are likely to have seasonal effects within the variables, were subjected to seasonal correction using Tramo/Seats. In the following process, variables were tested according to ADF.

Table 2: Model Variables ADF Test Results

VARIABLES	ADF RESULTS	1%	5%	10%
DIFFERENCE CA	-14.19767	-3.550396	-2.913549	-2.594521
DIFFERENCE OPEN	-12.54011	-3.550396	-2.913549	-2.594521
DIFFERENCE GFC	-5.646137	-3.565430	-2.919952	-2.597905
DIFFERENCE DEBT	-7.742492	-3.555023	-2.915522	-2.595565
DIFFERENCE REER	-12.84414	-3.550396	-2.913549	-2.594521
TOT	-4.165442	-3.548208	-2.912631	-2.594027

According to the results in Table 2, all variables except the TOT are stationary in the first order difference. The CUSUM test was also used to show that the unit root test was not robust implying that the structural break was not included.

Figure 4: Structural Fracture Test for Model Variables Stability



As shown in Figure 4, the distribution is within the boundary ranges. Therefore, it does not contain structural breaks. Although there is no structural break, the Johansen standard test cointegration cannot be used to test the long-term relationship between variables because the variables are not at the same stationary level. While the five variables including the dependent variable (CA) are the first order difference stationary, the TOT variable is stationary at the level. The problem of not applying the cointegration method to series with different degrees of cointegration can be overcame by ARDL (Autoregressive Distributed Lag) approach developed by Pesaran and Shin (1995) and Pesaran et al. (2001) which is known as the boundary test approach. With this method, it is possible to investigate whether there is a cointegration relationship between variables without considering the degree of integration of variables (Alt1ntaş 2013). If the F-statistic value found with ARDL exceeds the upper critical limit value or is lower than the lower critical limit value, cointegration can be declared (H_o is rejected) between variables (Alt1ntaş 2013). If the number of observations is small, the upper and lower critical values of the limit test produced by Narayan (2005) are used in accordance with the 30-80 observations (Alt1ntaş 2013).

The ARDL test results for the equation where the current balance variable which constitutes the subject of the study are given below.

Table 3: ARDL Boundary Test Results for Model Variables

	1%		5%		10%	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
P. K. NARAYAN (2005) LIMIT VALUES *	3.928	5.408	2.848	4.160	2.393	3.583
E-VIEWS 9 ARDL TEST LIMIT VALUES	3.060	4.150	2.390	3.380	2.080	3.000
F STATISTICS	2.704162					

*: P. K. NARAYAN Boundary Test Values 2005 study case III: From the unrestricted intercept and no trend table k = 5 and 55 were taken for observation (Narayan 2005).

As shown in Table 3, the ARDL boundary test F statistics of this study points to the cointegration problem between variables in the Narayan 2005 study at 1% and 5% significance level, and the program used in the study at 1% significance level. In this respect, firstly ARDL model analysis will be interpreted as meaningful of long-term values of variables. The problem will then be evaluated by VECM analysis.

Table 4: ARDL Model Variable Long Term Coefficients

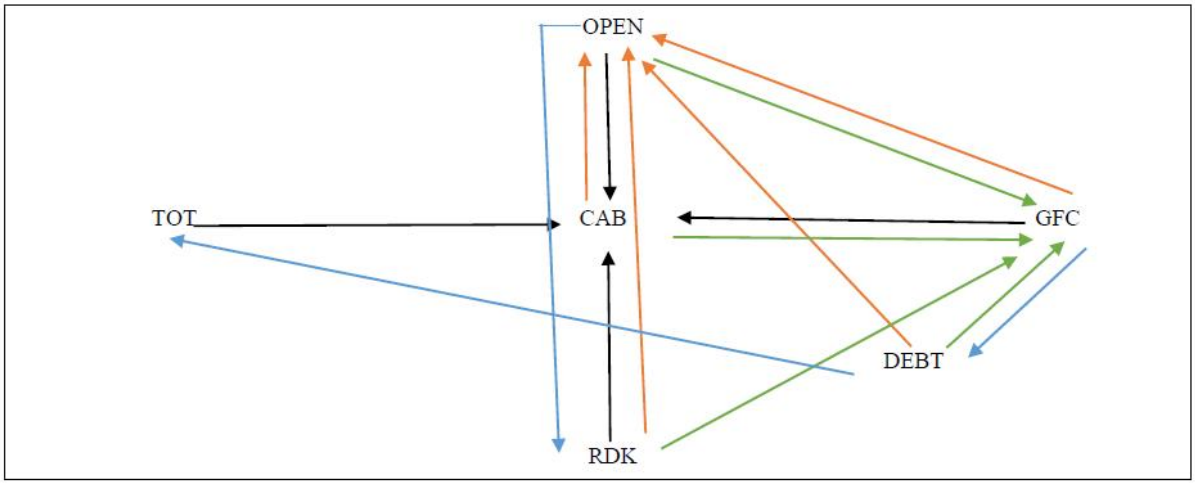
VARIABLE	COEFFICIENT	S. ERROR	T-STAT.
OPEN	-101	61	-1,650
DEBT	-0,12	0,05	0,020
REER	-38	28	0,180
R^2=0,83, DW=1,974, F-stat= 5,903			

Significant coefficients for long-term relationship as the results of ARDL model analysis are indicated in Table 4. According to the results, the 1-unit increase in the openness to international trade and real effective exchange rates significantly reduced the current account deficit, while the 1-unit increase in the net external debt stock meant that the inflow of money led to a decrease in the current account deficit (12%). These results are consistent with the results of the previously studies discussed below.

The appropriate delay rate for VEC (vector error correction) VAR model the was found to be 6 according to FPE and AIC. Since the centered VIF values were between 1 and 5, there was no multiple linear connection. Because Jarque- Bera value of 0.702 is larger than 0.05, the residuals have a normal distribution. The White Test value is 0,163 and there is no variance problem according to this result. Finally, according to the Breusch-Godfrey Serial Correlation LM Test, there is no autocorrelation problem in all delays as the probability of LM is greater than 0.05.

The causality relationships and directions of VEC Granger Causality/Block Exogeneity Wald Tests are as shown below.

Figure 5: Granger Causality Test Interaction Variables



2.Variance Decomposition

After showing Granger causality relations, interpretation of variance decomposition which is an important analysis in VAR models is required. Variance decomposition enables the explanation of predictive error variances with other variables and the shocks of the variables (Bölükbaş and Peker 2017).

Table 5: VEC VAR Model Variance Decomposition

	Period	CAB	OPEN	GFC	DEPT	REER	TOT
CAB	1	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
	2	81.54009	3.490771	0.544659	0.258812	6.184055	7.981611
	3	76.48334	4.488068	2.758495	2.942257	5.875765	7.452075
	4	67.28697	4.769718	2.966249	6.679687	6.246348	12.05103
	5	33.25546	**14.02801**	17.87897	9.155614	16.00686	9.675086
	6	22.08234	8.236756	**18.84119**	12.84812	14.47451	**23.51708**
	7	26.04037	7.152794	17.12163	12.06805	**17.48988**	20.12728
	8	31.80367	6.440892	14.90143	11.09837	15.40957	20.34608
	9	31.79846	6.152843	14.22599	**13.12032**	15.11690	19.58549
	10	28.98650	6.940794	16.91850	12.45056	14.51516	20.18848
		CAB	**OPEN**	**GFC**	**DEPT**	**REER**	**TOT**
OPEN	1	0.027841	99.97216	0.000000	0.000000	0.000000	0.000000
	2	15.84079	47.38436	**28.42382**	1.913723	1.468004	4.969301
	3	13.36192	39.24225	26.71118	10.55514	4.851956	5.277548
	4	19.25182	31.88265	22.35894	**14.88885**	3.888192	7.729558
	5	**20.38872**	30.94700	21.75878	14.65614	4.395350	7.854012
	6	20.23778	28.67732	20.33299	13.27606	6.247143	11.22871
	7	18.06125	29.76471	18.38628	14.65137	5.960099	13.17629
	8	15.74296	26.81282	16.20195	12.94628	10.89554	17.40045
	9	16.81772	26.57352	14.78605	13.45086	11.23631	17.13553
	10	17.96822	24.22223	13.23463	12.62472	**13.32270**	**18.62750**
		CAB	**OPEN**	**GFC**	**DEPT**	**REER**	**TOT**
GFC	1	7.839816	4.714688	87.44550	0.000000	0.000000	0.000000
	2	8.012766	**14.57378**	64.11231	0.000489	2.606960	10.69370
	3	7.366438	12.18333	53.50519	0.506545	4.206493	22.23200
	4	8.779429	11.91208	48.87265	2.391261	8.069361	19.97522
	5	7.410807	12.82729	43.56595	5.135030	7.940674	**23.12025**
	6	7.324482	14.10774	38.02630	11.55387	8.573777	20.41383
	7	8.177421	11.78342	32.09022	11.73289	13.45714	22.75891
	8	9.690778	11.17843	30.30999	12.07117	**14.24834**	22.50129
	9	**11.97484**	11.07811	30.61726	**12.10092**	13.15903	21.06983
	10	11.22912	14.43065	30.12537	11.44269	13.02607	19.74610

		CAB	OPEN	GFC	DEPT	REER	TOT
DEBT	1	10.68652	20.33778	8.686922	60.28878	0.000000	0.000000
	2	16.00636	19.86637	22.79840	38.20029	0.425944	2.702633
	3	**23.23983**	17.15554	19.58192	35.91240	1.022154	3.088151
	4	19.24691	14.31746	**29.37354**	31.12582	2.066940	3.869328
	5	21.73215	14.81476	28.15896	28.43657	1.884037	4.973522
	6	16.92565	11.28181	20.51707	20.71227	5.598668	24.96453
	7	15.78614	15.82477	19.36380	19.64547	6.396471	22.98334
	8	15.80575	15.88209	18.43177	18.82292	6.084671	**24.97280**
	9	14.78651	**22.32787**	17.68226	16.92612	5.795347	22.48189
	10	13.56310	20.50706	16.56569	16.25591	**9.231597**	23.87665

		CAB	OPEN	GFC	DEPT	REER	TOT
REER	1	7.091212	6.211237	13.07612	**40.74346**	32.87797	0.000000
	2	11.12840	5.238468	20.57272	33.37027	25.66132	4.028823
	3	15.75575	7.514441	36.54959	21.84629	15.77399	2.559931
	4	**18.41474**	6.967576	33.57824	23.04442	14.89295	3.102076
	5	18.07955	**10.07553**	35.78640	21.55040	12.23312	2.275002
	6	16.22281	8.053885	**37.76939**	22.89347	9.825309	5.235127
	7	14.95492	9.027084	36.44221	24.35844	9.635114	5.582234
	8	14.92526	8.984729	36.27770	24.43809	9.818804	5.555417
	9	14.40787	9.369337	36.18000	24.14076	9.668878	**6.233154**
	10	15.89766	8.402127	31.89484	30.06987	8.287922	5.447583

		CAB	OPEN	GFC	DEPT	REER	TOT
TOT	1	**24.95301**	1.375843	4.075301	0.052733	**7.681587**	61.86153
	2	22.30506	4.636522	**13.71661**	0.478568	5.332039	53.53120
	3	12.93910	13.38774	7.707641	5.605128	2.889464	57.47092
	4	11.16723	**16.53980**	10.91555	7.174495	3.680692	50.52224
	5	11.31002	14.53676	8.213450	16.02589	4.047565	45.86631
	6	15.90871	12.73340	6.916601	**17.99844**	3.799120	42.64373
	7	19.46596	11.15806	6.180609	15.62478	3.460088	44.11050
	8	21.89910	9.769876	5.722306	14.31421	3.749389	44.54512
	9	23.61824	9.449425	5.730341	12.88234	3.847152	44.47250
	10	22.85945	8.754423	7.037618	14.49222	3.823911	43.03238

Table 5 shows the variance decomposition results. According to the results, it is possible to interpret the influences of the current balance with the previous study results and in the context of individual variables as follows:

- The most important variables after the self-deficit were terms of trade (23.5%), gross fixed capital formation, openness to international trade, real effective exchange rate, and net external debt stock.
- The openness to international trade is affected from gross fixed capital formation (28.4%), followed by current account deficit, terms of trade, net external debt stock and real effective exchange rate.
- Gross fixed capital formation is affected from terms of trade (23.1%) followed by openness to international trade, real effective exchange rate, net external debt stock, and current account deficit.
- Net external debt stock is affected from gross fixed capital formation (29.3%) followed by the terms of trade, current account deficit, openness to international trade, and real effective exchange rate.
- Reel effective exchange rate is affected from the net external debt stock (40.7%) followed by gross fixed capital formation, current account deficit, openness to international trade, and terms of trade.
- The terms of trade is affected from current account deficit (24.9%) followed by net external debt stock, openness to international trade, gross fixed capital formation and real effective exchange rate.

3. Effect-response Functions

While the variance decomposition results provide information in terms of the direction and degree of impact, the interpretation of the effect-response functions provides information in terms of positive/negative impact and time. Making policy predictions between variables and whether the variables can be a policy tool for the variables that are thought to be more intrinsic are performed with the effect-response functions (Çaşkurlu 2007). Effect-response functions reveal the dynamic response of all variables to structural shocks in VEC model and the effect of analysis of variance decomposition testing on macroeconomic magnitudes in addition to the test of determining if it could be a policy tool (Kolçak et al 2017).

Figure 6: Effect - Response Functions Demonstration

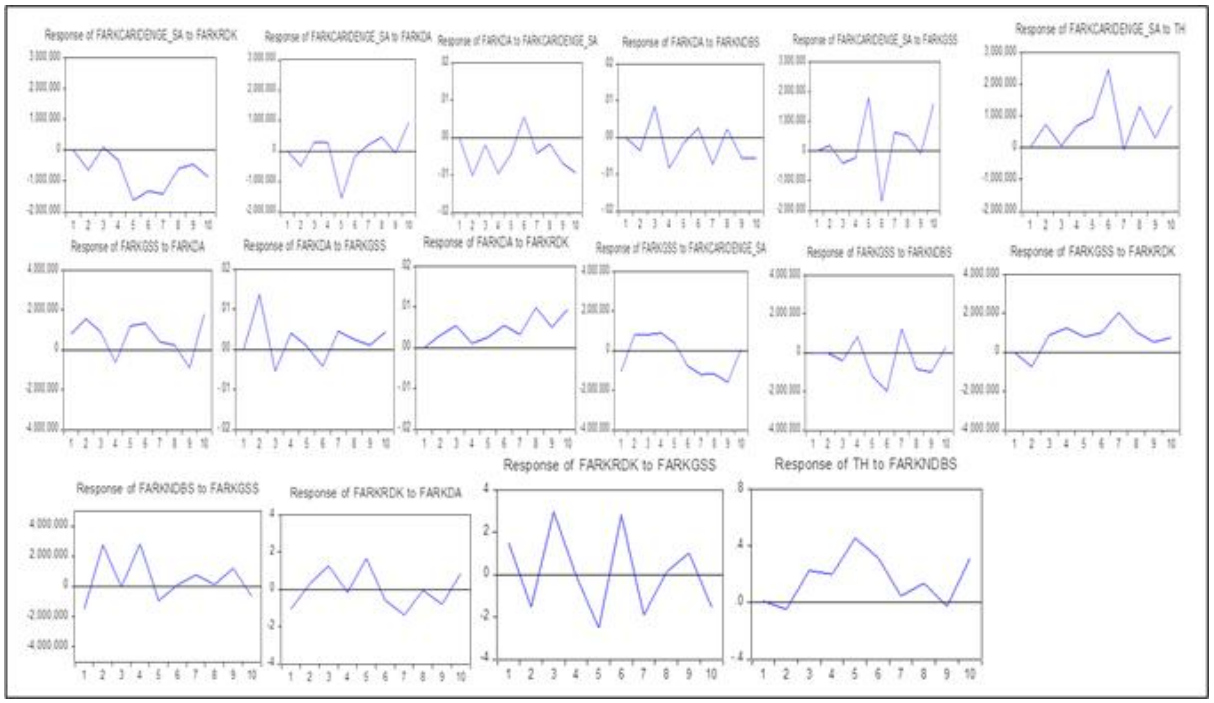


Figure-6 shows the effect-response functions. Together with the results of variance decomposition, we expressed the following comments:

i) The most important parameter affecting the current balance in this study is the terms of trade. The effect is positive. In other words, it increases the current account balance and decreases the deficit. The effect of standard error shocks is increasing especially after the 6th period. Terms of trade (net change) is the export price index/import price index ratio and expresses the international competitiveness of a country (Seyidoğlu2003: 635; Gürbüz & Çekerol, 2002:32) (Bölükbaş ve Peker 2017). According to the Harberger-Laursen-Metzler (HLM) hypothesis, the increase in the terms of foreign trade leads to an improvement in the current account balance and the current account deficit will decrease. In Obstfeld (1982: 258) this response is explained as the presence of deterioration in the terms of trade leads to a decrease in real income. Hence, the individuals are able to reduce their expenditures which ultimate resulted in reducing current account deficit (Bayraktutan ve Demirtaş 2011). The result of the study meets the HLM hypothesis.

Although the element affecting the terms of trade is different in the variance decomposition, it is the net external debt stock which is statistically significant and that is in Granger causality. There is an effect of about 18% in the decomposition. In the effect-response, the effect seems to be positive except for the second and 9th period. In other words, the 1 standard deviation shock in net external debt stock has an increasing effect on the terms of trade. Bölükbaş and Peker (2017) stated that the decrease in the external borrowing reduces openness to international trade, the decrease in the terms of trade has a negative effect on the foreign trade balance due to the increase in the price of imported goods, and external debt shock increases the terms of trade contrary to the explanations (Bölükbaş ve Peker 2017) of increasing external debts.

The increasing effect of one standard error shock in external borrowing is on the terms of trade may be explained by the fact that the increase in foreign debt stock leads to an increase in the need for foreign exchange and in turn makes importing difficult but exporting easier and thus increases the terms of trade. At this point, the importance of borrowing that strategically influences the other macroeconomic parameters should be emphasized. It is stated that the borrowing and debt management needs to be done in line with the country's economic priorities and strategically determined targets (Ejder ve Aksoy 2018).

ii) The second parameter in the variance decomposition that affect the current account balance is the gross fixed capital formation. Fixed capital formation includes assets such as facilities, equipment, the property (excluding raw materials) used in the production process and held for longer than one year. Fixed capital provides short-term or long-term economic growth, which is one of the preconditions for achieving economic growth. It is an important function in the foreign trade as it creates demand by means of export and technology transfer through import (Esener et al 2017). The analysis carried out here is in congruence with the previous literature and shows the positive interaction of openness to international trade with physical capital (Esener 2017). It can be stated that domestic and foreign savings (in the form of foreign direct investments), capital flows and domestic investments are low, whereas in countries with high current account deficits, there is a growth move. Increasing investments in countries with low savings is important, but increased investments in inefficient areas increase the current account deficit, lead to weak and fragile growth and hence the increase in the share of fixed capital formation in GDP should be devoted to sustainable growth through technology (Şahin 2017).

In the variance decomposition in the present study, the second parameter affecting the current account balance was gross fixed capital. In effect-response functions, except for the 3rd and 6th periods, the effect of 1 fixed standard error capital shock on the current account balance is increasing the deficit. In other words, current account balance deteriorates

due to increase in capital imports. This confirms the developing country paradox in the investment need mentioned above.

The openness to foreign trade has a significant effect on gross capital formation. The rate of variance decomposition was large. The effect of openness to foreign trade on gross fixed capital formation is due to imports realized in the case of capital requirement. In the effect-response function, the effect is upward and positive except for the 4th and 9th periods. Similarly, the real effective exchange rate and net external debt stock also have effects. The response of the real effective exchange rate shock is positive and upward, except for one period. It is an effect depending on the increasing nature of the exchange rate on import. On the other hand, net external debt stock has a negative effect except for two periods. This can be explained by the preference of the external sources to debt rather than capital formation. As a matter of fact, it is stated that the borrowing is mainly used as financing of open closure and the interest rate burden has deviated the public administration from different investment areas and hamper the development stage (Saraçoðlu 2002).

iii) The third parameter that affects the current balance is the ***real effective exchange rate***. Real exchange rates are defined as the ratio of domestic prices to foreign prices in the same currency and there are scientific studies reporting its effect on the current account deficit. When the real effective exchange rate is reduced, it increases the purchasing power of domestic currency against traded or non-traded foreign goods and thus increase the tendency to import. However, its increase leads to an increase in the consumption of domestic commodities and thus to a decrease in the total current consumption (Ketenci et al 2014).

In the effect-response function, the effect of the real effective exchange rate on the current account balance for the analyzed period for Turkey is negative. It also confirms the explanations provided above. The real effective exchange rate is also affected by gross fixed capital formation and openness to foreign trade, respectively. When we examine this effect from the effect-response functions, as seen in the variance decomposition, the degree of succession is quite high and the effect of gross fixed capital formation is seen as excessive increase and decrease periods. This situation explains the fluctuating course of capital formation due to imports together with other factors that affect the exchange rates. On the other hand, the effect of openness to foreign trade on the real effective exchange rate is positive except for two periods.

iv) The fourth parameter that affects the current balance is the ***openness to the foreign trade***. The openness to the foreign trade ratio is expressed as the ratio of the total of exports and imports to GDP, shows the level of openness of the national economy, and can have different effects on the current account deficit depending on the volume of import and export (Bayraktutan ve Demirtaş 2011). In a country at the stage of development, the acquisition of technology, intermediate and investment goods and the process of globalization increase the openness (Bayraktutan ve Demirtaş 2011). Foreign economic relations are therefore predominantly import-weighted in a country in such a situation, including the dependency of exports on imports, which in turn affects the current account deficit. It is stated that the process of globalization has been exposed to the effects of openness to foreign trade by directing countries to different forms of state with a number of elements such as the necessity of commercial harmonization, commitments and integrations of international agreements (Çaşkurlu 2018).

The effects of external shocks on the current account balance are seen as increases and decreases by periods. This indicates that the current account balance is negative in the case of export weight and negative in the reverse case. Gross fixed capital formation and net external debt stock also have effects on openness to foreign trade. In the case of openness to imports, there is a positive relationship with gross fixed capital formation. The relationship with net external debt stock is slightly more delayed and indirect. In periods of debt stock inflows and outflows, openness within the framework of foreign exchange needs and excess is affected.

CONCLUSION AND REMARKS

Apart from internal economic activities, countries have external economic relations which constitute an important part of the economic cycle. As a result of the globalization process, the inter-country economic relations have increased and created alteration the general process of economies in many different ways.

The current and potential impacts of foreign economic relations on the country's economy can be interpreted by analysing the balance of payments in which the transactions of these relations are monitored. There are sections in the balance of payments where the accounting records of different dimensions of the country's external economic activities are maintained. Current accounts account has an important place in the three main items. In this work, we targeted various factors of current account balance of Turkey. In the study, 2003 - 2017 quarter period data was used and vector autoregressive model (VAR) based on vector error correction (VEC) was used. Basic validation tests were performed for the accuracy of the measurement of the model.

To the results of the study and outcomes of the model employed are below with a hope to contribute the ongoing discussions:

- It is not rational for a country to have an endless current account deficit in terms of a country's economy. It should be perceived as a macroeconomic problem. Strategic targets and plans should be developed according to the economic dynamics of the country in terms of sustainability.
- According to the result of the study, the reducing effect of terms of trade on the current account deficit is important. The increase in the foreign economic competitiveness also leads to an improvement in the terms of trade and to the reduction of the current account deficit. The improvement in terms of trade will lead to a decrease in the external debt stock. Strategically, this parameter should be regarded as very important.
- Fixed capital formation is extremely important for the countries in the growth phase. The lack of internal savings and internal economic performance, especially in the formation of capital, may require imports along with the need for technology transfer. The increase in imports both reveals and increases the current account deficit. Initially it may be necessary to have a current account deficit for the formation of fixed capital. However, the use of capital created in this way with high productivity and high added value can both make the growth permanent and prevent the current account deficit from being acute.

-Openness to foreign trade is a very important parameter in the context of increasing exports. However, exports should be free from the import dependence as much as possible. In particular, the development and implementation of strategies for the production and export of high value-added goods will lead to openness to foreign trade yet highly competitive economic structure in the long term.

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