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Economic Growth and Trade Deficit in Turkey

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ABSTRACT	ARTICLE INFO
Current account deficit not only in Turkey, is located between the main macroeconomic problem in many developed and developing countries. High rates of economic growth with current account deficits observed in Turkey's economy has been the main subject of economic debate. Growth series based on many years of Turkey's current account deficit, it is seen that there is an interaction between the growth deficit. In this study, it said relations between Turkey and the 1983- 2017 period related to GDP and current account has been examined through VAR analysis using data from the balance. As a result of the study, two-way causality relationship was determined between the two variables. In addition, it was concluded that the current account deficit affected the economic growth negatively and economic growth led to an increase in the current account deficit. As a result of the action and reaction analysis, it was concluded that the current account deficit negatively affected the economic growth and economic growth led to an increase in the current account deficit. **Key Words:** Economic growty, trade deficit, GDP, current account	

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Türkiye'de Ekonomik Büyüme ve Ticaret Açığı

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ÖZET	MAKALE BİLGİSİ
Cari işlemler açığı sadece Türkiye'de değil, birçok gelişmiş ve gelişmekte olan ülke ana makroekonomik problemler arasında ilk sırada yer almaktadır. Son yıllarda Türkiye ekonomisindeki ekonomik büyümeyle birlikte görülen yüksek cari işlemler açığı, ekonomik tartışmaların ana konusu olmuştur. Türkiye'nin uzun yıllara dayanan büyüme serileri incelendiğinde cari işlemler açığı ile ekonomik büyüme arasında bir etkileşim olduğu görülmektedir. Bu çalışmada, söz konusu ilişki Türkiye'nin GSYİH'sı kullanılarak incelenmiştir. Cari hesap bakiyesi verileri, 1983-2017 dönemine ait VAR analizi ve VAR'a dayalı Granger Nedensellik Testi ile incelenmiştir. Çalışma sonucunda her iki değişken arasında çift yönlü nedensellik ilişkisi tespit edilmiştir. Ayrıca, etki-tepki analizi sonucunda, cari açığın ekonomik büyüme üzerinde olumsuz etkisi olduğu ve ekonomik büyümenin cari açığın artmasına neden olduğu sonucuna ulaşılmıştır.	
Anahtar Kelimeler: Ekonomik büyüme, ticaret açığı, GSYH, mevcut hesap	

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INTRODUCTION

As a significant part of the developing countries use imported inputs at a high rate in their production, they face serious deterioration in the current account balance as a result of the increase in economic growth rates. One of the most debated economic issues in Turkey's economy in recent years, the size of the current account deficit, financing, policies have to be implemented to ensure sustainability and deficit reduction. The current account deficit has become a vulnerability factor for Turkey's economy for many years and the current account deficit has become chronic.

This study will be examined in the framework of the econometric analysis of the relationship between the current account balance and economic growth in Turkey. Firstly, definitions of the current account balance and economic growth are made in the study. Afterwards; it will be examined to relationship between Turkey's current account balance and economic growth. In the last chapter, it will be carried out empirical analysis of the relationship between account balance and economic growth.

1. Definitions of Current Account Balance and Economic Growth

The current account deficit is a country's trade where the value of the goods and services it imports exceeds the value of the goods and services it exports. A deficit in the current account accounts shows that the country consumes more than its income, consumes more than it produces, ie it makes negative savings.

The current account deficit is a problem, but a more important problem is the reduction or financing of this deficit. When the current account have a deficit, the country sends more than the money came from abroad. Therefore, the deficit is closed by external borrowing or selling of domestic assets. When the current account is overdue, capital transfers from domestic residents are realized (Obstfeld and Rogoff, 1996: 5).

Current account movements are a dynamic macroeconomics issue. Current account surpluses or deficits represent the receivables or debts of a country against the rest of the world. Therefore, current account movements also show the inter-period income choices of households, firms and the public. The single-term current account theory, which shows the static equilibrium of exports and imports, is very closely related to single-term savings or investment theory. Because, current account imbalances are reflected in the preferences between the periods, and the expectations about the future that can limit the deficit and surplus and these expectations play a very important role in defining the domestic balance of the current account (Sachs, 1981: 212).

Economic growth is the only way to continuously improve the living standards of people living in a country. Therefore, one of the basic macroeconomic targets of all countries is to achieve a rapid economic growth (Ünsal, 2003: 15).

The current account deficit and high growth in a country may be caused by such reasons as the value of the national currency, the low exchange rates or the domestic saving deficits. Economically, the country is an undesirable element because it increases the risk rate.

2. Development of Current Account Balance in Turkey and The Relationship Between Economic Growth

Foreign trade items (export-import), which are included in the concept of current account deficit, are two important factors affecting growth. Especially in developing countries, economic units need some foreign goods and service units to realize their investments, so they import intermediate goods and capital goods. In other words, if there is a desire for growth in these countries, there is such a large demand for imports. Exports are related to competitiveness and such countries are generally unable to export heavy products at

low-cost as well as developed countries. The general reason for this is the lack of human capital and reform.

The positive effect of economic growth on the current account deficit is due to the increase in the demand for investment and consumption goods. The increase in demand due to the increase in GDP leads to an increase in imports and thus to an increase in the current account deficit (Calderon et al., 2000: 13).

There has always been a direct proportion between the growth of the economy and the current account deficit in Turkey. Even in recent years, when we have reached high growth rates, the steady increase in the current account deficit is the most concrete indicator of this. The economy grows to the extent that source enters our country from outside, and when the source goes out, growth stops or even causes economic crisis. In foreign trade, which is one of the most important items causing the current account deficit, the increase in imports is a function that accelerates the growth.

Chart 1: The Relationship between Current Account and Growth
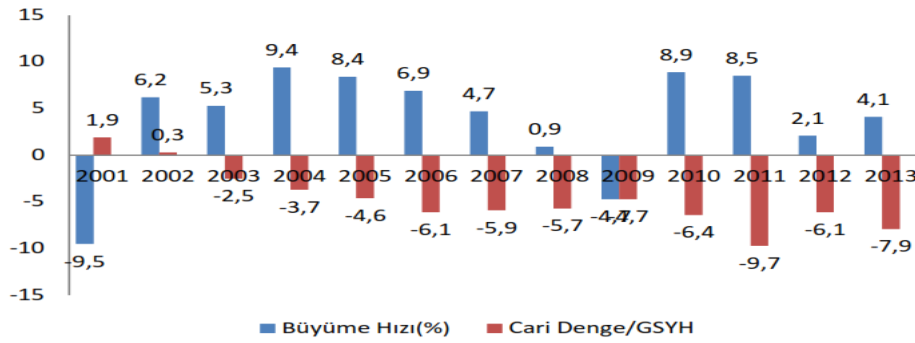
Source: TÜİK

Chart 1 must closely examine in order to see the relationship between current account and growth. According to the chart, the current account deficit became the most important determinant of the growth process. Due to the fact that imports are mainly based on intermediate goods and capital goods, the increase in economic growth led to an increase in the current account deficit in Turkey. It is observed that the current account deficit has increased in the growth periods of the country due to imports. On the other hand, it is observed that the current account deficit decreased during the recession or slowdown periods of growth.

The tendency is even worse for Turkey's economy lies in the relationship between growth of the deficit. This situation, which is very clear when compared to previous years, can be seen more clearly when the economic growth rate is high. If the comparison is made between the two periods in which the high growth rate is realized and by looking at the current deficit / GDP ratio, there is a growing danger (Özbek, 2008: 6).

Another reason for the high current account deficit is the structural problems in the economy. In an economy where structural problems are predominant, there are difficulties in economic growth, that means less production and less export. Structural elements of Turkey's economy, the fact that imports are mainly intermediate and capital goods are among the reasons that emphasize the increasing effect of growth on the current account deficit (Karagöl, 2011: 12).

Table 1: Growth Rate and Capital Inflows

Year	GNP (%)	DFI (Billion Dollar)
2005	8,4	10
2006	6,9	20,1
2007	4,7	22
2008	0,9	19,8
2009	-4,7	8,5
2010	8,9	9
2011	8,5	16,1
2012	2,1	13,2
2013	4,1	12,4
2014	2,9	12,5
2015	6,1	11,8
2016	3,2	9,2
2017	7,4	8,7

Source: TCMB

Table 1 shows the growth rate and foreign direct investment inflows in Turkey's economy. Accordingly, growth rates are high in the years when foreign direct investments are high. As foreign trade grows, the external deficit is growing, and the growing external deficit is expanding the current account deficit. The financing of the current account deficit is mainly achieved through the introduction of hot money and/or foreign direct investment. Thus, the economy has long been dependent, risky and fragile. This means that the volume of foreign trade is about 25% annually in dollar terms. While there was a foreign trade volume up to 41% of the national income in 2000, this ratio increased to 57% in 2006. Turkey, which more trade with the outside world during this period, in this sense, gave the appearance of a country with more integrated into the world economy (Özbek, 2008: 9).

Table 2: Foreign Trade Outlook

Year	Import (Million $)	Export (Million $)	Foreign Trade (Million $)	Foreign Trade Deficit (Million $)	GNP (Million $)
2000	54,503	27,775	82,278	-26,728	265,384
2001	41,399	31,334	72,733	-10,065	196,736
2002	51,554	36,059	87,613	-15,495	230,494
2003	69,34	47,253	116,593	-22,087	304,901
2004	97,54	63,167	160,707	-34,673	390,387
2005	116,774	73,476	190,251	-43,298	481,497
2006	139,576	85,535	225,111	-54,041	526,429
2007	170,063	107,272	277,334	-62,791	648,754
2008	201,964	132,027	333,991	-69,937	742,094
2009	140,928	102,143	243,071	-38,785	616,703
2010	185,544	113,883	299,428	-71,661	734,929
2011	240,841	134,883	375,748	-105,934	773,980
2012	236,545	152,461	389,006	-84,083	786,283
2013	251,661	151,802	403,463	-99,858	823,044
2014	242,177	157,610	399,787	-84,566	799,001
2015	207,234	143,838	351,072	-63,396	859,045
2016	198,618	142,529	341,147	-56,089	863,390
2017	233,799	156,992	390,791	- 76,807	851,520

Source:TCMB

3. Empirical Analysis of The Relationship Between The Current Account Balance and Economic Growth in Turkey

In this part of the study, the relationship between current account balance and economic growth has been investigated empirically. In the econometric analysis section, VAR analysis was performed with unit root tests and findings were obtained by Granger causality tests based on VAR.

3.1. Objective

Growth series based on many years of Turkey's current account deficit, it is seen that there is an interaction between the growth deficit. It is aimed to examine how the current account deficit affects economic growth.

3.2. Limitations

The research is limited to the sample because the whole of the universe cannot be reached. The research is limited to the TCMB data set.

3.3. Methodology and Data Set

In this part of the study, metedological information is given about unit root tests to be performed in econometric analysis, effect-response analysis to be applied within the scope of VAR analysis and variance separation tests.

Extended Dickey-Fuller Test (ADF) and Phillips Perron (PP-1988) unit root tests were used to test the stability of the variables used in the study. The null hypothesis (H0) in which the series is not stationary is tested with the DF and PP tests. If the null hypothesis is rejected, it is concluded that the series are stationary.

The following models are estimated for the ADF test (Enders, 1995):

$$\Delta y_t = \lambda_{y_{t-1}+a_i} \sum_{i-1}^{P} \Delta_{y_{t-i}} + \varepsilon_t \qquad\qquad \Delta_{y_1} = a_0 + \lambda_{y_{t-1}} + a_i \sum_{i-l}^{P} \Delta_{y_{t-i}} + \varepsilon_t$$

$$\Delta_{y_1} = a_0 + \lambda_{y_{t-1}} + a_i \sum_{i-l}^{P} \Delta_{y_{t-i}} + \varepsilon_t$$

From these equations, equation (1) is fixed without index and without trend; equation number (2) is fixed term; equation (3) is estimated as fixed term and trend. In these equations, yt shows tourism revenues and other macroeconomic variables. Δ the first difference operator; p, the length of the delay; εtise shows the error term.

The zero hypothesis $\lambda = 0$ is tested while performing the stationarity test. The alternative hypothesis is $\lambda < 0$. If the ADF-t statistic obtained from the test is absolutely greater than the critical value of MacKinnon (1990), since the null hypothesis is to be rejected, the coefficient λ is statistically significant and thus the series are found to be stationary. On the other hand, if the ADF-t statistics are absolutely less than the critical values, the null hypothesis is accepted. This means that the coefficient λ is not statistically significant, so that the series are not stationary. If the series are not stationary, the same tests are applied to the first differences of the series (Kadılar, 2005).

The Phillips-Perron test is a unit root test used for time series with nonparametric and moving averages. This unit root test was designed to counter the autocorrelation problem by softening the assumptions of the Dickey-Fuller test for the error term. Thus, it allows the error term to be weakly dependent and heterogeneous (Önel, 2006:77).

$$Y_t = a_0 + a_1 Y_{t-1} + \varepsilon_t \text{ ve } Y_t = a_0^* + a_1^* Y_{t-1} + a_2^*(t - T / 2) + \varepsilon_t$$

T: refers to the number of observations and εt: error. With the expected average of εt being equal to zero, the difference from Dickey Fuller is that there is no correlation between the error term or a requirement for homogeneity. The realization of the Phillips-Perron test, the limited and finite sample distributions of the test statistics are dependent on the correlation structure of the error terms. The error term within the model for the Phillips-Perron test is considered white noise (Maddala vd., 1998:74).

The Granger causality test is a causality test to determine whether there is a causality between any two variables, and if there is causality, what is the direction of this causality. In the Granger causality test, the series must be stationary, but they are not required to be stationary at the same level for the series. The regression variables of the Granger causality test, which investigates the causality relationship between two variables such as X and Y, are as follows (Telatar vd.,2009:127).

$$\Delta x_t = a_0 + \sum_{i=1}^{m} \beta_i \Delta x_{t-i} + \sum_{i=1}^{n} \gamma_i \Delta Y_{t-i} + \varepsilon_t$$

$$\Delta Y_t = \vartheta_0 + \sum_{J=1}^{P} \delta_j \Delta Y_{t-j} + \sum_{j=1}^{q} \emptyset_j \Delta X_{t-j} + v_t$$

In the above equations; βi, γi, δj and φj coefficients, m, n, p, and q show the optimal lag lengths, ε and v error terms, X and Y causality relationships, time series and Δ difference operatör (Telatar vd., 2009:127).

The VAR model treats all variables analyzed as a whole. In other words, variables are examined simultaneously in studies with VAR model. This model can give dynamic relationships without any restriction on the structural model and therefore the model is often used for time series Keating, 1990: 453-454).

Since the VAR model, which is used widely in economic studies on time series, does not require the internal external separation of variables, it differs from the systems of simultaneous equations in this respect (Charemza ve Derek, 1992: 182). Moreover, the delayed values of the dependent variables make it possible to make strong predictions for the future in VAR models (Kumar, et. al. 1995: 365). In the VAR analysis developed by Sims (1980), variables are taken as a dependent variable and are analyzed by an optimal delay length on the lagged values of itself and other variables. The effect-response function determines the effect of shock on a variable on the other variables in VAR analysis (Şentürk vd.,2013:146).

Action-reaction functions reflect the effect of a standard deviation shock in one of the random error terms on the present and future values of internal variables. In the VAR analysis, the action-reaction functions have a large share in determining the dynamic interaction between the examined variables and in determining the symmetrical relationships. The most effective variable above a macroeconomic magnitude is the action-reaction functions, whether or not this variable, which is effective by variance decomposition, can be used as a policy tool (Özgen and Güloğlu, 2004:97).

In this study, Monte Carlo technique is used to calculate the standard errors of the effect-response functions. According to this technique, a random sample is selected from the asymptotic distribution of VAR coefficients calculated by Hamilton (1994). Action-reaction

coefficients are obtained by using these coefficients obtained by simulation. The action-reaction coefficients were obtained by 1000 repetitions.

The variance decomposition divides the change in one of the internal variables into separate shocks that affect all internal variables. In this sense, variance decomposition gives information about the dynamic structure of the system. The aim of the variance decomposition is to reveal the effect of the foresight for the future variance on the error variance. The error variance of the prediction can be expressed as a contribution to the error variance of each variable for a period of h length. Then each variance obtained in this way is proportional to the total variance and has a relative weight as a percentage (Özgen ve Güloğlu, 2004:98).

It is also important to interpret the results obtained from variance decomposition. If we consider a model like the one above, x might be considered external if x is not affected by the predictive error variance regardless of the length of a prediction period in v1t. Because x moves independently from y. On the contrary, if a shock in v1t is totally (or significantly) affecting x predictive error variance, x is considered an internal variable. The sequence of the variables in the variance decomposition also affects the results (Özgen ve Güloğlu, 2004:98).

In this study, the VAR model which is formed in determining the relationship between current account balance and growth is as follows:

$$\Delta CiD_t = a_1 + \sum_{P}^{k} \beta_1 \Delta GSYH_{t-\rho} + \varepsilon_{1t}$$

$$\Delta GSYH_t = a_1 + \sum_{P}^{k} \beta_{2p} \Delta CiD_{t-p} + \varepsilon_{2t}$$

In order to determine the relationship between current account balance and growth, two variables were used: CAB (current account balance - million dollars) and GDP (million dollars). The data set consists of annual data covering the period 1983-2017. Related data Central Bank of the Republic of Turkey Electronic Data Dissemination System (EDDS) are taken from.

3.4. Empirical Findings

ADF and Phillips-Perron (PP) unit root tests were used to test the stability of variables before the VAR analysis. Table 3 shows the ADF unit root test results of the variables. Accordingly, the current account balance is stable at the level level and is stabilized by the first difference of the GDP variable.

Table 3: ADF Unit Root Test Results for CAB and GDP Variables

Variables	Level Value		First Difference	
	Fixed	**Trendy and Fixed Variable**	**Fixed**	**Trendy and Fixed Variable**
CAB	-3,419(0)*	-5,602(0)*	6,836(1)*	-6,771(1)*
GDP	0,630(0)	-1,600(0)	-5,743(0)*	-6,038(0)*

* Notation stands for 1% stasis.
The values in brackets indicate the delay lengths selected according to the SIC criteria.

Table 4 shows the unit root test results of the PP test. The current account balance variable was stable at the level and the GDP variable became stagnant upon the first difference.

Table 4: PP Unit Root Test Results for CAB and GDP Variables

Variables	Level Value		First Difference	
	Fixed	**Trendy and Fixed Variable**	**Fixed**	**Trendy and Fixed Variable**
CAB	-3,444(3)**	-5,600(1)*	-25,594(32)*	-30,471(25)*
GDP	0,617(3)	-1,639(3)	-5,768(3)*	-6,037(2)*

and ** Notation refers to stability at levels of 1% and 5%, respectively.

The values in brackets indicate the bandwidth values selected according to the Bartlett Kernel criteria.

It is important to determine the lag length before creating the VAR model by the variables used in the study. For determining the length of delay in econometric package programs; Likelihood Ratio Test (LR), Akaike Information Criteria (AIC), Schwarz Information Criterion (SIC), Final Prediction Error (FPE) and Hannan-Quinn Information Criteria (HQ) are used. First degree differences of the variables were taken before the VAR analysis.

Table 5: VAR Model Delay Lengths

Internal Variables: CAB GDP External Variable: C Sample: 1983-2017 Observation: 32					
0	-800,6471	NA	2,1E+19	50,16544	50,25705	50,19581
1	-745,2838	**100.3460***	**8.47e+17***	**46.95524***	**47.23006***	**47.04633***
2	-744,3832	1,519762	1,03E+18	47,14895	47,60699	47,30078
3	-742,0944	3,576189	1,16E+18	47,2559	47,89716	47,46846

* It shows the most appropriate delay length determined according to the relevant criteria.

Table 5 shows the VAR model delay lengths obtained from the VAR analysis. Accordingly, the length of the delay in the VAR analysis was determined to be 1. In the VAR analysis performed with a delay length of 1, the autocorrelation problem was tested.

Table 6: VAR Model Autocorrelation Results

Observation: 34 (1983-2017)		
Lags	**LM-Stat**	**Prob**
1	1,590877	0,8104
2	3,921241	0,4168
3	2,294681	0,6817
4	2,930217	0,5696
5	2,748074	0,6008
6	5,135167	0,2737
7	4,668539	0,323
8	2,023214	0,7315

* Blank Hypothesis: No Correlation in Series.

According to the results in Table 6, the Ho hypothesis is accepted as there is no correlation in the series because the probabilities in the 8 periods are greater than 0.10. Accordingly, there is no autocorrelation problem in the VAR analysis. So the established model is robust and consistent.

In the analysis, after the autocorrelation test, the effect-response analysis was carried out between the variables. The graphs of action-reaction analysis results are presented in Appendix 1. Accordingly, the response of GDP to a standard deviated shock in the Current Account Balance was negative. In a standard deviating shock from the GDP, the current account balance was positively affected from the first period.

Table 7: Results of Variance Decomposition for CAB Variables

CAB Variance Decomposition			
Period	S.E.	GDP	CAB
1	18404,12	7,14218	92,85782
2	18929,92	9,569367	90,43063
3	19299,11	12,30911	87,69089
4	19688,64	14,94808	85,05192
5	20090,11	17,51521	82,48479
6	20504,5	20,00793	79,99207
7	20932,07	22,42637	77,57363
8	21373,15	24,7707	75,2293
9	21828,08	27,04125	72,95875
10	22297,18	29,23856	70,76144

It is important to determine what percentage of the change in variables following impact response analysis is explained by itself, and what percentage is explained by other variables. This situation can be revealed by variance decomposition method. In the variance analysis for variables, the main purpose is to reveal the sources of change in the variance of a variable according to the variables in the model.

Table 7 shows the variance decomposition results obtained for the CAB variable. According to these results, 92% of the change in the current account balance stemmed from itself and 7,14% was due to economic growth. In the following periods, the ratio of the GDP variable to the current account balance variable has increased gradually and has recently been realized as 22,29%.

Table 8: Results of Variance Decomposition for GDP Variable

GDP Variance Decomposition			
Period	S.E.	GDP	CAB
1	44625,9	100	0
2	66797,43	87,47565	12,52435
3	83642,56	84,76428	15,23572
4	98336,39	83,39283	16,60717
5	111740,6	82,5866	17,4134
6	124305,2	82,05501	17,94499
7	136291,8	81,67867	18,32133
8	147869,5	81,39857	18,60143
9	159155,4	81,18223	18,81777
10	170234,8	81,01032	18,98968

Variance decomposition results of the GDP variable are also given in Table 8. According to the data in Table 8; 100% of the change in GDP variable in the first period is due to itself. In the second period, 12.52% was caused by CAB. As the periods progressed, it is seen that the ratio of the current account balance to the change in GDP has increased.

Table 9: Granger Causality / Block Exogeneity Wald Test Result for CAB

The dependent variable: CAB			
Variable	**x²**	**df**	**Probability Value**
GDP	**21.04126**	**1**	0.0000
All	**21.04126**	**1**	0.0000

Table 9 and 10 show the VAR based Granger causality test for both variables. According to these results, a bidirectional causality relationship was determined between the two variables. That is, while GDP is effective on current account balance, current account balance is also effective on GDP. These results are consistent with the results of the action-reaction analysis.

Table 10: Granger Causality / Block Exogeneity Wald Test Result for GDP

The dependent variable: GDP			
Variable	**x²**	**df**	**Probability Value**
CAB	**8.779253**	**1**	0.0030
All	**8.779253**	**1**	0.0030

Result and Recommendations

In the Study that analyzed the relationship between Turkey's economy in the current account and economic growth and stability, the relationship between the current account balance and growth was analyzed by VAR analysis and VAR based Granger causality test. In the VAR analysis, which was made on the annual data covering the period of 1983-2017, unit root tests were performed and the stability of the variables was tested. As a result of the unit root tests, while the current account balance variable was stable at the level value, the GDP variable became stagnant when the first difference was obtained. Before the VAR model was used, the length of the delay was determined and if there was an autocorrelation problem in the VAR analysis with 1 delay length was tested. It was concluded that there is no autocorrelation problem and the established model is robust and consistent in the VAR analysis.

According to the action and reaction analysis evaluations made in VAR analysis; while the GDP response was negative in the current account balance, the current account balance was positively affected from the first period in a standard deviation shock in GDP.

According to the variance decomposition; while 7% of the shocks in the current account balance was explained by economic growth in the first period, the explanatory power of economic growth increased in the following periods.

Consequently, the study findings obtained as a result, according to the literature, frequently raised in recent years by economists, Turkey lends support to the view that the current account deficit of growth based economy. The increase in the growth rate leads to an increase in the current account deficit.

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