AN EMPIRICAL INVESTIGATING OF BUDGET AND CURRENT ACCOUNT DEFICIT: THE CASE OF USA

Dr. Erdal Arslan

Asst. Professor, Department of Economics,
Selçuk University, Konya, Turkey

ABSTRACT

This study aimed to examine the causal relationship between the current account deficit and the federal budget deficit in the US economy during the period 1980-2017. Several tests have been used to examine the performance of the model, most notably ones are the unit root tests, Johanson's co-integration test, the causality test, and the Vector Autoregressive (VAR) test. The study showed that there is a correlation between the current account deficit and the budget deficit in the long term. The study results also showed a two way causal relationship between the current account deficit and the federal budget deficit which indicates a twin deficit in the US economy during the studied period.

Keywords: twin deficit hypothesis, current account deficit, federal budget deficit, USA

INTRODUCTION

Many economists and politicians believe that maintaining long-term macroeconomic balances depends on keeping the current account deficit and budget deficits under control (Sever & Demir, 2007). In the early 1980s, the large budget deficit in the United States, which is caused by the economic recession, caused the current account deficit. This was followed by a discussion of the two deficits imbalances in economic literature, which has assumed a great place in the scientific studies and researches. In this context, the fact that the budget deficit negatively affects the current account deficit has been known as the twin deficit phenomenon. Now, decades later, the twins have once again brought which affects both political and economic decision-makers. Some economists say that it is a sign of a weakness the United States cannot ignore in the medium term. Despite the decrease in unemployment rates and the increase in economic growth in the US during the first period of US President Donald Trump's administration, the US economy faces tough challenges in terms of foreign trade activity on the one hand (the trade exports are lower than imports which, in turn, increased the current account deficit) and the

increase in the federal budget deficit on the other hand.

This study aimed at analyzing the causal relationship between the federal budget deficit and the current account deficit in an advanced industrial economy. It also aimed to examine the hypothesis of Ricardian equivalence which states that there is no relationship between the two deficits. In addition, it examines the Keynesian theory which states that there is a positive causal relationship between the budget deficit and the current account deficit. This study deals with the US economy as an applied example to analyze the double relationship between the budget deficit and the current account deficit. The study is based on annual time series data covering the period 1980-2017.

PREVIOUS STUDIES

The phenomenon of twin deficit has become the subject of many standard and theoretical studies. Based on two basic assumptions, the theoretical literatures explain the relationship between the budget deficit and the current account deficit. These two assumptions are the traditional Keynesian approach and the Ricardian equivalence hypothesis. According to the traditional Keynesian method, there is a positive relationship between the budget deficit and the current account deficit, while the Ricardian equivalence hypothesis confirms that the positive relationship between the budget deficit and the current account deficit is vague or negligible. However, the empirical studies carried out by many researchers and applied to a large group of developed and developing countries reached conclusions that support both hypotheses and others proved otherwise.

Researchers argue that the reason behind the different results is the political and social characteristics of countries or the differences in the implementation of the macroeconomic policies. At the same time, the fragile financial structures of countries and their preparedness for the crisis are the main determinants of this relationship (Bolat et al., 2011).

Before beginning to examine the causal relationship between the budget deficit and the current account deficit in the United States of America in order to reach the results that support or refute the double deficit theory, it would be useful to refer to previous applied studies that attempted to investigate and analyze the relationship between the two deficits for a group of different countries. Out of these studies are:

Darrat study in 1988 at USA. This study aimed to examine the causal relationship between the budget deficit and the US current account deficit for the period 1960: 1 - 1984: 4. The study used the Granger causality test to determine causal trends along with the Akaike criterion for predicting final error. The study assumed that the budget deficit causes the current account

deficit or vice versa, or that the two variables do not cause each other. The results also assumed that there is a two-way causal relationship between the two variables. Darrat also examined the causal effect for a number of macroeconomic variables on the current account and the budget. The rise in interest rates and the growth of the monetary base played a role in increasing the current account deficit, while the real income from abroad has no impact on the growing of current account deficit. On the other hand, the monetary base, inflation, interest rates, wage costs, real output are considered as variables that have a significant impact on the federal budget deficit.

Kulkarni & Erickson study in 2001. This study aimed to test the causal relationship between the trade deficit and the budget deficit for the annual data for India, Pakistan and Mexico. The study found out that there was no double deficit and no evidence of causality in Mexico, while the results strongly showed the evidence of double deficits in both India and Pakistan.

Saeed & Khan study in 2012. In this study, an attempt was made to test the validity of the Ricardian equivalence hypothesis of Pakistan using the annual time series data for the period 1972 to 2008. The co-integration analysis is used in this study. The estimated experimental results showed that there is no evidence for the Riccardian equivalence hypothesis in Pakistan, and that Pakistan's economy is non-Riccardian and faces a current account deficit and budget deficit.

El-Baz study in 2014. This study examined the relationship between the current account and the balances of the government budget and it also examined the validity of the hypothesis of double deficit (TDH) in Egypt during the period 1990-2012. El-Baz study results rejected (TDH) and ,according to causality test, it confirmed the existence of an inverse relationship extending from the current account deficit to the budget deficit. "Twin Divergence" was found between the current account deficit and the budget deficit in the short-term and, according to the Vector Error Correction Model (VECM) , it found a negative balance relationship in the long-term.

Al-Twaigri study in the Kingdom of Saudi Arabia 2000. The study used the co-integration test and Granger's causality in examining the relationship between the budget deficit and the current account in the Kingdom. The results of the standard study found a causal relationship between the budget deficit and the current account in the short and long term.

The study of Özmen& Biçer, in Turkey in 2015. This study aims to examine whether the twin deficit theory is valid in Turkey or not. The researchers used annual data of current account deficit, GDP and budget deficit during the period 1980-2014 by using VAR and Johanson's co-integration test. The results of the study indicate a long-term relationship between the budget deficit and the current account deficit. It also indicate a causal relationship running from the

budget deficit to the current account deficit in the short-term.

Merza, E., Alawin, M., & Bashayreh. This study is for the State of Kuwait in 2012. The main objective of this study is to examine the hypothesis of twin deficit in Kuwait during the four-year period 4: 1993-4: 2010, using the different time series techniques: unit root test, Johanson's co-integration test, Granger's causality and the Vector Autoregressivetest (Var).The results of the study indicated that the trend of causation stems from the current account to the budget balance. In addition, the results of this study found a negative long-term relationship between the current account and the balance of the budget. This increase in the current account leads to a decrease in the government budget surplus or an increase in the budget deficit. The study also concluded that the twin deficit hypothesis was not confirmed for the case of Kuwait.

Kalou & Paleologou study in 2012. This study aimed at examining the causal relationship between the budget deficit and the current account deficit in Greece data during the period 1960-2007. The deficits were positively correlated, and the causation trend ran from the current account to the budget deficit.

Study of Owora & Owoye in 2006. The study examined the twin deficit phenomenon in Nigeria as an African oil country, using the techniques of co-integration, error correction model, Granger's causality, and generalized impulse response analysis during the period 1970-2001. The results indicated a positive relationship between the two deficits in the long-term and short-term, which supports the traditional Keynesian hypothesis. The results also found a unidirectional causality from the current account deficit to budget deficit in Nigeria.

Roy & Gupta study in 2013. This study aims to investigate the twin deficit hypothesis in Bangladesh. It examines the causal relationship between the trade balance deficit and the budget deficit on the basis of time series data during the period 1972-2012. The VAR model and the Granger causality are used after the unit root test. The study showed that the budget deficit causes a trade deficit and vice versa, but this relationship is not dynamic in the long term.

METHODS & MATERIALS

This study uses the unit root test to examine the stability of time series over time and Johanson's co-integration test and the Vector Auto-Regression Test (VAR) to study the long-term relationship and long-term changes between the current account deficit and the federal budget deficit. The model used in this study can be characterized by the relationship between the current account deficit, as a dependent variable, and the federal budget deficit as an independent variable. The model can be written as follows:

Composition

$$CA_t = \alpha_0 + \alpha_1 FBD_t + e_t \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(1)$$

Where:

CA_t	= US current account deficit.
FBD_t	= US Federal Budget Deficit.
t	= Time
α_0	= constant
α_1	= Form parameter
e	= random error limit

The study relied on the annual data during the period 1980-2017 for the current account deficit as a percentage of GDP (%) and the of the federal budget deficit as a percentage of GDP (%) taken from the US Bureau of Statistics (US Census Bureau).

Empirical Analysis

Unit Root Test (Stability)

The Study of time series stability is a necessary condition for estimating VAR models. For this purpose, we will test the stability of the time series degree of the studied variables, using the Augmented Dickey Fuller (ADF) test and the Philips Peron test, and Eviews 10. The results obtained from these tests are shown in Table (1) and (2).

Table 1: Unit Root Test By Augmented Dickey Fuller (ADF)

Name Of Test	UNIT ROOT TEST (ADF)					
	Included observations 38		At level		At First difference	
			Intercept	Intercept & Trend	Intercept	Intercept & trend
Variables	Test statistics		-1.915	-1.447	-4.359	-4.483
CA	Test critical Value	1% level	-3.621	-4.226	-3.626	-4.234
		5% level	-2.943	-3.536	-2.945	-3.540
		10% level	-2.610	-3.200	-2.611	-3.202
FBD	Test statistics		-2.815	-2.778	-4.332	-4.268

	Test critical Value	1% level	-3.626	-4.234	-3.626	-4.234
		5% level	-2.945	-3.540	-2.945	-3.540
		10% level	-2.611	-3.202	-2.611	-3.202

According to the ADF test, table (1) shows that when the variables stability is studied by using the two conditions (Intercept, Intercept& Trend), both variables (CA, FBD) are not stable at the level, all three significance levels (1%, 5%, 10%). Taking the first difference of the two series, we note that, in both cases, they stabilized at all three significance levels (1%, 5%, 10%). According to the PP test, when the stability of the two variables is studied by using the two conditions (Intercept, Intercept &Trend), both variables (CA, FBD) were not stable at the level, all three significance levels (1%, 5%, 10%).Taking the first difference of the two series, we note that, in both cases, they stabilized at all three significance levels (1%, 5%, 10%). After ensuring that all time series are stable, and integrated of first class I (1), there is a possibility of a co-integration between the current account deficit, the federal budget deficit.

Table 2: Unit Root Test By Philips Peron (PP)

Name Of Test / Variables	UNIT ROOT TEST (PP)					
	Included observations 38		At level		At First difference	
			Intercept	Intercept & Trend	Intercept	Intercept & trend
	Test statistics		-2.122	-1.789	-4.326	-4.461
CA	Test critical Value	1% level	-3.621	-4.226	-3.626	-4.234
		5% level	-2.943	-3.536	-2.945	-3.540
		10% level	-2.610	-3.200	-2.611	-3.202
FBD	Test statistics		-2.200	-2.1798	-4.165	-4.092
	Test critical Value	1% level	-3.621	-4.226	-3.626	-4.234
		5% level	-2.943	-3.536	-2.945	-3.540
		10% level	-2.610	-3.200	-2.611	-3.202

Before conducting Johanson's co-integration test, the degree of the optimal number of lag length will be determined in VAR model.

Lag Length Criteria Test:

Before examining the Granger test and Co-integration Test of variables, we must determine the

number of lag length to eliminate any correlation between the variables by applying the Lag length criteria test (Gujarati, 2003). The results in Table (3) show that the optimal number of lag length are three degrees of delay (3 years) by relying on the following statistical criteria (HQ, AIC, FPE, LR) and that the lowest values for these criteria is the third degree.

Table 3: Lag Length Criteria Test

Lag length criteria test						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-143.4229	NA	13.93158	8.309881	8.398758	8.340561
1	-94.24140	89.93192	1.054608	5.728080	5.994711	5.820121
2	-83.97282	17.60328	0.739380	5.369875	5.814261*	5.523277
3	-77.31717	10.64904*	0.639736*	5.218124*	5.840263	5.432886*
*Indicates lag order selected by the criterio						

Johansen's Co-Integration Test:

After determining the integration degree and the delay degree, and ensuring that the time series in our study are stable and integrated (all of the same degree) the co-integration test and causality test will be applied in the following table.

**Table 3: Results of Co-integration Test**

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.325247	21.69696	15.49471	0.0051
At most 1 *	0.217090	8.321057	3.841466	0.0039
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level * denotes rejection of the hypothesis at the 0.05 level **MacKinnon-Haug-Michelis (1999) p-values				

The results of the co-integration test in Table 5 show that the values of Trace Static (21.69, 8.32) are greater than all the critical values (15.49,3,841) at a significant level of 5% which show that there is a co-integrated relationship between the federal budget deficit and the current account deficit in the long term.

Granger Causality:

Table 4: Granger Causality results

Dependent variable: CA			
Excluded	Chi-sq	Df	Prob.
FBD	9.082288	3	0.0282
All	9.082288	3	0.0282
Dependent variable: FBD			
Excluded	Chi-sq	Df	Prob.
CA	7.333931	3	0.0620
All	7.333931	3	0.0620

Inverse Roots of AR Characteristic Polynomial
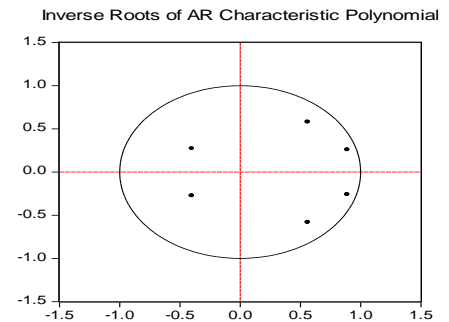
In order to test the causal relationship between the current account deficit and the federal budget deficit, we will use the VEC Granger Causality / Block Exogeneity Wald Tests test, where the significance of the test was reached. The change in the federal budget deficit causes a change in the US current account deficit at a significant level of 5% while the current account deficit causes the federal budget deficit but at a significant level of 10%. We can, therefore, conclude that there is a two-way causal relationship between the current account deficit and the federal budget deficit as shown in Table (5).

CONCLUSION

This study aimed to analyze the causal relationship between the federal deficit and the current account deficit in an advanced industrial economy. It also aimed to examine the Ricardian equivalence hypothesis which states that there is no relationship between the two deficits. In addition, the study aimed to examine the Keynesian theory which states that there is a causal relationship between the budget deficit and current account deficit . The main findings of this study are:

The results of the unit root test showed that the time series of the study variables are stable at the first difference and are not stable at the level. The results of Johansson's co-integration test showed that the study variables are integrated on the long term. It also showed a two integration vectors describing the behavior of variables. It rejected the null hypothesis which states that there is no co-integration relationship between the studied variables and accepted the alternative hypothesis which states that there is an integrated relationship between the variables on the long term at a significance level of 5%.

There is a two-way causal relationship between the federal budget deficit and the current account

deficit at a significant level of 5% and a causal relationship between the current account deficit and the federal budget deficit at a significant level of 10%. In other words, a change in the federal budget deficit causes or leads to a change in the current account deficit of the US and vice versa. Accepting the Keynesian hypothesis which states that there is a causal relationship between the budget deficit and the current account deficit in the American economy and refuting the Ricardian hypothesis which states that there is no causal relationship between the two deficits.

REFERENCES

AL-Twaigri, H.A. (2000). The Relationship between the Government Budget Deficit and the Current Account Deficit in Saudi Arabia: Testing for Cointegration and Causality, Economics and Administration, 14(1), 168-177.

Bolat, S., Belke, M. and Aras, O. (2011). Türkiye ikiz açık hipotezinin geçerliliği: sınır testi yaklaşımı, Maliye Dergisi, 161(1), 347-364.

Darrat, A.F. (1988). Have large budget deficits caused rising trade deficits?, Southern Economic Journal, 54(4), 879-887.

El-Baz, O. (2014). Empirical investigation of the twin deficits hypothesis: The Egyptian case (1990-2012), Munich Personal RePEc Archive, MPRA Paper No. 53428, 25.

Gujarati, D.N. (2003). Basic Econometrics, McGraw-Hill Inc. USA. 4th Edition.

Kalou, S. & Paleologou, S.M. (2012). The twin deficits hypothesis: Revisiting an EMU country, Journal of Policy Modeling, 34(2), 230-241.

Kulkarni, K. G. & Erickson, E. L. (2001). Twin deficit revisited: evidence from India, Pakistan and Mexico, Journal of Applied Business Research, 17(2), 97-104.

Merza, E., Alawin, M. and Bashayreh, A. (2012). The relationship between current account and government budget balance: The case of Kuwait, International Journal of Humanities and Social Science, 2(7), 168-177.

Onafowora, O. A. & Owoye, O. (2006). An empirical investigation of budget and trade deficits: the case of Nigeria, The Journal of Developing Areas, 39(2), 153-174.

Özmen, M. & Biçer, B. (2015). Türkiye İçin İkiz Açıkların Ekonometrik Analizi. Çukurova Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 24(2), 279-294.

www.ijsser.org
Page 1536

Roy, A. & Gupta, S.D. (2013). An Empirical Investigation of Budget and Trade Deficits: The Case of Bangladesh, International Journal of Economics and Financial Issues, 3(3), 570-579.

Saeed, S. & Khan, M. A. (2012). Ricardian Equivalence Hypothesis and Budgetary Deficits: The Case of Pakistan 1972-2008, Interdisciplinary Journal of Contemporary Research in Business, 3(9), pp. 1432-1446.

Sever, E. & Demir, M. (2007). Türkiye'de bütçe açığı ile cari açık arasındaki ilişkilerin VAR analizi ile incelenmesi, Eskişehir Osmangazi Üniversitesi İİBF Dergisi, 2(1), 47-63.