



THE TWIN DEFICITS PHENOMENON IN TURKEY: AN EMPIRICAL INVESTIGATION

Pelin Varol Iyidogan^{1*}

¹Department of Public Finance, Hacettepe University, Ankara, Turkey. Email: pelinv@hacettepe.edu.tr.

KEYWORDS

Budget deficit, current account deficit, structural break, causality.

ABSTRACT

The aim of this study is to explore the relationship between budget deficit and the current account deficit for Turkey over the period 1987-2005. Considering the structural breaks in the series, the stationarity analysis is employed by means of Zivot- Andrews unit root test. In the succeeding step of the methodology, by utilizing Toda Yamamoto test, the causality relationship between the budget deficit and the current account deficit is examined. The empirical results indicate that current account deficit is a causing variable for the budget deficit in Turkish economy.

1. INTRODUCTION

A wide and expanding literature tries to shed light on the the impact of budget deficit on the current account deficit, in other words twin deficits relation. The regarding relation is based on two theoretical explanations which are the Keynesian approach and the saving-investment interaction. According to the Keynesian view, an expansionary fiscal policy which leads to budget deficit will deteriorate current account balance via an increase in income. Besides, in a small open economy which has a flexible exchange rate system, an increase in the fiscal deficit will lead to a rise in the current account deficit through the interest rate and the exchange rate transmission mechanisms. On the other hand, the current account balance (CAB) is defined by

$$(S^P - I^P) + (S^G - I^G) = CAB \quad (1)$$

where $(S^P - I^P)$ and $(S^G - I^G)$ represent the private sector and the public sector saving-investment balance, respectively. An increase in the budget deficit, in other words a deterioration in the public sector balance in (1) will give rise to current account deficit, i.e. twin deficits if the private sector balance is held constant. Contrarily, Ricardian equivalence theorem asserts that tax payers will increase the private savings to pay the future taxes in consequence of debt-financed government spending. More briefly, budget deficits have no real impact on the external balance since the rise in the private saving will neutralize the alteration in the public sector balance. Beside the Ricardian equivalence theorem, twin deficits relation can be criticized with regard to Summers (1988) that points out the implementation of fiscal policies such as reducing budget deficits in order to improve the current account balance so that the causality runs from the current account balance to the budget balance. Moreover, as Magazzino (2012) states, while budget deficits may cause current account deficits, the existence of significant feedback may cause causality between the two variables to occur in both directions.

Following Baharumshah and Lau (2005), it can be asserted that the recent empirical literature on the budget balance and the current account balance interaction has mainly concluded with four relations mentioned above that are, i) twin deficits relation (Beetsma et al. 2008; Afonso and Rault 2010; Bagnai, 2010; Ketenci and Uz 2010; Bluedorn and Leigh 2011; Stournaras 2013), ii) Ricardian equivalence (Daly and Siddiki 2009; Datta and Mukhopadhyay 2010), iii) the reverse causality from the current account balance to the budget balance (Marinheiro 2008; Katircioğlu et al. 2009; Ganchev 2012; Magazzino 2012) and iv) the bilateral causality between the variables in question (Mukhtar et al. 2007; Arize and Malindretos 2008; Pahlavani and Saleh 2009; Barışık and Kesikoğlu 2010). Moreover, there is also a current literature that is devoted to the analysis of the budget balance and current account balance relationship for Turkey by utilizing VAR analysis, conventional cointegration tests and Granger causality analysis (Sever and Demir 2007; Yay and Taştan 2007; Erdinç 2008; Ümit and Yıldırım 2010; Varol İyidoğan and Erkam 2013).

In this context, this study empirically examines the validity of twin deficits relation in Turkish economy which has experienced both high fiscal and external deficits over the considered period, 1987-2005. Apart from the existing literature, the regarding relation is investigated by taking into account the structural breaks and employing causality analysis that does not rely on the stationarity properties or the cointegration relation between the series.

2. DATA AND METHODOLOGY

The budget balance and the current account balance relationship for Turkey is analyzed by using 1987-2005¹ quarterly data of the budget balance/GDP (bb) and current account balance/GDP (ca) series. The budget balance, current account balance and GDP series have been generated by means of data which is obtained from the Ministry of Finance General Directorate of Accounting, CBRT Electronic Data Distribution System and Turkish Statistical Institute, respectively. The descriptive statistics of the series are reported in Table 1.

Table 1: Descriptive Statistics

Variables	Current Account Balance	Budget Balance
Mean	-0.013956	-0.070697
Median	-0.013529	-0.052042
Maximum	0.058292	0.012813
Minimum	-0.086843	-0.254566
Standard deviation	0.033797	0.058368
Skewness	-0.102773	-1.080172
Kurtosis	2.627719	3.556539
Jarque-Bera	0.572666	15.75994

¹The reason for the data not being up-to-date is the change of the budget definition in 2006. Accordingly, while consolidated budget implementation was in question between 1994-2005, central government budget has begun to be used since 2006. Since the harmonization of these two practices has not been completed yet, the analyses in the study is employed using the data of 1987:1-2005:4.

Table 1 shows that average rates of the series are about -0.014 and -0.07 with a standard deviation of 0.034 and 0.058, respectively. The small values of the standard deviation can be interpreted on behalf of the low volatility of the series. The kurtosis value smaller than 3 indicates that “ca” series is small-tailed. Besides, both series exhibit leftward skewness due to the negative skewness values. According to the Jarque-Bera test statistics, the null hypothesis of normality is accepted for “ca” series while “bb” series is not found to be normally distributed. This result can be attributed to the skewness value of the “bb” series that is substantially different from zero, the normal distribution value.

As the first step of the methodology, the stationarity of the series is examined by utilizing the testing procedure of Zivot and Andrews (1992) which endogenously determines the structural breaks in the series. The null hypothesis of unit root is tested through three models that are Model A, B and C in equations (2)-(4). Model A allows for a one-time change in the intercept while Model B permits a one-time change in trend and Model C both allows a break in intercept and trend.

Model A:

$$y_t = \mu^A + \alpha^A y_{t-1} + \beta^A t + \theta^A DU_t(\lambda) + \sum_{j=1}^k d_j^A \Delta y_{t-j} + \varepsilon_t \tag{2}$$

Model B:

$$y_t = \mu^B + \alpha^B y_{t-1} + \beta^B t + \theta^B DT_t(\lambda) + \sum_{j=1}^k d_j^B \Delta y_{t-j} + \varepsilon_t \tag{3}$$

Model C:

$$y_t = \mu^C + \alpha^C y_{t-1} + \beta^C t + \theta^C DU_t(\lambda) + \gamma^C DT_t(\lambda) + \sum_{j=1}^k d_j^C \Delta y_{t-j} + \varepsilon_t \tag{4}$$

$DU_t(\lambda)$ and $DT_t(\lambda)$ dummy variables represent the shifts in intercept and trend, respectively that occur at break time TB. $DU_t(\lambda) = 1$ and $DT_t(\lambda) = t - TB$ if $t \geq TB$ and zero otherwise. The null of unit root is rejected if α is statistically significant.

After the stationarity analysis, the relationship between the budget balance and the current account balance is examined by applying causality test of Toda and Yamamoto (1995). TY analysis does not consider the integration order or the long run relationship between the series so that the problem of misidentification of the stationarity properties or the cointegration relation is avoided. The testing procedure is based on the estimation of VAR(k+d^{max}) model in equation (5) and (6) where d^{max} and k represent maximum order of integration and the optimal lag length, respectively.

$$ca_t = \mu_1 + \sum_{i=1}^{k+d \max} \alpha_{1i} ca_{t-i} + \sum_{i=1}^{k+d \max} \beta_{1i} bb_{t-i} + e_{1t} \tag{5}$$

$$bb_t = \mu_2 + \sum_{i=1}^{k+d \max} \alpha_{2i} bb_{t-i} + \sum_{i=1}^{k+d \max} \beta_{2i} ca_{t-i} + e_{2t} \tag{6}$$

3. EMPIRICAL RESULTS

The empirical results are reported in two steps. First, the integration order of the series is determined by applying Zivot Andrews unit root test. Second, the causality relationship between the budget deficit and the current account deficit is examined by means of Toda-Yamamoto methodology. In this context, Table 2 reports the results of stationarity analysis.

Table 2: Zivot Andrews Test Results

Variables	Model A		Model B		Model C	
	t-stat	TB	t-stat	TB	t-stat	TB
Budget balance	-6.718	2003Q1	-8.174	2003Q1	-9.330	2001Q2
Current account balance	-6.176	2003Q1	-6.089	2002Q1	-6.639	2001Q2
	Model A critical values: %1: -5.43, %5:-4.80		Model B critical values: %1: -4.93, %5:-4.42		Model C critical values: %1: -5.57, %5:-5.08	

According to Table 2, in all models the null of unit root can be rejected at %1 significance level implying that both series are stationary at levels. The structural breaks for budget and current account balance occur in 2001Q2 and 2002Q1 that coincide with the crisis period in Turkish economy. More clearly, this result can be explained through the deterioration of fiscal balance and current account balance during 2001 financial crisis. Moreover, according to Model A and Model B, the structural break time for the budget balance series is found to be 2003Q1 that can be attributed to the contractionary fiscal policy implementations aftermath of the 2001 crisis to maintain the public sector balance.

The Toda Yamamoto causality analysis is based on both the integration order of the series and the optimum lag structure. The maximum integration order of the series is found to be “0” with regard to the results of Zivot Andrews unit root tests in Table 2. The optimal lag length for the bivariate VAR model is determined through the Akaike Information Criteria (AIC), Schwarz Information Criteria and Hannan-Quinn (H-Q) criteria together with the autocorrelation tests (Table 3)..

Table 3: The Determination of Optimal Lag Length

	AIC	SC	HQ
0	-6.721703	-6.656423	-6.695837
1	-7.225734	-7.029896	-7.148137
2	-7.183785	-6.857387	-7.054456
3	-7.159878	-6.702920	-6.978817
4	-7.178824	-6.591308	-6.946032
5	-7.378762	-6.660686	-7.094239
6	-7.339100	-6.490465	-7.002845
7	-7.272564	-6.293369	-6.884577
8	-7.282502	-6.172748	-6.842783

The optimal lag length is determined as to be “1” with regard to the results of SC and HQ criteria while “5” according to AIC. However, lag length “1” is preferred to “5” in order to avoid the loss of degrees of freedom. The problem of serial correlation for the optimal lag length is also checked through LM autocorrelation tests. Finally Toda Yamamoto causality test which utilizes Wald test is employed to testify whether the β coefficients in (5) and (6) are statistically significant. The results of the Toda Yamamoto procedure are given in Table 4.

Table 4: Causality Test Results

	k+dmax	Wald statistic	p-value
bb→ca	1	0.633904	0.4259
ca→bb	1	7.257528	0.0071

The causality test results indicate that current account balance has a causal impact on the budget balance in the considered period of Turkish economy. More briefly, a change in the current account deficit will affect the fiscal balance. On the other hand, there is no evidence of twin deficits hypothesis, in other words causality running from the budget balance to the current account balance. The result is consistent with Varol İyidoğan (2011) and Varol İyidoğan (2013) that analyze the regarding relation for Turkey over the same period, 1987-2005.

4. CONCLUSION

The empirical literature on the twin deficits relation commonly comprises the analysis of the countries which experience both fiscal and current account deficits. Considering 1994 and 2001 crisis which have aroused from both internal and external imbalances, the examination of the budget balance and current account balance relationship is also crucial for Turkish economy. Accordingly, this study empirically analyzes the regarding relationship over 1987-2005 period of Turkish economy. The methodology is based on both Zivot Andrews stationarity analysis and Toda Yamamoto causality tests. Zivot Andrews test results indicate that both series are stationary at levels with structural breaks in the period of 2001 financial crisis. Finally, according to Toda Yamamoto analysis the evidence of reverse causality running from current account balance to budget balance is found in the considered period. This result can be attributed to the impact of the current account balance on the economic growth, thus the tax revenues. On the other hand, the finding can also imply that the current account deficit leads to rise in the external debt service which deteriorates the consolidated budget balance. As a result, it can be concluded that the policies aiming at the current account balance will also contribute to the improvement of the budget balance together with the fiscal policy.

REFERENCES

- Afonso, A. and Rault, C. (2009), Bootstrap Panel Granger-Causality Between Government Budget and External Deficits for the EU, CESifo Working Paper, 2581.
- Arize, A.C. and Malindretos, J. (2008), Dynamic Linkages and Granger Causality Between Trade and Budget Deficits: Evidence from Africa, *African Journal of Accounting, Economics, Finance and Banking Research*, 2(2), pp. 1-19.
- Bagnai, A. (2010), Twin Deficits in CEEC Economies: Evidence From Panel Unit Root Tests, *Economics Bulletin*, 30(2), pp. 1-9.
- Baharumshah, A.Z. and Lau, E. (2005), Budget and Current Account Deficits in SEACEN Countries: Evidence Based on the Panel Approach, *International Finance*, EconWPA 0504002, pp. 1-34.
- Barışık, S. and Kesikoğlu, F. (2010), Makro Ekonomik Değişken Olarak Bütçe Açığı-Cari Açık İlişkisi: Gelişmekte Olan Piyasalar Örneği, *İktisat İşletme ve Finans*, 25(294), pp. 109-127.
- Beetsma, R., Giuliodori, M. and Klaassen, F. (2008), The Effects of Public Spending Shocks on Trade Balances and Budget Deficits in the European Union, *Journal of the European Economic Association*, 6(2-3), pp. 414-423.
- Bluedorn, J., and Leigh, D. (2011), Revisiting the Twin Deficits Hypothesis: The Effect of Fiscal Consolidation on the Current Account, *IMF Economic Review* 59(4), pp. 582-602.
- Daly, V. and Siddiki, J. U. (2009), The Twin Deficits in OECD Countries: Cointegration Analysis with Regime Shifts, *Applied Economic Letters*, 16(11), pp. 1155-1164.
- Datta, K. and Mukhopadhyay, C.K. (2010), Twin Deficits Phenomenon in Maldives: Spectral and Time Domain Analysis of Time Series, *The IUP Journal of Applied Economics*, 9(2), pp. 98-125.
- Erdoğan, Z. (2008), İkiz Açıklar Hipotezinin Türkiye’de 1950-2005 Yılları Arasında Eşbütünlük Analizi ve Granger Nedensellik Testi ile İncelenmesi, *Anadolu Üniversitesi Sosyal Bilimler Dergisi*, 8(1), pp. 209-222.
- Ganchev, G.T., Stavrova, E. and Tsenkov, V. (2012), Testing the Twin Deficit Hypothesis: The Case of Central and Eastern European Countries, *International Journal of Contemporary Economics and Administrative Sciences*, 2(1), pp. 1-21.
- Katırcıoğlu, S.T., Feth, S. and Feth, M.D. (2009), Twin Deficits Phenomenon in Small Islands: An Empirical Investigation By Panel Data Analysis, *Applied Economics Letters*, 16(5), pp. 1569-1573.
- Ketenci, N. and Uz, İ. (2010), Determinants of Current Account in the EU: The Relation Between Internal and External Balances in the New Members, *MPRA Paper*, 27466.
- Magazzino, C. (2012), The Twin Deficits Phenomenon: Evidence From Italy, *Journal of Economic Cooperation and Development*, 33(3), pp. 65-80.
- Marinho, C.F. (2008), Ricardian Equivalence, Twin Deficits, and the Feldstein-Horioka Puzzle in Egypt, *Journal of Policy Modeling*, 30, pp. 1041-1056.
- Mukhtar, T., Zakaria, M. and Ahmed, M. (2007), An Empirical Investigation for the Twin Deficit Hypothesis in Pakistan, *Journal of Economic Cooperation*, 28(4), pp. 63-80.

- Pahlavani, M. and Saleh, A. S. (2009), Budget Deficits and Current Account Deficits in Philippines: A Causal Relationship?, *American Journal of Applied Sciences*, 6(8), pp. 1515-1521.
- Sever, E. and Demir, M. (2007), Türkiye’de Bütçe Açığı ile Cari Açık Arasındaki İlişkilerin VAR Analizi ile İncelenmesi, *Eskişehir Osmangazi Üniversitesi İİBF Dergisi*, 2(1), pp. 47-63.
- Stourmaras, C. F. (2013), Twin Deficits in Greece: Theory and Evidence from the Last Drachma Journey, Available at SSRN: <http://ssrn.com/abstract=2205047> or <http://dx.doi.org/10.2139/ssrn.2205047>.
- Summers, H. L. (1988), Tax Policy and International Competitiveness. in Ed. J. Frankel, *International Aspects of Fiscal Policies*, Chicago: Chicago: UP, pp. 349-375.
- Toda H. Y. and Yamamoto T. (1995), Statistical Inference in Vector Autoregressions with Possibly Integrated Processes, *Journal of Econometrics*, 66(1-2), pp. 225-250.
- Ümit, A. Ö. and Yıldırım, K. (2010), İkiz Açıklar Hipotezi: Türkiye Analizi, *İktisat İşletme ve Finans*, 23(267), 116-132.
- Varol İyidoğan, P. (2011), İkiz Açıklar Hipotezi: Türkiye Deneyimi, Hacettepe University Graduate School of Social Sciences Department of Economics, Unpublished Ph.D. Thesis.
- Varol İyidoğan, P. and Erkam, S. (2013), İkiz Açıklar Hipotezi: Türkiye için Ampirik Bir İnceleme (1987-2005), *Pamukkale Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 15, pp. 39-48.
- Yay, G.G. and Taştan, H. (2007), İkiz Açıklar Olgusu: Frekans Alanında Nedensellik Yaklaşımı, *İÜ Siyasal Bilgiler Fakültesi Dergisi*, 37, pp. 87-111.
- Zivot, E. and Andrews, D. W. K. (1992), Further Evidence of the Great Crash, The Oil Price Shock and the Unit Root Hypothesis, *Journal of Business and Economic Statistics*, 10(3), pp. 251-270.