Testing Twin Deficits and Saving-Investment Nexus in Turkey

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Abstract

This paper provides further evidence on the validity of twin deficits and the Feldstein-Horioka hypotheses for Turkey during the period of 1987-2004 using bounds testing approach to cointegration. In order to explain the main determinants of the current account deficits in the long-run, the fiscal balance and the domestic investments are used in an econometric model.The cointegration tests indicate the presence of a long-run relationship between the current account and budget deficits as well as the domestic investments during the estimation period. As a result, it is concluded that the twin deficits hypothesis and the Feldstein-Horioka puzzle are present and Turkey appeared to be integrated into the world capital market with a low degree of capital mobility as less than 1/5 of its domestic investment is financed through external funds. The augmented Granger-causality tests suggest no causality between the current account and budget deficits, both in the short-run and the long-run. The post-sample variance decompositions suggest that the domestic investments are the main cause of current deficits in the long-run. The paper also discusses the policy implications of the empirical results.

Keywords: Twin deficits, Feldstein-Horioka hypothesis, cointegration, Turkey

JEL Classifications: C22, F32, F36

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1. Introduction

In recent economic literature, a new research interest has emerged, suggesting that both the twin deficits and Feldstein – Horioka hypotheses may be used to explain the long-run determinants of current account imbalances. Fidrmuc (2003) has pionoreed this new direction of research providing first theoretical underpinnings and empirical evidence from some EU (European Union) countries. According to this new research area, the Feldstein-Horioka and the twin deficits hypotheses could be incorporated and estimated empirically in a single equation in order to provide plausible exlanations for the long-run determinants of current account imbalances. Feldstein-Horioka (1980) presents that changes in domestic investment are very sensitive to changes in domestic savings. Thus, there is a positive long-run relationship between the ratio of domestic investment-gross domestic product and the ratio of domestic savings – gross domestic income. This simple statistical association is also regarded as the existence of the degree of international capital mobility. Meanwhile the twin deficits hypothesis is defined as a positive long-run relationship between the current account and fiscal balance. Fidrmuc (2003) tested both hypotheses for 12 OECD countries during 1970-2001 and concluded that the twin deficits and Feldstein-Horioka hypotheses existed only in the case of Hungary and Poland. The study of Fidrmuc (2003) recently has been adopted by a few researchers. Marinheiro (2008) reports a high degree of capital mobility and a rejection of twin deficits hypothesis during the period of 1974-2004 for Egypt. Altintas and Taban (2011) argues that the twin deficits and Feldstein –Horioka hypotheses are valid in the case of Turkish data for the period of 1974-2007. Using the annual data of 1976-2010 for Pakistan, Khan and Saeed (2012) confirms the existence of the twin deficits and the Feldstein - Horioka hypotheses. Bagheri *et al*. (2012) presents a weak support for the hypotheses in Iran over the period of 1971-2007. Erdem *et al.* (2016) finds evidence for the hypotheses in the case of Turkey using annual data of 1960-2014[1].

Turkey has been implementing a set of economic reforms to transform its import-substituting economic structure to market economy structure since 1980. The liberalization of money and foreign exchange markets were relatively faster and effective in comparison to reducing the size of government in economy. To this end, following the interest rate liberalization in 1987, the capital account was also liberalized in 1989 which paved the way for foreign savings to contribute to the domestic savings' gap. During the decade of the 1990s and the begining of the 2000s, Turkey has faced both severe current account and budget deficits at the same time. Although the budget deficits were taken under control following the austerity programme which was put into implentation in 2001 following the economic crises of 1999 and 2001, the current account deficits are still seen to be running quite high in the last decade.

The objective of this paper is as follows: to test empirically the validity of the twin deficits and the Feldstein – Horioka hypotheses using Turkish time series data during 1987-2004 and implementing a dynamic cointegration procedure as well as establishing the casuality tests between the variables both within and out of sample periods.

The aim of this study is to investigate the main determinants of the current account imbalances in Turkey and provide some policy guidelines for the policy makers.

This study differs from Altintas and Taban (2011) and Erdem *et al.* (2016) on two different accounts; firstly, these studies cover some periods before1989 in which Turkey did not have financial account liberalizations. Therefore, using external savings for domestic investments was not a financial option and the authors did not take this into account in their econometric model. Moreover, this study extends the causality analysis beyond the out of sample periods.

[1] As a passing note, there are numerous studies empirical relating to twin deficits hypothesis in Turkey such as Ay *et al* (2004), Yay and Tastan (2007), Yaprakli (2010), Bolat *et al.* (2011), Kayhan *et al.* (2013), Calik *et al.* (2015) with inconclusive results for the hypothesis.

The remainder of this paper is organized as follows: the next section presents a brief conceptual framework and econometric methodology. Section 3 discusses the empirical results and the last section concludes.

2. Empirical Model and Methodology

Fidrmuc (2003) sets out the relationship between budget and current account balances using the national accounts as follows:

$$Y_t = C_t + I_t + G_t + X_t - M_t \tag{1}$$

where Y is income, C is private consumption, I is private investment, G is public consumption, X is exports and M is imports. Eq.(1) can be arranged as folllows:

$$X_t - M_t = Y_t - C_t - G_t - I_t = S_t - I_t \tag{2}$$

Eq. (2) suggests that the external account has to equal the difference of national savings and investments. Thus, the current account is directly related to saving and investment in the economy, implying that as investment is encouraged as a result, external account will be negatively affected. However, a contraction in private or public consumption will have a positive impact on current account balance as they increase national savings.

As we separate public S^g from private savings S^p, then public savings are related to fiscal budget which are defined as (T - G) in which T is tax income. Similarly, private savings are defined as $S^p = Y_t - T_t - C_t$. Thus, we write out Eq. (2) as follows:

$$X_t - M_t = (Y_t - T_t - C_t) + (T_t - G_t) - I_t = S_t^p + S_t^g - I_t \tag{3}$$

Eq. (3) suggests that if private savings equal investment, the current account and fiscal budget are directly interrelated or "twinned". The concept of twin deficits hypothesis finds its theoretical basis in the Mundell-Fleming open economy model and the Keynesian absorption theory. The former approach argues that an increase in budget deficits will cause an increase in domestic interest rate above the world rate which leads to capital inflows and exchange rate appreciation and , in turn, leaves the country's current account in deficits. The latter theory demonstrates that a rise in budget deficits induces domestic absorption which results in an increase in imports and a decrease in exports; thus, the current account deficits occurs. On the other hand, the Ricardian Equivalence Hypothesis (REH) of Barro (1974) dictates that the current account and budget balance are not related, implying that the government tax policy has no impact on private spending and national savings.

According to Feldstein and Horioka (1980) in a world of perfect capital mobility, the financing of domestic investment is not related to domestic savings, if the domestics savings and investments are not correlated implying high capital mobility. However, a number of empirical research studies have found reverse results leading to the conclusion of a puzzle that a high portion of domestic investment is still financed from domestic savings, especially in developed countries. On the other hand, some researchers, such as Coakley *et al*. (1996) and Sachsida and Caetano (2000), argue that the Feldstein-Horioka hypothesis does not necessarily imply capital mobility and it should be regarded as an indication of substitution between external and domestic savings. Therefore, it seems that the debate over whether saving-investment co-movement as an indication of capital mobility is still unresolved.

Eq. (3) also implies that there is a long-run relationship between the current account, the budget deficit and total investment. Therefore, it is possible to estimate Eq. (3) by a regression model, as proposed by Fidrmuc (2003).

$$x_t - m_t = \alpha_0 + \alpha_1 (t_t - g_t) - \alpha_2 i_t + \varepsilon_t \tag{4}$$

The lower case letters in Eq. (4) indicate that the variables are expressed as a share of GDP in which ($x - m$) stands for the current account, ($t - g$) represents the government budget balance and the investment ratio is defined as i.

A positive sign for the coefficient of fiscal balance (i.e. $\alpha_1 > 0$) and a negative sign for the coefficient of investment (i.e. $\alpha_2 < 0$) are expected indicating that a budget deficit and high investment deteriorate the current account. If both slope coefficients are equal to one, then it is assumed that the country is perfectly integrated into the world economy, implying that both budgetary and investment expenditures are financed on the world financial market. If the coefficient of budget balance is positive, it results in a twin deficit which also implies non existence of the REH. On the other hand, if the coefficient of investment is relatively close to unity or higher than unity, it indicates the validity of the Feldstein – Horioka hypothesis and, if the coefficient of investment is relatively close to zero, it implies the existence of the Feldstein – Horioka puzzle.

The short-run dynamic adjustment process of the long-run relationship in Eq. (4) may provide useful policy recommendations. It is possible to incorporate the short-run dynamics into Eq. (4) by expressing it in an error-correction model as suggested in Pesaran *et al.* (2001).

$$\begin{aligned} \Delta(x-m)_t = \beta_0 + \sum_{i=1}^{n1} \beta_{1i} \Delta(x-m)_{t-i} + \sum_{i=0}^{n2} \beta_{2i} \Delta(t-g)_{t-i} + \sum_{i=0}^{n3} \beta_{3i} \Delta i_{t-i} + \\ \beta_4 (x-m)_{t-1} + \beta_5 (t-g)_{t-1} + \beta_6 i_{t-1} + v_t \end{aligned} \tag{5}$$

This approach, also known as autoregressive-distributed lag (ARDL)[2], provides the short-run and long-run estimates simultaneously. Short-run effects are reflected by the estimates of the coefficients attached to all first-differenced variables. The long-run effects of the explanatory variables on the dependent variable are obtained by the estimates of β_5-β_6 that are normalized on β_4. The inclusion of the lagged-level variables in Eq. (5) is verified through the bounds testing procedure, which is based on the Fisher (F) or Wald (W)-statistics. This procedure is considered as the first stage of the ARDL cointegration method. Accordingly, a joint significance test that implies no cointegration hypothesis, (H_0: all β_4 to $\beta_6 = 0$), against the alternative hypothesis, (H_1: at least one of β_4 to $\beta_6 \neq 0$) should be performed for Eq. (5). The F/W test used for this procedure has a non-standard distribution. Thus, Pesaran *et al.* (2001) compute two sets of critical values for a given significance level with and without a time trend. One set assumes that all variables are $I(0)$ and the other set assumes they are all $I(1)$. If the computed F/W-statistic exceeds the upper critical bounds value, then the H_0 is rejected, implying cointegration. In order to determine whether the adjustment of variables is toward their long-run equilibrium values, estimates of β_4-β_6 are used to construct an error-correction term (EC). Then lagged-level variables in Eq. (5) are replaced by EC_{t-1} forming a modified version of Eq. (5) as follows:

$$\Delta(x-m)_t = \beta_0 + \sum_{i=1}^{n1} \beta_{1i}\Delta(x-m)_{t-i} + \sum_{i=0}^{n2} \beta_{2i}\Delta(t-g)_{t-i} + \sum_{i=0}^{n3} \beta_{3i}\Delta i_{t-i} + \lambda EC_{t-1} + \mu_t \qquad (6)$$

Eq. (6) is re-estimated one more time using the same lags previously. A negative and statistically significant estimation of λ not only represents the speed of adjustment but also

[2] Different applications of the ARDL approach to cointegration can be found in the following studies: Bahmani *et al*. (2017), Bahmani *et al*. (2016), Halicioglu and Ketenci (2016), Durmaz (2015), Tayebi (2014), Halicioglu and Karatas (2013), Halicioglu (2013), Pattichis (2012), Catik *et al*. (2011), Dell'Anno and Halicioglu (2010), Halicioglu (2007).

provides an alternative means of supporting cointegration between the variables. Pesaran *et al.* (2001) cointegration approach has some methodological advantages in comparison to other single cointegration procedures. Reasons for the ARDL are: i) endogeneity problems and inability to test hypotheses on the estimated coefficients in the long-run associated with the Engle-Granger (1987) method are avoided; ii) the long and short-run coefficients of the model in question are estimated simultaneously; iii) the ARDL approach to testing for the existence of a long-run relationship between the variables in levels is applicable irrespective of whether the underlying regressors are purely stationary $I(0)$, purely non-stationary $I(1)$, or mutually cointegrated; iv) the small sample properties of the bounds testing approach are far superior to that of multivariate cointegration, as argued in Narayan (2005).

The Granger representation theorem suggests that there will be Granger causality in at least one direction if there exists a cointegration relationship among the variables in equation (1), providing that they are integrated order of one. Engle and Granger (1987) caution that the Granger causality test, which is conducted in the first-differenced variables by means of a VAR, will be misleading in the presence of cointegration. Therefore, an inclusion of an additional variable to the VAR system, such as the error correction term would help us to capture the long-run relationship. To this end, an augmented form of the Granger causality test involving the error correction term is formulated in a multivariate pth order vector error correction model.

$$(1-L)\begin{bmatrix}(x-m)_t\\(t-g)_t\\i_t\end{bmatrix}=\begin{bmatrix}\theta_1\\\theta_2\\\theta_3\end{bmatrix}+\sum_{i=1}^{p}(1-L)\begin{bmatrix}\phi_{11i}\,\phi_{12i}\phi_{13i}\\\phi_{21i}\phi_{22i}\phi_{23i}\\\phi_{31i}\phi_{32i}\phi_{33i}\end{bmatrix}\begin{bmatrix}(x-m)_{t-i}\\(t-g)_{t-i}\\i_{t-i}\end{bmatrix}+\begin{bmatrix}\delta_1\\\delta_2\\\delta_3\end{bmatrix}\left[EC_{t-1}\right]+\begin{bmatrix}\omega_{1t}\\\omega_{2t}\\\omega_{3t}\end{bmatrix} \quad (7)$$

$(1-L)$ is the lag operator. EC_{t-1} is the error correction term, which is obtained from the long-run relationship described in Eq. (1), and it is not included in Eq. (7) if one finds no cointegration amongst the vector in question. The Granger causality test may be applied to

Eq. (7) as follows: i) by checking statistical significance of the lagged differences of the variables for each vector; this is a measure of short-run causality; and ii) by examining statistical significance of the error-correction term for the vector that there exists a long-run relationship. As a passing note, one should reveal that Eq. (6) and (7) do not represent competing error-correction models because Eq. (6) may result in different lag structures on each regressors at the actual estimation stage; see Pesaran *et al*. (2001) for details and its mathematical derivation. All error-correction vectors in equation (7) are estimated with the same lag structure that is determined in unrestricted VAR framework.

Establishing Granger causality is restricted to essentially within sample tests, which are useful in distinguishing the plausible Granger exogeneity or endogenity of the dependent variable in the sample period, but are unable to deduce the degree of exogenity of the variables the beyond the sample period. To examine this issue, the decomposition of variance of the variables may be used. The variance decompositions (VDCs) measure the percentage of a variable's forecast error variance that occurs as the result of a shock (or an innovation) from a variable in the system. Sims (1980) notes that if a variable is truly exogenous with respect to the other variables in the system, own innovations will explain all of its forecast error variance (i.e., almost 100%). By looking at VDCs policy makers gather additional insight as to what percentage (of the forecast error variance) of each variable is explained by its determinant.

3. Results

Annual data over the period 1987-2004 were used to estimate Eq. (5) and (6) by the ARDL cointegration procedure of Pesaran *et al*. (2001)[3]. Variable definition and sources of data are cited in the Appendix.

[3] The data span for this study was initially selected as 1987-2012 and but after several econometric trials, the most meaningful results confirming the existence of the twin-deficits hypothesis were obtained from the period of 1987-2004.

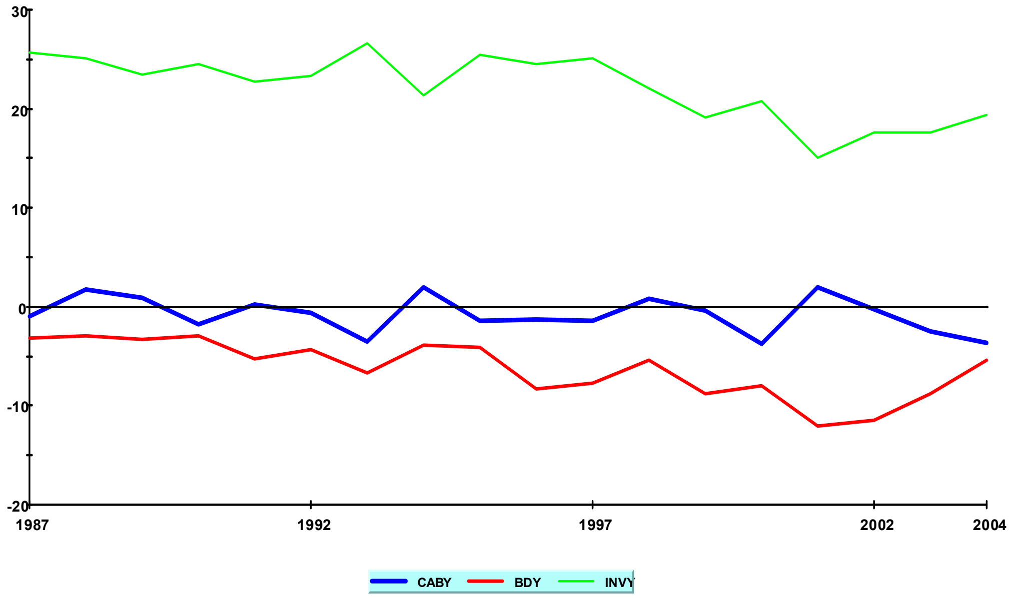
Correlation matrix and graphs of the variables in Eq. (4) are provided below in Table 1 and Graph 1, respectively in order to present the preliminary relationships between the variables.

Table 1. Correlation Matrix

	$(x\text{-}m)_t$	$(t\text{-}g)_t$	i_t
$(x\text{-}m)_t$	1.000	0.092	-0.145
$(t\text{-}g)_t$	0.092	1.000	0.701
i_t	-0.145	0.701	1.000

Considering the correlation matrix in Table 1, it is clear that there is a weak positive correlation between the current account and fiscal balance. It is also seen that the there exists a negative relationship between the current account balance and investment level. These simple statistical relation did not hold in the other periods. It is very likely that because of these *priori* results, when the ARDL cointegration was implemented in other periods such as 1980-2012 and 1987-2012, we could not find any long-run relationships between the variables apart from the period of 1987-2004. Thus, our econometric results are limited with only the selected estimation period.

Graph 1: Plot of the variables



In Graph 1, CABY stands for current deficits which is in the middle, BDY represents the budget deficits which is at the bottom, and INVY stands for the investment which is at the top. All variables are reflected as a percentage of GDP.

To implement the Pesaran *et al*. (2001) procedure, one has to ensure that none of the explanatory variables in equation (1) is above $I(1)$. Three tests were used to test unit roots in the variables: Augmented Dickey-Fuller (henceforth, ADF) (1979, 1981), Phillips-Perron (henceforth, PP) (1988), and Elliott-Rothenberg-Stock (henceforth, ERS) (1996). Unit root tests results are displayed in Table 2 to warrant implementing the ARDL approach to cointegration as the variables are in the combination of $I(0)$ and $I(1)$.

Table 2. Unit root results

Variables	ADF	PP	ERS
$(x-m)_t$	4.99*	5.68*	4.32*
$(t-g)_t$	3.08	2.57	3.14
i_t	3.71*	4.26*	1.88
$\Delta(x-m)_t$	5.98*	3.95*	3.95*
$\Delta(t-g)_t$	4.83*	4.83*	4.83*
Δi_t	5.70*	5.71*	5.71*

Notes: The sample level unit root regressions include a constant and a trend. The differenced level unit root regressions are with a constant and without a trend. All test statistics are expressed in absolute terms for convenience. Rejection of unit root hypothesis is indicated with an asterisk. Δ stands for first difference. Critical values are simulated for sample size. This is done automatically by the econometric software

Table 3. The results of F and W tests for cointegration.

Panel A: The assumed long-run relationship: $F/W((x-m)|(t-g),i))$

F-statistic	95% LB	95% UB	90% LB	90% UB
21.70	4.77	6.19	3.71	4.91
W-statistic				
65.12	14.33	18.57	11.14	14.73

If the test statistic lies between the bounds, the test is inconclusive. If it is above the upper bound (UB), the null hypothesis of no level effect is rejected. If it is the below the lower bound (LB), the null hypothesis of no level effect cannot be rejected. Critical values are simulated for sample size. F and W testing critical values are simulated for the small sample size. This is done automatically by the econometric software

On establishing a long-run cointegration relationship amongst the variables of Eq. (4), a two-step procedure to estimate the ARDL model was carried out. First, in search of the optimal lag length of the differenced variables of the short-run coefficients, Schwarz Bayesian Criterion (SBC) was utilized and in the second step, the ARDL model was estimated. The results of SBC based ARDL model is displayed in Panel A, B, and C of Table 4. The results of long-run coefficients are presented in Panel A of Table 4, whereas the short-run estimates are reported in Panel B of Table 4. Finally, Panel C of Table 4 demonstrates the short-run diagnostic test results. The overall regression results are satisfactory in terms of diagnostic tests. The short-run diagnostics obtained from the estimation of Eq. (5) suggest that the estimated model is free from a series of econometric problems such as serial correlation, functional form, normality, and heteroscedasticity.

Table 4. ARDL cointegration results.

Panel A: Estimated long-run coefficients Dependent variable: $(x-m)_t$			
Regressor	Coefficient	Standard error	T-ratio
$(t-g)_t$	0.255^{*}	0.095	2.680
i_t	-0.165^{**}	0.084	1.998
Constant	4.446^{**}	2.354	1.888

Panel B: Error correction representation results. Dependent variable: $\Delta(x-m)_t$			
Regressor	Coefficient	Standard error	T-ratio
$\Delta(x-m)_{t-1}$	0.670^{*}	0.127	5.268
$\Delta(t-g)_t$	0.040	0.100	0.407
$\Delta(t-g)_{t-1}$	-0.248^{*}	0.103	2.403
Δi_t	-0.592^{*}	0.102	5.756
Δi_{t-1}	0.233^{*}	0.091	2.542
EC_{t-1}	-1.525^{*}	0.205	7.414

Panel C: Diagnostic test results.

$\bar{R}^2$	0.92	F-statistic	34.8^{*}	$\chi^2_{SC}(1)$	0.034	$\chi^2_{FF}(1)$	4.07
RSS	5.42	DW-statistic	1.89	$\chi^2_{N}(2)$	1.682	$\chi^2_{H}(1)$	0.90

*, **, and, *** indicate, 1%, 5%, and 10% significance levels respectively. RSS stands for residual sum of squares. T-ratios are in absolute values. χ^2_{SC}, χ^2_{FF}, χ^2_{N}, and χ^2_{H} are Lagrange multiplier statistics for tests of residual correlation, functional form mis-specification, non-normal errors and heteroskedasticity, respectively. These statistics are distributed as Chi-squared variates with degrees of freedom in parentheses. The critical values for $\chi^2(1) = 3.84$ and $\chi^2(2) = 5.99$ are at 5% significance level.

The overall results confirm the existence of the twin deficits phenomenon for Turkey during the estimation period, since the coefficient of the fiscal account is positive and statistically significant. The estimated government budget deficit, 0.255, suggests that for each 1 % increase in budget deficits, there results 0.255% rise in current account deficits in the long-run. Similarly, the coefficient of investment, -0.165, implies that about less than 1/5 of domestic investments are financed from world financial markets. As this value is relatively close to zero, it also an indication of the existence of the Feldstein – Horioka puzzle, which suggests that Turkey's financial integration to the world markets is limited during the estimation period despite the wave of globalization in the decades of 1990s and 2000s. These results are in line with the study of Altintas and Saban (2011) for Turkey. The speed of adjustment parameter is –1.52, suggesting that when the current account balance equation is above or below its equilibrium level, it adjusts by 76% within the first year. The full convergence to its equilibrium level takes less than one year.

Table 5. Results of Granger causality				
	F-statistics (probability)			
Dependent Variable	$\Delta(x-m)_t$	$\Delta(t-g)_t$	Δi_t	EC_{t-1} (*t*-statistic)
$\Delta(x-m)_t$	-	1.23 (0.09)	0.89 (0.15)	-0.66 (1.12)
$\Delta(t-g)_t$	0.62 (0.61)	-	0.79 (0.56)	
Δi_t	0.44 (1.24)	1.06 (0.23)	-	
Causality inference : none				

* and ** indicate 5 % and 10 % significance levels, respectively. The probability values are in brackets. The optimal lag length is 2 and is based on SBC.

Granger-causality results indicate that there exists no Granger-causality between the current account and budget balance. This may be also be interpreted as the confirmation of the REH in the short-run. However, this interpretation would be flawed as the cointegration results indicate the reverse situation in the first instance. Granger-causality results contradict the result of Altintas and Saban (2011).

Table 6. Decomposition of Variance

Percentage of forecast variance explained by innovations in:			
Years	Current account deficits	Budget deficits	Investment
0	1.000	0.000	0.000
1	0.729	0.025	0.244
2	0.712	0.057	0.230
3	0.731	0.055	0.212
5	0.718	0.061	0.219
10	0.716	0.066	0.216

Notes: Figures in the first column refer to horizons (i.e., number of years). All figures are rounded to two decimal places. The covariances matrices of errors from all the VECMs appeared to be very small and approaching zero suggesting that the combinations of all the variables in these models are linear. Therefore, the ortohogonal case for the variance decompositions are applied.

Table 6 provides the summary results for the VDCs. As for the VDCs, a substantial portion of the variance of current account deficits (72.9%) is explained by its own innovations in the short-run, for example, at the two-year horizon. In the long-run, for example, at the ten-year horizon, the portion of the variance of current account deficits slightly decreases from 71.6% implying that other variables explain about 27 % of the shocks in the current account deficits. The post-sample VDCs also indicates that 21.6% of the shocks in the current account deficits is due to innovations in investment at the ten year-horizon, emphasing the fact that investment is the main cause of the current account deficits in the long-run.

4. Conclusions

This study tested the validity of the twin-deficit and the Feldstein – Horioka hypotheses for Turkey and concludes that only the former hypothesis is valid for the period of 1987-2004 as far as the cointegration tests are concerned. This paper also finds that the Feldstein – Horioka puzzle is present as Turkey appeared to be integrated into world financial markets relatively with a low degree capital mobility and during the estimation period less than 1/5 of its investments is financed with foreign savings despite the considerable amount of globalization. However, the augmented Granger-causality tests or the VDCs did not indicate any significant causality between the current and fiscal accounts. Therefore, our results are not conclusive to confirm that there exists twin a deficit phenomenon in Turkey. The VDCs are presented here to suggest that one of the main determinants of the current account deficits in the long-run is the level of investments. Turkey has been pursuing a growth policy in the last decade, where foreign savings are substituted for domestic savings and private consumptions are encouraged.

It would be appropriate to recommend that Turkey should continue to maintain its floating exchange rate regime and allow its currency to depreciate faster to reduce the current account deficits in the short-run but this policy would not be efficient in the long-run. Therefore, the export promotion policies along with the structural reforms should be designed to overcome the current account deficits. Similarly, tax increases would alleviate the fiscal deficits in the long-run. Moreover, the long term-saving policy in the form of pension funds should be widened with compulsory measurements to reduce further the saving gaps.

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Appendix

Data definition and sources

Data are collected from two different sources: International Financial Statistics of International Monetary Fund (IMF) and Turkish Ministry of Finance (TMoF).

$(x - m)_t$ is the difference between exports and imports as % of GDP. Source: IMF.

$(t - g)_t$ is the difference between tax revenues and government expenditures as % of GDP. Source: TMoF.

i_t is the total investments as % of GDP. Source: IMF.