Abstract
This paper considers the major determinants of the current account in Turkey. It examines the long-run and short-run impact of the exchange rate and private and public savings on the current account balance. The bounds testing autoregressive distributed lag (ARDL) approach to cointegration is used and the results indicate that there is strong support for cointegration relationship between current account balance and the selected variables. The exchange rate has the strongest impact on the current account, but the signs vary in the long-run and in the short-run. Finally, the study supports the presence twin deficit phenomenon in Turkey, but the relation is slightly weaker than expected.

**JEL Codes:** F31, F32, F4

**Keywords:** Twin deficit, ARDL Approach, Bounds test.

1. Introduction

The determinants and the dynamics of the current account constitute an important topic in open economy macroeconomics. Alternative theories try to predict the sign and the magnitude of the current account determinants. Different approaches to testing the empirical implications of these theories still attract considerable interest.

Among the analyses of the current account, the relation between external and internal balances, deficits in specific, deserves significant attention in the literature. Deficits often are cited as either a cause or a symptom of economic weaknesses. However, as Pakko writes, ‘deficits are neither causes nor symptoms of weaknesses, but are among the many macroeconomic quantities that are determined jointly by the decisions and interactions of households, firms and governments at both national and international markets’ (Pakko, 1999, 13).

The questions regarding the determinants of fiscal balance and the current account attracted attention in the early 1980s and later in the 2000s, mainly because of the high current account deficit of the US. Examples of these include early studies by Mc Kinnan (1980), Laney (1984), Bernheim (1988), Miller and Russe (1989), Enders and Lee (1990), Dewald and Ulan (1990), Rosenweig and Tallman (1993). Recent studies such as Mann (2002), Obstfeld and Rogoff (2004, 2005) Erceg et al. (2005), Bordo (2006), Coughlin et al. (2006), Salvatore (2006), Corsetti and Muller (2006) and Kim and Roubini (2008) have studied whether the budget deficit causes trade deficit. There are some studies supporting the twin deficits such as Bernheim (1988), Roubini (1988), Miller and Russel (1989), Normandin (1999), Salvatore (2006), Chinn and Prasad (2003). There are also studies that found support for the existence of twin divergence such as Evans (1986), Enders and Lee (1990), Dewald and Ulan (1990), Erceg et al. (2005), Corsetti and Muller (2006) and Kim and Roubini (2008). Additionally, there are some studies providing mixed evidence such as Darret (1988), Abell (1990), Rosenweig and Tallman (1993), Kao and Coskey (1999) and Chin and Prasad (2003).

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1 Idil Uz, Department of Economics, Yeditepe University, Kayisdagi, 34755, Istanbul, Turkey. E-mail: idiluz@yeditepe.edu.tr
The analysis of the relationship between the budget deficit and the current account deficit has recently attracted attention in Turkey. Generally, the studies by Zengin (2000), Akbostanci and Tunc (2001), Yucel and Ata (2003) have used various VAR techniques providing evidence that shows the presence of the twin deficits. Additionally, Acaravci and Öztürk (2008) studied the cointegration relationship between external account and fiscal balance using ARDL approach and found causality with one direction running from the budget deficit to the current deficit.

This study investigates the major determinants of the current account in Turkey for the short run and long run. Furthermore, it studies whether there is a cointegration relationship between the current account and major variables such as the exchange rate (ER), private saving decisions and the fiscal balance in Turkey. This also allows for considering the effects of the government spending shock on the external sector. Understanding the factors behind the current account fluctuations could have important policy implications. The recent episodes of macroeconomic turbulence in many emerging markets including Turkey have created increasing concerns and gathered interest in this topic.

This study is different from earlier studies that focus primarily on the analysis of the short-term and long-term fluctuations in the current account in Turkey. It also tries to determine the relationship between the current account and its determinants by using recent econometric techniques, rather than the simple relationship between the current account and the budget balance. Furthermore, the paper’s objective is to provide primarily an empirical, rather than an entirely theoretical, characterization of current account determinants that will be helpful for constructing more formal theoretical models.

Our model in section 3 relates the current account balance ($X-M$) to aggregate demand components. The approach developed in the macro-econometric models from the supply side published by Guisan (2007) and (2008) regarding the important role of industrial development in Turkey and other OECD countries to explain foreign trade and economic growth also is interesting. Some comments on this approach are included in section 2.

The analysis is structured as follows: Section 2 starts with an overview of the composition of the current account and the recent developments. Section 3 explains the theory and the model used in this analysis. Section 4 shows the methodology and section 5 discusses the empirical results of the analysis. Finally, section 6 gives concluding remarks.

2. Understanding the Current Account in Turkey

Before testing the dynamics of the current account fluctuations in Turkey, it is important to present an overview of the developments for the composition of the current account. Table 1 shows the composition of the current account in Turkey. There has been a steady increase in the amount of the current account deficit. The largest component, and the one that accounts for nearly the entire deficit, is the merchandise trade. This component is also the most important variable accounting for most of the fluctuations in the current account over time. In contrast to the deficit in merchandise trade, Turkey has a stable surplus in service trade. However, recent trends show that there has been a reduction in the amount of service trade surplus. The third category of the current account is income on investments. As foreign residents have accumulated Turkish assets over
time, this category reflects the rising debt-service payments. The net outflow as interest payments in Turkey is greater than the payments of interest on Turkish investments abroad. The final category is net unilateral transfers. This category consistently has been in a surplus for a long time.

Table 1. Composition of the Current Account (Billions of dollars)

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Merchandise</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exports</td>
<td>21.6</td>
<td>30.8</td>
<td>78.4</td>
<td>115.4</td>
</tr>
<tr>
<td>Imports</td>
<td>-34.8</td>
<td>-52.9</td>
<td>-111.4</td>
<td>-162.0</td>
</tr>
<tr>
<td>Balance</td>
<td>-13.2</td>
<td>-22.1</td>
<td>-33.0</td>
<td>-46.7</td>
</tr>
<tr>
<td><strong>Services</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exports</td>
<td>14.9</td>
<td>19.5</td>
<td>26.6</td>
<td>28.7</td>
</tr>
<tr>
<td>Imports</td>
<td>-5.3</td>
<td>-8.1</td>
<td>-11.4</td>
<td>-14.9</td>
</tr>
<tr>
<td>Balance</td>
<td>9.6</td>
<td>11.4</td>
<td>15.3</td>
<td>13.9</td>
</tr>
<tr>
<td><strong>Income on Investment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflows</td>
<td>1.5</td>
<td>2.8</td>
<td>3.6</td>
<td>6.4</td>
</tr>
<tr>
<td>Outflows</td>
<td>-4.7</td>
<td>-6.8</td>
<td>-9.5</td>
<td>-13.5</td>
</tr>
<tr>
<td>Balance</td>
<td>-3.2</td>
<td>-4.0</td>
<td>-5.9</td>
<td>-7.1</td>
</tr>
<tr>
<td>Net Unilateral transfers</td>
<td>4.4</td>
<td>4.8</td>
<td>1.5</td>
<td>2.2</td>
</tr>
<tr>
<td><strong>Current Account Balance</strong></td>
<td>-2.3</td>
<td>-9.9</td>
<td>-22.1</td>
<td>-37.7</td>
</tr>
</tbody>
</table>

Source: Central Bank Republic of Turkey

As shown in Figure 1, it is apparent that the current account has been volatile over the past decade. Nevertheless, it is more meaningful to study the magnitude of the current account deficit relative to the size of the economy. Figure 1 shows that there has been a significant increase in the size of the current account deficit as a percentage of the GDP since 2002. This draws the attention of academics as well as policymakers back to the determinants of the current account and raises the possible arguments from the political and theoretical aspects.

Figure 1 Current Account as a Percentage of the GDP

Source: Central Bank Republic of Turkey, OECD.
The increase in deficit usually arises when a country tries to foster non-industrial production without enough industrial development: as a consequence, imports of industrial factors increase more than exports. As seen in Guisan (2009) and other studies, development of industry allows a more even development of foreign trade and non-industrial production avoiding increase of trade deficit. Industrial development also allows development of non-industrial sectors, including public services, avoiding increases in the public deficit.

Turkey has a low level of imports and exports per capita in comparison with other OECD countries, as seen in Guisan and Cancelo (2002) and other studies. These authors found several factors that explain the level and balance of foreign trade. They noticed that Turkey had similar levels of exports per capita to those of Japan and the United States, but for different reasons: while Japan and the USA had high levels of industrial development and high levels of domestic industrial trade, the case of Turkey was different with much lower levels of industrial development. Figure 2 shows the positive impact of industrial real value-added on non-industrial sectors in Turkey and similar results have been found for other OECD countries in Guisan.

**Figure 2. Real Valued Added per capita of industrial and non industrial sectors in Turkey, 1983-2003 (thousand dollars at 2000 prices and exchange rates)**

![Graph showing real valued added per capita](image)

Source: Elaborated from OECD National Account Statistics.

As seen in Guisan and Exposito (2006) Turkey almost doubled real industrial production per capita in the period 1985-2005, but it is yet clearly below the OECD average and its value will be surpassed by that of China at the end of that period, in spite of the lower Chinese level of industrialization at the starting point. It is very important to recommend industrial development per capita in Turkey to increase real income per capital and to lower the level of current account deficit per inhabitant.

3. **Theoretical Model**

The framework of the national accounts defines a clear relationship between external and internal balances within an economy.

\[ Y_t = C_t + I_t + G_t + (X_t - M_t) \]  

(1)
By rearranging the variables,

\[(X_t - M_t) = Y_t - C_t - G_t - I_t\]  \(\text{(2)}\)

then,

\[(X_t - M_t) = S_t - I_t\]  \(\text{(3)}\)

where \(C_t - G_t - I_t\) is equal to the sum of private and public consumption, and therefore \(Y_t - C_t - G_t = S_t\), national saving. This means that the external account has to equal the difference of national savings and investment. This relationship implies that the current account is related to saving and investment in the economy directly. It is common in literature to assume trade deficit as a proxy for current account, although the latter includes net investment income and net unilateral transfers (Enders and Lee, 1990; Kim and Roubini, 2008). Therefore, the polices supporting investment have a negative impact on the current account, while policy measures reducing private or public consumption have a positive impact on the current account because they increase national saving.

Further insights into policy implications are given by dividing the national saving into public and private saving.

\[(X_t - M_t) = (Y_t - T_t - C_t) + (T_t - G_t) - I_t = S_t^p + S_t^z - I_t\]  \(\text{(3)}\)

After inserting the real variables to the model, it becomes as follows:

\[\frac{TB_t}{P_t} = (Y_t - \frac{NT_t}{P_t} - \frac{P_{Ct}}{P_t} C_t) + (\frac{NT_t}{P_t} - G_t) - \frac{P_{It}}{P_t} I_t\]  \(\text{(4)}\)

where \(TB_t\) is the nominal trade balance, \(P_t\) is the GDP deflator, \(NT_t\) is the taxes net of transfers, \(P_{Ct}\) is the price of final consumption goods that are purchased, and \(P_{It}\) is the price of final investment goods. So, the real trade balance is the sum of real private and public saving minus real investment. If the private savings is roughly equal to investment, then the external account and public budget are directly interrelated, or twinned. According to the Mundell-Flemming approach, the external account and fiscal balance have to move in the same direction. In other words, an increase in budget deficit causes an increase in interest rates, resulting in turn in an increase in capital inflows and appreciation of the domestic currency thereby causing a current account deficit. A fiscal deficit is causing current account deficit, the so-called twin deficits.

Alternatively, higher real interest rates induce an appreciation of the real exchange rate; the relative price of imported goods falls, while the relative price of exported goods rises in the foreign market. This may increase the terms of trade, however, boosting real import demand and reducing export demand. The increase in real import demand is partly offset by a decline in private consumption and investment spending if the income effect of the high interest rate is large. Furthermore, a rise in the budget deficit leads to a fall in national saving unless there is an equal offsetting rise in private savings. Therefore, an increase in the budget deficit had to reduce either private investment or net export. Twin deficit is a abbreviated way of saying that almost all of that adjustment was in net exports. The division of the response to lower saving between investment and trade deficit depends on certain key parameters and on changes in external environment. The factors on which the magnitude of the responses of real trade demand depends are (Erceg et al., 2005 382):
• The magnitude of the real exchange rate appreciation and the sensitivity of the exchange rate to the level of interest rate,
• The price elasticities of export and import demand, and
• Factors that determine the response of private consumption and investment spending, i.e., the sensitivity of the investment to interest rate.

Furthermore, with other things the same, decline in investment is a smaller fraction of the fall in national saving when investment has low sensitivity to interest rate, or/and the exchange rate is sensitive to the level of interest rate or/and trade is sensitive to exchange rate. This mixture of changes in investment and net export need not be a response to a decline in national saving, let alone to an increase in the budget deficit. More fundamentally, the response to a budget deficit or, more generally, to a fall in savings is not likely to be the same in the long run as in the short run. Changes in domestic saving are generally balanced in the short run by changes in international flows, but changes in domestic savings that persist lead to parallel change in domestic investment. Feldstein and Horioka (1980) find a substantial degree of correlation between the country’s domestic saving and domestic investment rates over the medium term. This shows that capital is not very mobile across national borders.

The aim of this study is to assess the major determinants of the current account and to study whether there is a twin deficit in Turkey by using recent econometric techniques. First, the current account will be used as an endogenous variable and exchange rates, private savings and public savings for exogenous variables. The exchange rate is used to measure the price elasticity of trade demand. Increase in the domestic exchange rate is associated with the appreciation of the currency, where it decreases the competitiveness of the country and deteriorates the current account. We expect a positive sign between private saving decisions and the current account balance. Any increase in private savings reduces consumption both of domestic and foreign goods. As a result, reduction in imports improves current account balance. Under these circumstances, the model becomes as:

\[ CA_t = a_0 + a_1 ER_t + a_2 S_p^t + a_3 S_g^t + \varepsilon_t \]  

(5)

where \( CA \) is current account, \( ER \) is the exchange rate, \( S_p^t \) is the private savings and \( S_g^t \) is the government saving and \( \varepsilon_t \) is the error term.

4. Methodology

The test for cointegration in a single-equation framework is based on the coefficient of the lagged dependent variable in an autoregressive distributed lag (ARDL) model used by Hendry and Richard (1982). A relatively recent econometric technique developed by Pesaran et al. (1996, 2001) is used to estimate the long-run relationship among variables. The bounds testing or autoregressive distributed lag (ARDL) approach tests the cointegration relationship without requiring the same order of integration of all variables. Later, the model was extended by including the error correction term (Phillips and Loretan, 1991; Saikkonen, 1991; Hendry, 1995).

The focus of the analysis is to study the long-run relationship and dynamic interactions among the variables of current account. However, to incorporate the short-run dynamics, the model has been estimated by the using ARDL approach to cointegration. Furthermore, the reasons for ARDL are as follows:
It is simple, allowing cointegration relationship once the lag order of the model is identified.

It does not require unit root test therefore it is applicable irrespective of whether the regressors in the model are purely stationary $I(0)$, purely non-stationary $I(1)$ or mutually cointegrated.

The test is relatively more efficient in small samples or finite sample data sizes. The procedure will however become obsolete in the presence of $I(2)$ series (integrated of order 2).

The ARDL approach involves two steps for estimating the long-run relationship (Pesaran et al., 2001). The first step is to examine the existence of long-run relationship among all variables in an equation and the second step is to estimate the long-run and short-run coefficients of the same equation. We run the second step only if we find a cointegration relationship in the first step. This step determines the appropriate lag lengths for the independent variables. Finally, the study uses a more general formula of error correction model (ECM). In error-correction models, the long run multipliers and short run dynamic coefficients improve the model as follows:

$$
\Delta CA_t = \alpha_0 + \sum_{i=1}^{p} \alpha_1 \Delta CA_{t-i} + \sum_{i=0}^{p} \alpha_2 \Delta \log ER_{t-i} + \sum_{i=0}^{p} \alpha_3 \Delta S_{r-1}^p + \sum_{i=0}^{p} \alpha_4 \Delta BD_{r-1} + \beta_1 CA_{t-1} + \beta_2 ER_{t-1} \\
+ \beta_3 S_{r-1}^p + \beta_4 S_{r-1}^g + \delta_1 EC_{t-1} + \varepsilon_t
$$

(6)

The ARDL approach is used to establish whether the dependent and independent variables in each model are cointegrated. The null of no cointegration, i.e. $H_0 : \beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$ is tested against the alternative of $H_1 : \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0$. So, we are looking at the ARDL bounds testing approach to estimate these equations by ordinary least square (OLS) test in order to test for the existence of coefficients of the lagged variables.

We have to conduct a Walt-type (F-test) coefficient restriction test, which entails testing the above null hypotheses, $H_0$ and $H_0^*$. Pesaran et al. (2001) computed two sets of asymptotic critical values for testing cointegration. The first set assumes variables to be $I(0)$, the lower bound critical value (LCB) and the other $I(1)$, upper bound critical value (UCB). If the F-statistic is above the UCB, the null hypothesis of no cointegration can be rejected irrespective of the orders of integration for the time series. Conversely, if the test falls below the LCB, the null hypothesis cannot be rejected. Finally, if the statistic falls between these two sets of critical values, the result is inconclusive.

The results of the F-test are sensitive to lag lengths. However, as Pesaran and Pesaran (1997, 305) argue, the variables in regression ‘in first differences are of no direct interest’ to the bounds cointegration test. Thus, a result that supports cointegration at least any one lag structure provides evidence for the existence of long-run relationship. Alternatively, Kremers et al. (1992) and Banerjee et al. (1998) have demonstrated that in an ECM, a significant lagged error-correction term is a relatively more efficient way of establishing cointegration. So, the error correction term can be used when the F-test is inconclusive. The model in equation 6 shows that $\alpha$ represents the short-run dynamics and $\beta$ represents the long-run dynamics of the current account, as will be discussed later. Following
Nielsen (2004), using any dummy in an autoregressive model is avoided. According to Nielsen (2004), the best results are obtained for the case where the cointegration rank is initially determined in a model with no dummies.

The CUSUM (Cumulative Sum of Recursive Residuals) and CUSUMQ (Cumulative Sum of Square of Recursive Residuals) stability tests are incorporated in the cointegration procedure. The cointegration relationship does not imply the stability of the estimated model; appropriate stability tests need to be conducted additionally after the cointegration is established. In this paper the stability tests, which are CUSUM and CUSUMQ, are also conducted in order to investigate the stability of the estimated model as the information on the stability of exchange rate model is very important for policy makers in dealing with exchange rate policy designing.

5. Data Sources and Empirical Results

The data used in this paper were drawn from different sources. The listing of the mnemonics for the variables used in the analysis is given below. This study includes quarterly data for the period 1987Q1-2008Q2. Definitions for the selected data are as follows:

- **CA**: Trade balance is used as a proxy for current account and obtained from the Central Bank of the Republic of Turkey.
- **ER**: Exchange Rates are the US dollars per national currency and increases denote appreciation of domestic currency, obtained from the Central Bank of the Republic of Turkey.
- **Sp**: Private Savings are calculated from the gross domestic product expenditure approach, which is equal to GDP minus private consumption. Data was obtained from the Turkish Statistical Institute.
- **Sg**: Public Savings are the consolidated budget balances obtained from the Republic of Turkey Ministry of Finance.

All variables except exchange rates are represented as a ratio of the GDP.

The analysis considers investigating whether there is a cointegrating relationship between current account and its variables. As Bahmani-Oskooee and Brooks (1999) showed in their study, the results of the F-test are sensitive to lag tests. Therefore, four lags were used in the F-test and the lag selection is based on Akaike Information Criteria (AIC).

The result of the bounds testing approach for cointegration shows that the calculated F-statistic is 5.48 and that it is significant at 5 percent level as the critical values of the upper level of bounds are 4.45, 5.07 and 6.36 for 10, 5 and 1 percent level of significance, respectively (Pesaran et al., 2001). The F-test shows that the null hypothesis if no cointegration can be rejected. The next step requires the ARDL method to estimate the short-run and long-run elasticities. Further discussion regarding to the existence of cointegration will be discussed by examining the error correction term in Table 3 in the Annex.

The long-run coefficients of the variables under investigation are shown in Table 2 in the Appendix. All estimated coefficients except private savings are found statistically. The magnitude of the ER has the highest among other selected parameters. This shows the ambitious relationship between the exchange rate and the current account.
Excess demand for goods is mainly a function of the real exchange rate. Furthermore, excess demand (supply) in domestic goods markets results in net imports (exports), in order to maintain short run equilibrium. So there is a straightforward relationship between the exchange rate and the current account balance. J-curve is used to explain the relationship between exchange rate and the current account. Current account worsens immediately after depreciation. Then, appreciation reduces demand for exports and increases demand for imports, worsening the current account.

Additionally, there is a positive relationship between the current account balance and the private saving decisions. However, it is not statistically significant in the long run. Finally, there is a positive relationship between government saving and current account balance that is consistent with the earlier studies. However, this study shows that the magnitude of the coefficient is slightly lower. The estimated coefficient suggests that if the ratio of the public budget balances to GDP changes by one unit, which is 1 percentage point, the ratio of current account to GDP on average changes almost by 0.1 percentage point.

The results of the short-run coefficient estimates associated with the long-run relationships obtained from the ECM version of ARDL model and are presented in Table 3. Since it takes time for these variables to exert their impact on the current account, we expect a nation’s current account balance to be related to both contemporaneous and lagged values of the selected variables. This means that current account balances are a function of or depend on current as well as lagged values of exchange rate, private saving and the public budget balances. The results of this analysis found strong support for the short-run relationship between the current account and its selected determinants excluding public savings. All variables except public savings are statistically significant.

Table 3 shows that there is a positive relationship between exchange rate and current account; in other words, appreciation of the currency causes improvement in the current account balance. One possible explanation is that some portfolio balance theorists give importance to the current account of the balance of payments of investment income accruing to the domestic economy from domestic holdings of foreign assets. A short-run increase (decrease) in the value of these holdings, if not reversed in the long run, will be associated with a rise (fall) domestic interest income on foreign assets, and a consequent decrease (increase) in the surplus required on other current account items consistent with a zero balance. Thus, current account surpluses will be associated with appreciating and deficits with depreciating currencies.

There is a positive relationship between current account and private saving decisions and it is statistically significant in the short run. Increase in savings reduces consumption both on domestic and foreign products, reducing imports and improving current account. However, public saving is not found statistically significant in the short run.

The error correction (EC) coefficient shows the speed of adjustment of variables return to equilibrium and it should have a statistically significant coefficient with negative sign. The error correction term $EC_{t-1}$, which measures the speed of adjustment to restore equilibrium in the dynamic model, appears with negative sign and it is statistically significant at a 5 percent level, ensuring that the long-run equilibrium can be attained. Bannerjee et al. (1998) holds that a highly significant error correction term is further proof of the existence of a stable long-run relationship. Furthermore, testing the significance of the $EC_{t-1}$ is a relatively more efficient way of establishing cointegration.
Thus, the error correction term for this analysis provide evidence to assume there is
cointegration between the current account and its determinants.

Table 4. Diagnostic Tests for the Short-Run Model

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
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<tbody>
<tr>
<td>$R^2$</td>
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</tr>
<tr>
<td>LM (4)</td>
<td>4.44</td>
</tr>
<tr>
<td>Normality</td>
<td>2.22</td>
</tr>
<tr>
<td>Heteroskedasticity</td>
<td>0.34</td>
</tr>
<tr>
<td>RESET</td>
<td>0.75</td>
</tr>
<tr>
<td>CUSUM</td>
<td>STABLE</td>
</tr>
<tr>
<td>CUSUMQ</td>
<td>STABLE</td>
</tr>
</tbody>
</table>

Notes: *, **, *** refer to 10, 5 and 1 percent level of significance. Lagrange multiplier test of
residual serial correlation for lag 4 with the null of no serial correlation. Jarque-Bera statistic used
for testing normality. Heteroskedasticity is based on the regression of squared residuals on squared
fitted values with the null of no heteroskedasticity. Ramsey's RESET test using the square of the
fitted values. Distributed as $X^2$ with 1 d.f..

6. Concluding Remarks

The aim of this paper was to investigate the long-run and short-run empirical
relationship between current account balances and a broad set of macroeconomic
determinants. It tried to underline the major causes of current account deficit using the
simple Mundel-Flemming approach.

The results show that there is a cointegration relationship between the current
account and macroeconomic variables selected in this study. We found a strong
cointegration relation both in the long run and the short run. The appreciation of the
domestic currency is associated with improvement in the current account, supporting the
portfolio approach of the balance of payments in the short run. In the long run, however,
depreciation of the currency improves the current account. There is a positive relationship
between the current account and private saving decisions both in the long run and short
run, but statistically significant only in the long-run. Finally, while this study found the
existence of the twin deficit phenomenon, the relationship is weaker than expected.

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Appendix

Table 2. Long-run Behavior of Current Account

<table>
<thead>
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<th>C</th>
<th>ER</th>
<th>Sp</th>
<th>Sg</th>
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<tbody>
<tr>
<td>ΔCA1</td>
<td>33.80 **</td>
<td>-29.14 ***</td>
<td>0.03</td>
<td>0.07 **</td>
</tr>
<tr>
<td>ΔCA2</td>
<td>(14.69)</td>
<td>(7.65)</td>
<td>(0.33)</td>
<td>(0.07)</td>
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</tbody>
</table>

*, **, *** refer to 10, 5 and 1 percent level of significance.
Standard errors are in parantheses.

Table 3. Error Correction Representations of ARDL Model

<table>
<thead>
<tr>
<th></th>
<th>ΔCA1</th>
<th>ΔCA2</th>
<th>ΔER</th>
<th>ΔER1</th>
<th>ΔER2</th>
<th>ΔER3</th>
<th>ΔS^p</th>
<th>ΔS^p1</th>
<th>ΔS^p2</th>
<th>ΔS^p3</th>
<th>ΔS^g</th>
<th>ΔS^g1</th>
<th>ΔS^g2</th>
<th>ΔS^g3</th>
<th>ΔS^g4</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΔCA1</td>
<td>0.19 **</td>
<td>-0.26 ***</td>
<td>-10.11</td>
<td>30.23 ***</td>
<td>1.97</td>
<td>21.63 ***</td>
<td>0.24</td>
<td>0.52 **</td>
<td>0.07</td>
<td>0.35 *</td>
<td>0.24</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔCA2</td>
<td>(0.11)</td>
<td>(0.10)</td>
<td>(7.88)</td>
<td>(8.42)</td>
<td>(8.65)</td>
<td>(8.48)</td>
<td>(0.23)</td>
<td>(0.27)</td>
<td>(0.24)</td>
<td>(0.23)</td>
<td>(0.03)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EC-1</td>
<td>-0.59 ***</td>
<td>(0.13)</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

*, **, *** refer to 10, 5 and 1 percent level of significance.
Standard errors are in parantheses.

Note: ΔCA1 = CA(-1)–CA(-2); ΔER=ER–ER(-1); ΔER1=ER(-1)–ER(-2); ΔER2=ER(-2)–ER(-3); ΔER3=ER(-3)–ER(-4);
ΔS^p=S^p–S^p(-1); ΔS^p1=S^p(-1)–S^p(-2); ΔS^p2=S^p(-2)–S^p(-3); ΔS^p3=S^p(-3)–S^p(-4); ΔS^g=S^g–S^g(-1); ΔS^g1=S^g(-1)–S^g(-2).

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