TWIN DEFICITS HYPOTHESIS: THE CASE OF PAKISTAN 1972-2008

SUMAIRA SAEED1 AND M. ARSHAD KHAN2

1International Islamic University, Islamabad Pakistan
2Senior Research Economist, Pakistan Institute of Development Economics, Islamabad Pakistan

ABSTRACT

Pakistan represents a valuable case study for investigating the dynamics of steadily high rates of budget and current account deficits. In this study an attempt has been made to empirically test the validity of Twin deficits hypothesis for Pakistan using annual time series data for the period 1972 to 2008. The cointegration results indicate the long run relationship between the budget deficit and current account deficit while the Granger causality running from current account to budget deficit. So the twin deficit hypothesis is accepted by rejecting Ricardian equivalence hypothesis. Pakistan is a non Ricardian economy facing twin deficits.

1.1 INTRODUCTION

The fiscal decisions of the government are capable to affect household’s consumption and saving behavior meaningfully as the fiscal policy has a key role to play in stabilizing the economy. The governments often float debts by issuing bonds of different maturities and coupon rates. According to the Keynesians, the households consider government bonds as net wealth. It implies that the substitution of debt by the government for taxes has a positive impact on private consumption and thereby on aggregate demand. The resulting decrease in total savings causes higher real interest rate, which in turn leads to crowd out private investment, capital inflows with exchange rate to appreciate and eventually leading to an increase in the current account deficit (CAD). The external deficit and budget deficit in the United States increased significantly during the 1980’s for several reasons. Many economists considered this co-movement of the twin deficits to be meaningful and concluded that a considerable share of the deterioration in the external balance was due to the emergence of record level budget deficits. This phenomenon of mutual connection was later on known as the twin deficits hypothesis.

Theoretically speaking, the said hypothesis originates from the Mundell-Fleming open-economy model. According to this model (with the assumption of free capital mobility), an increase in the budget deficit (BDEF) exerts an upward pressure on the rate of interest to attract foreign capital, which leads to an appreciation of the exchange rate and ultimately to a deficit in the current account (CAD).

Keeping in view the severity of the problem, it seems important to investigate the dynamics of steadily growing budget and current account deficits in Pakistan as a case study. The debate and research conducted so far with reference to Pakistan economy in this regards is mostly incomplete and inconclusive. For instance, Zaidi (1995), Burney and Akhtar (1992); Burney and Yasmeen (1989) and Kazimi (1992) have used OLS techniques on annual data to relate the twin deficits with other...
macroeconomic variables. Similarly Aqeel and Nishat (2000) have tested the causality between fiscal and current account deficits by using annual data set and their methodology is similar to Vamvoukas (1997) adopted for Greece. Although, the studies under reference are extremely important in understanding the links between the twin deficits and other macroeconomic variables, however as noted by Hakro (2009), most studies have reached contrasting conclusions due to pre-specification of the structural relations used in their models.

The rest part of the paper is organized as follows. Section 2 reviews the existing literature on Twin Deficits hypothesis. Theoretical and analytical framework is presented in section 3. Section 4 gives data description and econometric methodology. Section 5 discusses the estimation results while section 6 is devoted to conclusion. The appendix and references are presented at the end.

2. LITERATURE REVIEW

This section reviews some existing theoretical and empirical literature on Twin deficits hypothesis. Normandin (1994) estimated the fundamental relationship between the external and budget deficit by using Blanchard's overlapping generation model (BOLGM). He found the relevant Canadian consumer's reactions towards budget deficit are statistically positive but the responses U.S. consumers are statistically insignificant. Kulkarni and Erickson (1998) analyzed different evidences of twin deficits for India, Pakistan and Mexico. Vamvoukas (1999) suggested that budget deficit has positive and significant effects on trade deficit both in the short run and long run for a small open economy of (Greek) using annual data. Alkhatib (2000) analyzed positive and one way causality running from trade deficit to budget deficit in the Saudi Arabian economy. Aqeel and Nishat (2000) found that the budget deficit has positive and significant effect on the trade deficit for Pakistan in long run not in short run. Zengin (2000) supported the notion that budget deficits affect trade balance in case of Turkey. Kouassi et al. (2002) found evidence of causality between the twin deficits for twenty developing countries. Aristovnik (2003) suggested that high budget deficits in transition economies confirm relatively low level of substitutability between private and public savings. These results are implying a relatively high correlation between fiscal and external imbalances. Zubaidi et al. (2005) examined the twin deficits hypothesis in Indonesia, Malaysia, Philippines and Thailand (4 ASEAN countries). They confirmed the existence of a long run relationship between the two deficits. However, the Keynesian reasoning best suits only for Thailand. Bartolini and Lahiri (2006) examined this hypothesis and found some empirical evidence in its support. Saleh and Chowdhury (2007) examined the long-run and short-run relationships between the current account deficit, budget deficit, savings and investment gap and trade openness in Sri Lanka. They found that trade openness has a positive effect on the current account deficit, although is statistically insignificant. Fonseca (2007) rejected the twin-deficit hypothesis as well as the validity of Ricardian equivalence in Egypt. Corsetti and Muller (2007) also investigated the co-movement of the government budget balance and the trade balance in the perspective of international business cycle theory. They also showed that the model predicts a perfect correlation of the budget balance and the trade balance on the condition of spending shocks. Mukhtar et al. (2007) supported that budget deficit have optimistic and
significant long run effect on current account deficit in Pakistan. Acaravci and Ozturk (2008) rejected the Ricardian Equivalence Hypothesis by supporting the Keynesian view that there is a long-run relationship between both budget and current account deficits. Neaime (2008) analyzed unidirectional causal relationship in short run examined the relationship between current account and budget deficits in the small open developing economy of Lebanon. Arize and Malindretos (2008) explored bidirectional causality between the twin deficits received strong empirical support in the long run but a unidirectional relationship in short run in Ten African countries. Baharumshah et al. (2009) investigated the relevance of twin deficit hypothesis (TDH) in five countries of Association of South East Asian Nations (ASEAN). They found that TDH holds only for 3 countries Malaysia, the Philippines and Thailand. Finally, since a high portion of domestic investment is financed through international sources, which suggested that the F-H puzzle is less important in these economies. Hakro (2009) suggested that causality link of deficits is flowing from budget deficits to trade deficits using multivariate time series on Pakistan’s data. Siddiqui (2009) investigated the twin deficit hypothesis in case of Pakistan. The results confirmed one way direction causal relationship showing trade deficit positively effecting budget deficit in the short run for Pakistan.

3. THE ISSUE OF TWIN DEFICITS

Both the external and the budget deficits in United States increased extensively during the 1980’s. This co-movement led several researchers to reach the conclusion that a major portion of the worsening in external balance was due to the emergence of record budget deficits. This mutual relationship is recognized as the twin deficits hypothesis. However, the causality of relationship between the two deficits is not always observed in any specific direction. As noted by Aqeel and Nishat (2000), the probability of the relationship between them increases significantly when the volumes of the two deficits are large. The theoretical explanation for the said hypothesis based on the Mundell-Fleming open-economy model. According to this model (with the assumption of free capital mobility and under flexible exchange rate), an increase in the budget deficit (BDEF) puts an upward pressure on the rate of interest to attract foreign capital, which leads to an appreciation of the exchange rate and ultimately to a current account deficit (CAD). The Keynesian school of thought views the budget deficit to have a considerable impact on the current account deficit. According to the simple Keynesians approach, an increase in the budget deficit will increase domestic absorption by import expansion thereby, causing a current account deficit. Some researchers have examined the Keynesian proposition of twin deficits with reference to trade openness¹.

There is a significantly voluminous body of literature (e.g. Fleming, 1962; Mundell, 1963; Kearney and Monadjemi, 1990; among others) which suggests that government budget deficits may cause trade deficits all the way through different channels. However, four hypotheses are important, which concern the twin deficits phenomenon.

¹ For instance, see the analysis of Saleh and Chowdhry (2007) in case of Sri Lanka.
The first hypothesis is based on the preposition that constitutes a key ingredient of the twin-deficit hypothesis. According to Keynesian view, a tax cut lowers national saving by rising private disposable income and hence private consumption (an increase in imports) causing a worsening of the CAD.

The second hypothesis is presented by Barro (1974), often known as the Ricardian Equivalence Hypothesis (REH). According to this approach, any meaningful relationship between current account and budget deficit is refuted. As explained above, this hypothesis holds the view that substitution of debt for taxes has no effect on aggregate demand or on interest rates for a particular expenditure path. Consequently, a tax change would not change the external deficit but change the volume of budget deficit. This implies that the tax-financed expenditures do not affect private spending or national saving.

The third hypothesis, known as ‘current account targeting’ due to Summers (1988), claims a reverse causality running from current account to budget deficit. This claim can be rationalized on the grounds that deterioration in current account leads to a slower rate of economic growth that in turn may lead to increases in the budget deficit. There is one another channel; an increase in current account deficit put a pressure on government to expand more and these government expenditures leads to an increase in budget deficit.

The fourth hypothesis suggests a possibility of a two-way causality between the two deficits. In other words, a budget deficit causes current account to deteriorate and vice versa.

3.1 Analytical Framework

The analytical framework is based on the national income identity in the context of an open economy. The aggregate demand or expenditure on GDP is given below, where the symbols carry their usual meaning:

\[ Y = C + I + G + (X - M) \]  \hspace{1cm} (3.1)

On the other hand, income is allocated for different purposes like consumption, saving, taxes and transfer payment, as shown below:

\[ Y = C + S + T + R \]  \hspace{1cm} (3.2)

Equating the two sides, ignoring the transfers and rearranging the terms yields:

\[ (S - I) + (T - G) = (X - M) \rightarrow (I - S) + (G - T) = (M - X) \]  \hspace{1cm} (3.3)

The terms on the left hand side denote the domestic savings and investment imbalance (I-S) and the budget deficit (G-T), both of which join hands to determine the current account deficit (M-X). Any imbalance in the current account is attributable to either savings–investment gap and/or fiscal imbalance.

---

Acarvci et al. (2008) have discussed all four possible hypothesis related to correlation of budget deficit and current account deficit and have tested twin deficits phenomenon by using ARDL bound approach for Turkey.
This relation implies that the current account balance is directly related to saving-investment gap and the tax-expenditure gap. National savings can be decomposed further into private ($S_p$) and government ($S_g$) savings

$$S = S_p + S_g$$  \hspace{1cm} (3.4)

where \( S_p = Y - T - C \) and \( S_g = T - G \)

On necessary substitutions, equation (3.4) may be re-written as:

$$(X - M) = (S_p - I) + S_g \rightarrow CAD = IS_p + BD_g$$  \hspace{1cm} (3.5)

The government budget deficit (BD=G-T) and the private deficit (given by I-S or the investment-saving gap) are collectively reflected in the current account deficit (M-X). If private saving equals investment at the margin, then external account balance and public budget are directly interlinked. In other words, both the variables will move in the same direction and in the same proportion. The assumption that a particular deficit is the explanatory variable for the other deficits does not seem to be reasonable since there is a two-way causality among the variables. The most important of them is the analysis of the relationship between trade deficit and budget deficit, named as twin deficits\(^3\).

The empirical literature often suggests a log-linear functional specification of the relationship between the external and the fiscal balance.

It may be expressed in this simple form:

$$CAD_t = \alpha_0 + \alpha_1 BD_t + \varepsilon_t$$  \hspace{1cm} (3.6)

The symbols carry their usual meaning; CAD is the current account deficit and BD stands for budget deficit, where \( \varepsilon \) is the error term. The coefficient of budget deficit (beta) is expected to be positive, ranging between zero and unity.

The necessary condition for twin deficits to emerge is the absence of Ricardian equivalence and financial openness. Any findings of twin deficits must be interpret as an indirect sign of financial openness.

### 3.2 Issue of Twin deficits for Pakistan

Pakistan constitutes an important case study for investigation of the dynamics of persistently high rates of deficits in fiscal budget and international trade. So far as the budget deficit is concerned, it remained around an average of nearly 6 percent of GDP during 1980's, where it reached the peak of 8.5 percent of GDP in 1987-88. The budget deficit fell to the lowest bound of 5 percent of GDP in 2000-01, but started rising again and remained somehow again around 5 percent of GDP in 2005-06. The

---

\(^3\) Saleh and Chowdhry, 2007; Alkhatib, 2000.
trade deficits followed a trend of 5 percent of GDP during 1980’s and its peak during the last decade was 7.17 percent in 1995-96. For 2005-06, the figure of trade deficit is reported as 6.6 percent of GDP. The budget deficit has varied between 5.4 to 8.7 percent during last two decades. On the other hand the current account deficit varied between 2.7 to 7.2 percent during the same period. The growing fiscal deficit and deteriorating current account balance have been an important matter of concern for the nation and policy-makers. During the fiscal year 2008-09, trade deficit was at highest level of Rs.1304.15 billions, which is 108% of total exports (Rs.1208.12 billion). Same is the case with overall fiscal deficit which stands at a level of Rs. 6834.00 billions. The following tables reflect the severity of the twin deficit problem in Pakistan.

Table 3.1: Trade Deficit and Budget Deficit as percentage of GDP

<table>
<thead>
<tr>
<th>Year</th>
<th>Trade Deficit</th>
<th>Budget Deficit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1981-85</td>
<td>9.74</td>
<td>3.82</td>
</tr>
<tr>
<td>1986-90</td>
<td>5.78</td>
<td>4</td>
</tr>
<tr>
<td>1991-95</td>
<td>4.26</td>
<td>4.54</td>
</tr>
<tr>
<td>1995-00</td>
<td>3.64</td>
<td>4.44</td>
</tr>
<tr>
<td>2001-05</td>
<td>2.78</td>
<td>1.86</td>
</tr>
<tr>
<td>2006-09</td>
<td>10</td>
<td>5.8</td>
</tr>
</tbody>
</table>

Source: Pakistan Economics Survey (2008-09)

4. ECONOMETRIC METHODOLOGY AND DATA DESCRIPTION

In this study, we employed the unit root tests, Johansen co-integration technique and the Error Correction Model to attain our objectives. The main purpose of co-integration analysis is to verify the nature of long run relationship between a set of time series variables. However, it is essential to check each time-series for stationarity before starting the co-integration tests. In case the time-series at hand is non-stationary, then the regression analysis carried out in the usual manner may produce spurious results. So the unit root tests are conducted first to examine this property of the time-series.

4.1 Co-integration Analysis

If the variables of interest share a common stochastic trend, they are said to co-integrated in the long run (Christensen, Nielsen 200). The concept of co-integration was firstly introduced by Granger (1981) and further formalized by Engel and Granger (1987) by introducing a very simple method to check the existence of long run relationship between the variables. Although the EG test is very simple and convenient to implement, but it does not intimate as to which of the variable should be used as regressor and why. It may lead to contradictory results, especially when there are more than two I(1) variables.

---

4 See Economic Survey (2005-06).
under consideration (Pesaran and Pesaran, 1997). Therefore Johansen (1988; 1991) and Johansen and Juselius (1992) tests are employed in multivariate analysis. We discuss the Johansen co-integration procedure briefly:

Let's assume that we have three variables $Y_t$, $X_t$, and $W_t$ which can all be endogenous. Each time series variable has links with its past values. The variables can written in the matrix notation as $Z_t = [Y_t, X_t, W_t]$, where the vector may be expressed as:

$$Z_t = \alpha_0 + \alpha_1 Z_{t-1} + \alpha_2 Z_{t-2} + \ldots + \alpha_k Z_{t-k} + \mu_t$$  \hspace{1cm}(4.1)

Defining $\Delta = 1-L$, where $L$ is the lag operator, the above can be formulated in a vector error correction model (VECM) as follows:

$$\Delta Z_t = \Pi_1 \Delta Z_{t-1} + \Pi_2 \Delta Z_{t-2} + \ldots + \Pi_k \Delta Z_{t-k} + \alpha_k Z_{t-k} + \mu_t$$

$$= \alpha_0 + \sum_{i=1}^{k-1} \Pi_i \Delta Z_{t-i} + \alpha_k Z_{t-k} + \mu_t$$ \hspace{1cm}(4.2)

where $\Pi_i = -(1 - \alpha_1 - \alpha_2 - \ldots - \alpha_k)$, $i = 1, 2, \ldots, k - 1$

The $\Pi$ matrix is $3 \times 3$ due to the fact that we assume three variables in $Z_t$. The matrix contains the information regarding the long run relationships among the variables concerned. If the matrix has a full rank, all the elements in the vector $Z$ are stationary. On the other hand, a zero rank indicates the absence of any co-integration and the model reduces to VAR in the first difference. In case the rank is positive but less than full, there exists co-integration. To test whether there exists co-integration among the variables or otherwise, two methods (test statistics) are used that determine the rank of co-integration space, due to Johansen (1988) and Johansen and Juselius (1990). The procedures are based on the propositions about eigenvalues.

a. This method tests the null hypothesis that rank of the matrix $\Pi$ is ‘r’ against the alternative hypothesis that the rank is $r+1$. Thus, according to the null hypothesis, there are ‘r’ co-integrating vectors. The test statistics is based on the characteristic root (Eigenvalues).

To test how many of the numbers of the characteristic roots are significantly zero this test uses the following statistics:

$$\lambda_{max} (r, r + 1) = - T \ln (1 - \lambda_{r+1})$$ \hspace{1cm}(4.3)

The test statistic is based on the maximum eigenvalue (maximum eigenvalue statistic)

b. The second method is based on a likelihood ratio test about the trace of the matrix (trace statistic). This statistic is considers whether the trace is increased by adding more eigenvalues beyond the rth eigenvalue. The null hypothesis in this case is that the number of cointegrating vectors is less than or equal to r. This statistic is calculated by:
\[ \lambda_{\text{trace}} (r) = - T \sum_{i=r+1}^{n} \ln (1 - \lambda_{i,i}) \] (4.4)

The usual procedure is to work downwards and stop at the value of \( r \) which is associated with a test statistic that exceeds the displayed critical value.\(^5\) Another important aspect is to select the appropriate model regarding the deterministic components in the multivariate system. It means that whether an intercept and/or a trend should enter either the short run and long run model, or both models.

4.2 Granger Causality Test

If a pair of series is cointegrated then there must be Granger-causality in at least one direction, which reflects the direction of influence between series. Theoretically, if the current or lagged terms of a time-series variable, say \( X_t \), determine another time-series variable, say \( Y_t \), then there exists a Granger-causality relationship between \( X_t \) and \( Y_t \), in which \( Y_t \) is Granger caused by \( X_t \).

4.3 The Short Run Analysis

The short run dynamics are examined using the Error Correction Model (ECM). It explains changes in the dependent variable in term of changes in the explanatory variables as well as deviations from the long run relationship between the variables and its determinants. The model follows from general to specific approach in econometric modeling which best fits the given data set. The co-integration of any two variables implies that there is some adjustment process which prevents the error term to enter in the long run relationship. However, if the variables are co-integrated over time, then an Error Correction Model (ECM) is appropriate. According to Engle and Granger (1987), the co-integrated variables have an ECM representation, which has the advantage of incorporating both the short-run and long run relationship between the variables in the same regression.

While studying the behavior of current account deficit (CAD) and the budget deficit (BDEF) overtime, we have to check if the twin deficits are co-integrated. To focus on the causality between the budget deficit (BDEF) and the current account deficit (CAD), it is possible to estimate the following Error Correction Model:

\[
\Delta BDEF_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1,i} \Delta BDEF_{t-i} + \sum_{i=1}^{q} \alpha_{2,i} \Delta CAD_{t-i} + \beta_1 ECM_{t-1} + \epsilon_{1t} \] (4.9)

\[
\Delta CAD_t = \delta_0 + \sum_{i=1}^{p} \delta_{1,i} BDEF_{t-i} + \sum_{i=1}^{q} \delta_{2,i} \Delta CAD_{t-i} + \beta_2 ECM_{t-1} + \epsilon_{2t} \] (4.10)

---

The symbol $\Delta$ denotes the difference operator, $\alpha$’s and $\delta$’s are the short-term time-invariant coefficients, $\beta$’s are the coefficients of the lagged error-correction terms derived from the long-run relationships. The $\epsilon$’s are serially uncorrelated white-noise (error) terms.

According to Kouassi (2004), the relevant testing hypotheses in Granger sense are:

- **H1**: BDEF does not cause CAD- if and only if $\delta_1 = 0$, for all $i$ and $\beta_2 = 0$
- **H2**: CAD does not cause BDEF- if and only if $\alpha_2 = 0$, for all $i$ and $\beta_1 = 0$
- **H3**: there is no feedback between CAD and BDEF if $\alpha_2 = \delta_1 = 0$, and $\beta_1 = \beta_2 = 0$.

### 4.4 Data and Variables

Availability of adequate and reliable data is very important for consequential analysis. The validity of results depends on sufficient and consistent data. Problems in adequate data result into to conclusions that may be misleading. Therefore, data must be collected and checked properly before conducting empirical analysis. We have done our utmost effort for the collection of reliable and consistent data set for our research.

We have used annual data set of Pakistan for the period 1972-2008. This data set is retrieved from different data sources. Most of the data is collected from Federal Bureau of Statistic, Annual Reports of the State Bank and the Hand Book of Pakistan Economy. Data on some variables is collected Pakistan Economic Survey and Yearbook of International Financial Statistic (IFS) published by the IMF. The main variables used were current account deficit and Budget Deficit.

### 5. RESULTS AND INTERPRETATION

As discussed in the previous section, we have adopted a three-step procedure in testing the three hypotheses under consideration. First we apply the Augmented Dickey Fuller (ADF) unit root test to check the stationarity and order of integration of different economic variables used in this study. Next we resort to the Johansen’s Maximum Likelihood procedure to test for the long run co-integration among the variables. Finally, the Error Correction Model is employed to see the causality between the crucial variables. In the following lines, we discuss the findings and analyze the relevant results.

#### 5.1 Unit root tests

At the outset, we test for the stationarity of all the time series variables involved with all the three hypotheses of this study. We have used the variables in level and also in term of their ratios to GDP for testing of the Twin Deficit Hypothesis and the F-H puzzle. We use the ADF model to check for the stationarity and the order of integration. The results are projected in Table 5.1 below.
Table 5.1: The ADF Test

\[ \Delta y_t = \mu + \delta y_{t-1} + \sum_{i=1}^{k} \beta_i \Delta y_{t-i} + \varepsilon_t \]

<table>
<thead>
<tr>
<th>Variable</th>
<th>Levels ADF T-test</th>
<th>First Difference ADF T-test</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP ratios</td>
<td></td>
<td></td>
<td>I(1)</td>
</tr>
<tr>
<td>Current Account deficit</td>
<td>-1.43423</td>
<td>-5.259725*</td>
<td>I(1)</td>
</tr>
<tr>
<td>Budget Deficit</td>
<td>-3.60052</td>
<td>-7.607254*</td>
<td>I(1)</td>
</tr>
</tbody>
</table>

Note: The Mackinnon critical values of significance at the 1%, 5% and 10% are -3.69987, -2.97626 and -2.62742 respectively. The superscripts *, **, *** show significance at 1%, 5% and 10% respectively.

It is evident from the test that the series have become stationary by taking the first difference, which implies the presence of unit roots in the original data. In other words, all the variables are non-stationary at level and stationary at first difference or they are integrated of same order I(1). This validates our propositions that the variables concerned are indeed co-integrated and a long run relationship holds among them. With this information at hand, we proceed further to examine the nature of long run and short run relationships among the variable.

5.2 The Twin Deficits Phenomenon

Next we examine the issue of twin deficits for Pakistan’s economy. As both variables (current account deficit and the fiscal deficit) are integrated of the order I(1), the next step is to examine the long run relationship between the two variables. The results of Johansen’s Maximum Likelihood test are reported in Table 5.2.

Table 5.2: Johansen’s Maximum Likelihood Test for Twin Deficits

(both the budget deficit and current account deficit are expressed as %GDP)

<table>
<thead>
<tr>
<th>Eigen-value</th>
<th>H₀</th>
<th>H₁</th>
<th>Trace</th>
<th>5% Critical Value</th>
<th>H₀</th>
<th>H₁</th>
<th>Max</th>
<th>5% Critical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.37450</td>
<td>r≤0</td>
<td>r&gt;0</td>
<td>16.1252</td>
<td>12.3209</td>
<td>r≤0</td>
<td>r&gt;0</td>
<td>15.9529</td>
<td>11.2248</td>
</tr>
<tr>
<td>0.00505</td>
<td>r≤1</td>
<td>r&gt;1</td>
<td>0.17230</td>
<td>4.12990</td>
<td>r≤1</td>
<td>r&gt;1</td>
<td>0.17236</td>
<td>4.1299</td>
</tr>
</tbody>
</table>

Note: The lag length of one is used in the VAR. The critical values for trace and maximum likelihood tests are due to Osterwald-Lenum (1992). The estimation was obtained assuming only an intercept and no trend in the cointegration equation.
Keeping in view the above, the hypothesis of no co-integration is rejected by the trace and maximum eigen-value statistics at 5 % level. This suggests that there is long run relationship between both CAD and BDEF. The estimation was carried out by using one lag length. The estimated long run equation is given by:

\[
CAD = 0.993BDEF \quad (5.1)
\]

The above estimations suggest a positive correlation between the budget deficit and the current account balance in the long run. The results support the earlier findings of Kulkani and Erickson (1998), Aqeel and Nishat (2000), Mukhtar et al. (2007), Hakro, (2009) and Siddiqui (2009). All these studies have concluded that there has been a stable long run relationship between the twin deficits over the past two and half decades in Pakistan. However these findings of positive correlation between the two variables do not indicate the direction of causality; whether it could be the BDEF that causes CAD or the other way around. We take up this question by estimating the Vector Error Correction Model (VECM).

Both the variables are expressed as ratios to the GDP and the data corresponds for a fairly long period: 1972-2008. The results are reported in the Table 5.3 below.

<table>
<thead>
<tr>
<th>Dependent</th>
<th>Regressors</th>
<th>R²</th>
<th>F-tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>∆BDEF</td>
<td>Constant</td>
<td>∆BDEF-1</td>
<td>∆CAD-1</td>
</tr>
<tr>
<td></td>
<td>221.37</td>
<td>0.49</td>
<td>-0.40</td>
</tr>
<tr>
<td></td>
<td>(0.68)</td>
<td>(3.50)</td>
<td>(2.34)</td>
</tr>
<tr>
<td>∆CAD</td>
<td>71.45</td>
<td>0.04</td>
<td>-0.33</td>
</tr>
<tr>
<td></td>
<td>(0.20)</td>
<td>(0.37)</td>
<td>(0.55)</td>
</tr>
</tbody>
</table>

Note: t-values are in parenthesis and [.] are the p-values.

The F-test results suggest a single unidirectional causality relationship operating from the current account deficit to the budget deficit. This result supports our earlier findings. The negative value of ECM is indicative of the long run convergence. The ECM estimate reveals that the disequilibrium in BDEF produced by CAD would be adjusted. This implies that changes in current account deficit adjust to remove past period’s deviations.

The Johansen and Juselius cointegration test is not informative relative to the stability of the parameters in the system. For stability test, we have also utilized the CUSUM and CUSUMSQ procedures (Brown, Durbin and Evans, 1975) to check for structural change in the budget and current

---

6 This long run relation has been estimated assuming no trend and no intercept

7 They have used different econometric techniques for examining the relationship between the budget deficit and the current account deficit but found same results (twin deficits).
account deficits. Both the CUSUM and the CUSUMSQ procedures are updated recursively and are plotted against the break points. Parameter stability is indicated when the plots of the CUSUM and the CUSUMSQ stay within the 5 percent significance level.\(^8\)

The results of multivariate analysis are reported in Table 5.4.

**Table 5.4 Granger Causality Test**

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Independent Variable</th>
<th>$\Delta$BD</th>
<th>$\Delta$CAD</th>
<th>ECM</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\Delta$BD</td>
<td>-</td>
<td>2.75 [0.08]</td>
<td>-1.23 (5.84)</td>
<td></td>
</tr>
<tr>
<td>$\Delta$CAD</td>
<td>5.39 [0.01]</td>
<td>-</td>
<td>0.17 (0.26)</td>
<td></td>
</tr>
</tbody>
</table>

The null hypothesis that CAD does not cause BDEF is rejected. In contrast, the null hypothesis that the BDEF does not cause CAD is not rejected. This means that there is a one way causality that operates from CAD to BDEF, which is supports the earlier findings of Kulkarni and Erickson (1998), Mukhtar et al. (2007), Hakro (2009) and Siddiqui (2009).\(^9\) Therefore, we conclude that: CAD $\rightarrow$ BDEF.

6. CONCLUSIONS

The main objective of this study was to investigate the pros and cons of the twin deficits issue in the context of Pakistan economy. The estimated empirical results confirmed the strong evidence in favor of long run relationship between the budget deficit and current account deficit for Pakistan. The Granger causality test points out to one way causation, that is, from current account deficit to the budget deficit. Again however, this result warrants caution. Economic theory suggests that an increase in budget deficit, with partial financing through borrowing, induces an upward pressure on the rate of interest rate. This invites an inflow of foreign capital in an environment of free mobility. The exchange rate appreciates due to higher demand for domestic currency, which in turn leads to a fall in exports and thereby to an increase in the current account deficit. However, the case of Pakistan, and majority of developing countries of the third world, is different. The twin deficits are surely inter-linked. However, the underlying rationale is not the movements of the interest rates. Pakistan has to borrow most often directly from the donor agencies to finance its development and defence needs. Only recently, the government has floated bonds in the international markets to attract foreign capital. Further, the country is in practice of inviting direct foreign investment to carry out heavy development projects in the public sector. All

---

\(^8\) CUSUM and CUSUMQ plots for stability tests are given in appendix of this section. These tests are used to check the long run stability of the variable.

\(^9\) They have found a causality running from current account deficit to budget deficit. See Erickson(1998), Mukhtar et al., 2007; Hakro, 2009, for detail.
these factors, along with population pressure and consumption demand, have led to an ever increasing demand for imports. On the other hand, the exports of Pakistan are low and more or less stagnant because of structural problems rather than variations in the exchanges rates. In fact, the Pakistani currency is constantly depreciating since 1970’s in the international market but exports are not increasing due to several restrictions and non-access to the markets concerned. Naturally, the country is facing a persistent deficit on the current account of the balance of payments.

6.1 Policy Implications

The key policy implications in terms of the twin deficit problem that can be dire need to render our exports more competitive in the international markets. However, even these efforts shall not be successful unless the West opens its borders and allow our exports an access to penetrate in the relevant markets. However, this is more a political matter and the government should emphasize on this point. Therefore, every effort should be made to contain the evil of budget deficit at source. We should find ways and means to increase the revenues and increase the scope of direct taxation. Likewise, there is dire need to reduce the un-necessary current expenditure, failing which the nation is likely to default in the near future. After all, for how long it is possible to get foreign assistance. So the authorities ought to pay more attention to export promotion and budget balancing policies. However, only a stable, democratic and serious government can formulate adequate fiscal and monetary policies and implement these policies efficiently.
APPENDIX

Figure 1: CUSUM and CUSUMQ Plots for stability Tests

Budget Deficit

Current Account Deficit

REFERENCES


