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TWIN DEFICITS HYPOTHESIS: THE CASE OF PAKISTAN 1972-2008

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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 co integration 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.

Keywords: Twin defects hypothesis, budget deficit, current account deficit

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. 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.

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 & Akhtar (1992); Burney & Yasmeen (1989); Kazimi (1992) have used OLS techniques on annual data to relate the twin deficits with other macroeconomic variables. Similarly Aqeel & 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 macro-economic 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.

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LITERATURE REVIEW

This section reviews some existing theoretical and empirical literature on Twin deficits hypothesis. Normandin (1994) found the relevant Canadian consumer's reactions towards budget deficit are statistically positive but the responses U.S. consumers are statistically insignificant. Kulkarni & Erickson (1998) analyzed mixed evidences of twin deficits for India, Pakistan and Mexico. Vamvoukas (1999) supported this hypothesis for a small open economy of (Greek). Alkhatib (2000) analyzed positive correlation between both deficits for Saudi Arabian economy. Aqeel & Nishat (2000) found significant relationship for Pakistan in long run not in short run. Zengin (2000) supported the evidence of twin deficit hypothesis in case of Turkey. Kouassi *et al.,* (2002) found evidence of twin deficit for twenty developing countries. Aristovnik (2003) found relatively high correlation between fiscal and external imbalances. Zubaidi *et al.,* (2005) confirmed this hypothesis for Indonesia, Malaysia, Philippines and Thailand (4 ASEAN countries). Bartolini & Lahiri (2006) examined this hypothesis and found some empirical evidence in its support. Saleh and Chowdhury (2007) found that trade openness has a positive but insignificant effect on the current account deficit in Sri Lanka. Fonseca (2007) rejected the twin-deficit hypothesis for Egypt. Corsetti and Muller (2007) showed a perfect correlation of the budget balance and the trade balance on the condition of spending shocks. Mukhtar *et al.,* (2007) supported optimistic and significant relationship between both deficits in Pakistan. Acaravci & Ozturk (2008) supported the Keynesian view. Neaime (2008) analyzed unidirectional causal relationship in the small economy of Lebanon. Arize & Malindretos (2008) explored bidirectional causality between the twin deficits in Ten African countries. Baharumshah *et al.,* (2009) found TDH holds only for 3 countries Malaysia, the Philippines and Thailand of ASEAN. Hakro (2009) found that causality link of deficits by using multivariate time series on Pakistan's data. Siddiqui (2009) confirmed one way causal relationship for Pakistan.

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 this mutual relationship is recognized as the twin deficits hypothesis. 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 openness[†].

There is a significantly voluminous body of literature (e.g. Fleming, 1962; Mundell, 1963; Kearney & 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.

The first hypothesis is based on 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 channel is known as the Ricardian Equivalence Hypothesis (REH). According to this approach, 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. This implies that the tax-financed expenditures do not affect private spending or national saving.

The third hypothesis claims a reverse causality running from current account to budget deficit. 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.

[†] For instance, see the analysis of Saleh & Chowdhry (2007) in case of Sri Lanka.

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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[‡].

Analytical Framework

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

$$Y = C + I + G + (X - M) \tag{1.1}$$

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

$$Y = C + S + T + \mathrm{R} \tag{1.2}$$

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

$$(S - I) + (T - G) = (X - M) \rightarrow (I - S) + (G - T) = (M - X) \tag{1.3}$$

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. 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

$$S = S_P + S_g \tag{1.4}$$

where $S_P = Y - T - C$ and $S_g = T - G$

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

$$(X - M) = (S_P - I) + S_g \rightarrow CAD = IS_p + BD_g \tag{1.5}$$

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 o 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[§].

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:

$$CAD_t = \alpha_0 + \alpha_1 \, BD_t + \varepsilon_t \tag{1.6}$$

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

Pakistan constitutes an important case study for investigation of the dynamics of persistently high rates of deficits in fiscal budget and international trade. The following tables reflect the severity of the twin deficit problem in Pakistan.

[‡] 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.
[§] Saleh & Chowdhry, 2007; Alkhatib, 2000.

Table 1. Trade Deficit and Budget Deficit as percentage of GDP

Year	Trade Deficit	Budget Deficit
1981-85	9.74	3.82
1986-90	5.78	4
1991-95	4.26	4.54
1995-00	3.64	4.44
2001-05	2.78	1.86
2006-09	10	5.8

Source: Pakistan Economics Survey (2008-09)

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. 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-stationarity, 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. 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:

$$\Delta BDEF_t = \alpha_0 + \sum_{i=1}^{P} \alpha_{1,i} \Delta BDEF_{t-i} + \sum_{i=1}^{Q} \alpha_{2,i} \Delta CAD_{t-i} + \beta_1 ECM_{t-1} + \varepsilon_{1t} \quad (1.7)$$

$$\Delta CAD_t = \delta_0 + \sum_{i=1}^{p} \delta_{1,i} BDEF_{t-i} + \sum_{i=1}^{q} \delta_{2,i} \Delta CAD_{t-i} + \beta_2 ECM_{t-1} + \varepsilon_{2t} \quad (1.8)$$

The symbol Δ denotes the difference operator, α's and δ's are the short-term time-invariant coefficients, β's are the coefficients of the lagged error-correction terms derived from the long-run relationships. The ε'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 $\beta_1 = \beta_2 = 0$.

DATA AND VARIABLES

The validity of results depends on sufficient and consistent data. 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. Most of the data is collected from Federal Bureau of Statistic, Annual Reports of the State Bank, Pakistan Economic Survey, Yearbook of International Financial Statistic (IFS) published by the IMF and the Hand Book of Pakistan Economy. The main variables used were current account deficit and Budget Deficit.

RESULTS AND INTERPRETATION

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.

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Unit Root Tests

We use the ADF model to check for the stationarity and the order of integration. The results are projected in Table 2 below.

Table 2. The ADF Test $\Delta\ y_t = \mu + \delta\ y_{t=1} + \sum_{i=1}^{k} \beta_i \Delta\ y_{t-i} + \varepsilon_t$

Variable	Levels	First Difference	Conclusion
	ADF T-test	ADF T-test	I(1)
	GDP ratios		
Current Account deficit	-1.43423	-5.259725*	I(1)
Budget Deficit	-3.60052	-7.607254*	I(1)

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 all the variables are non-stationarity at level and stationarity at first difference or they are integrated of same order I (1). With this information at hand, we proceed further to examine the nature of long run and short run relationships among the variable.

The Twin Deficits Phenomenon

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 3.

Table 3. Johansen's Maximum Likelihood Test for Twin Deficits

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

Λ-Trace					Λ-Max			
Eigen-value	**H_0**	**H_1**	**Trace**	**5%** Critical Value	**H_0**	**H_1**	**Max**	**5%** Critical Value
0.37450	r≤0	r>0	16.1252	12.3209	r≤0	r>0	15.9529	11.2248
0.00505	r≤1	r>1	0.17230	4.12990	r≤1	r>1	0.17236	4.1299

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:

$$CAD = 0.993 BDEF^{**} \qquad (1.9)$$

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 & Erickson (1998); Aqeel & Nishat (2000); Mukhtar *et al.,* (2007); Hakro (2009); Siddiqui (2009)[††]. All these found a stable long run relationship between the twin deficits over the past two and half decades in

[**] This long run relation has been estimated assuming no trend and no intercept

[††] 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).

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).

The results are reported in the Table 4 below.

Table 4. Causality between the Budget and Trade Deficits (%GDP)

Dependent	Regressors				R^2	F-tests	
	Constant	ΔBDEF-1	ΔCAD-1	ECM-1		BDEF	CAD
ΔBDEF	221.37 (0.68)	0.49 (3.50)	-0.40 (2.34)	-1.23 (5.84)	0.54		11.54 [0.00003]
ΔCAD	71.45 (0.20)	0.04 (0.37)	-0.33 (0.55)	0.17 (0.26)	0.04	0.45 [0.72]	

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 Johansen and Juselius co integration 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 & Evans, 1975) to check for structural change in the budget and current account deficits. Parameter stability is indicated when the plots of the CUSUM and the CUSUMSQ stay within the 5 percent significance level.[‡‡]

The results of multivariate analysis are reported in Table5.

Table 5. Granger Causality Test

DEPENDENT VARAIBLE	INDEPENDENT VARIABLE		
	ΔBD	ΔCAD	ECM
ΔBD	-	2.75 [0.08]	-1.23 (5.84)
ΔCAD	5.39 [0.01]	-	0.17 (0.26)

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 & Erickson (1998); Mukhtar *et al.,* (2007); Hakro (2009); Siddiqui (2009).[§§] Therefore, we conclude that: CAD → BDEF.

CONCLUSION

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. In the case of Pakistan, 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. Further, the country is in practice of inviting direct foreign investment to carry out heavy development projects in the public sector. All 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

[‡‡] 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.

[§§] They have found a causality running from current account deficit to budget deficit. See Erickson (1998); Mukhtar *et al.,* (2007); Hakro (2009), for detail.

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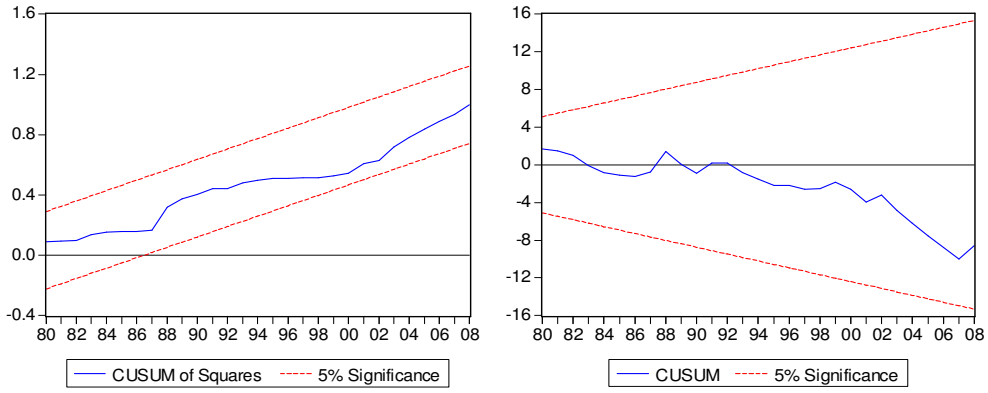
variations in the exchanges rates. In fact, the Pakistani currency is constantly depreciating since 1970's in the international market but exports are not increasing due to several restrictions and non-access to the markets concerned. Naturally, the country is facing a persistent deficit on the current account of the balance of payments.

POLICY IMPLICATIONS

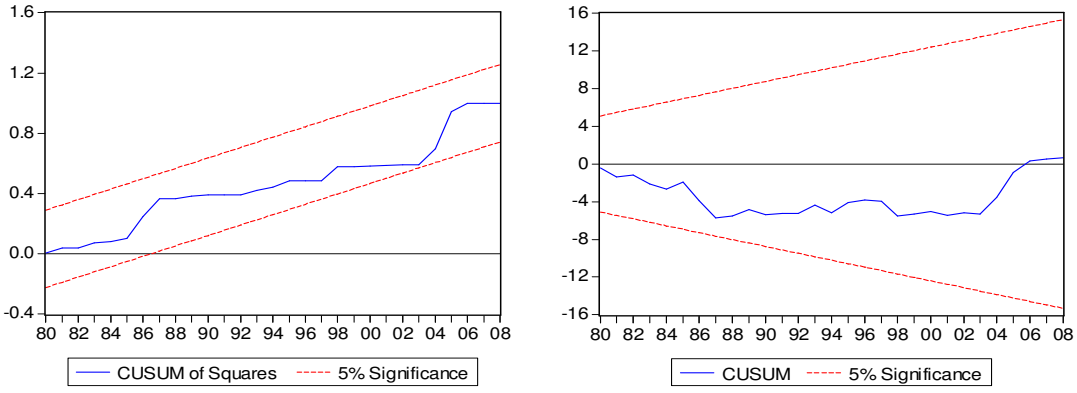
The key policy implications in terms of the twin deficit problem that can be dire need to render our exports more competitive in the international markets. However, even these efforts shall not be successful unless the West opens its borders and allow our exports an access to penetrate in the relevant 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.

Figure 1. CUSUM and CUSUMQ Plots for stability Tests

Budget Deficit



Current Account Deficit



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