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Assessing the Triple Deficit Hypothesis for Major South Asian Countries: A Panel Data Analysis

Shruti Shastri[1]*, A. K. Giri[2], Geetilaxmi Mohapatra[3]

[1]Department of Economics, Banasthali Vidyapith, Vanasthali, Rajasthan, India, [2]Department of Economics and Finance, Birla Institute of Technology and Science, Pilani, Rajasthan, India, [3]Department of Economics and Finance, Birla Institute of Technology and Science, Pilani, Rajasthan, India. *Email: shastrishruti5@gmail.com

ABSTRACT

The paper examines the "triple deficit hypothesis" - An extension of the "twin deficit hypothesis" with inclusion of private saving gap for a panel of five South Asian countries, namely India, Pakistan, Bangladesh, Srilanka and Nepal for the period 1985-2015. The results based on first and second generation panel cointegration tests indicate long-run relationship among budget balance (BB), current account balance (CAB) and private saving gap. The long-run coefficients obtained using mean group (MG)-dynamic ordinary least square, MG-fully modified ordinary least squares and common correlated effect MG indicate positive impact of BB and private saving gap on CAB thus confirming triple deficit hypothesis. The causality analysis reveals feedback relationship between CAB and BB implying that improvement in CAB requires fiscal austerity but fiscal adjustment is not fully policy controlled and requires adjustment in current account. Further, the causation also runs from saving gap to CAB and BB implying that plugging the saving gap would help improve both current account and BB.

Keywords: Triple Deficit Hypothesis, South Asia, Panel Cointegration, Panel Causality, Group Mean-dynamic Ordinary Least Square, Group Mean-fully Modified Ordinary Least Squares, Common Correlated Effect Mean Group, Estimator
JEL Classifications: E60, F32, H62

1. INTRODUCTION

The nexus between budget deficit (BD) and current account deficit (CAD) has long been the center of rigorous theoretical as well as empirical investigation. Persistently large CAD is troublesome due to the associated transfer of wealth to foreigners and the burden it imposes on the future generations (Anoruo and Ramchander, 1998). Though running a BD cannot be faulted as profligacy under all circumstances, a series of large BDs is inimical to macroeconomic performance. Persistent BDs not only increase the public debt and its burden, they may also contribute to the inflationary pressures in the economy. Further, excessive government borrowings from the market leave less resources for private investors thus crowding out private investment.

Due to the serious implications associated with persistent BD and CADs for the viability of long term growth, the alleged causation from BD to CAD (popularly known as the "twin deficit hypothesis [TDH]") has been studied intensively but the role of private saving gap in the emergence of CAD has often been ignored. With the liberalization of capital movements worldwide, the necessity that domestic investments be limited to the amount of domestic savings has disappeared. When domestic investments are greater than domestic savings, the financing of the emerging savings-investment gap from abroad causes the savings-investment balance to play a role, along with the BD, in the emergence of CAD. This means that the budget balance (BB), savings-investment balance, and current accounts balance of a country may all together be in deficit. Such a scenario is known as the triple deficit hypothesis' in the literature (Akbas et al., 2014).

In view of the potential importance of savings-investment balance in the formation of current account balance (CAB), the purpose of the present study is to test the validity of "triple deficit hypothesis" for a panel of five major South Asian economies namely India, Pakistan, Srilanka, Bangladesh and Nepal for the period 1985-2015.

The issue is pertinent as economic mismanagement over the years in the region has given rise to macroeconomic imbalances including high BD and CAD. Given the enormous responsibilities of economic development the resource availability for carrying out fiscal operations in the region is meager. Further, political pressures for specific public expenditures, in particular poorly targeted and wasteful current subsidies, are hard to resist leading to structurally entrenched BDs. Besides the high BDs, the South Asian countries (except for Bangladesh and Nepal) are facing continuous deficits in their current account for the last few decades. More recently, after the eruption of global financial crisis in 2007-08 not only the CAB deteriorated as exports declined more than imports, the fiscal balance also got adversely affected because of the necessity to provide effective stimulus during the crisis period. With the size of both deficits being high the probability of relationship between them increases significantly. Since the saving rate in these countries has also remained in low to medium range, by defining the composition of CAD as a sum of net private and public savings shortages, the study provides an insight into the existence of the twin or triple deficit hypothesis for these economies. This question signifies fundamental inputs to these countries policy design and formulation because if the essential reason for growing CAD is indeed the growing BD and/or private saving gap then in that case policy makers may focus on reducing BD and/or private saving gap to resolve the current account problem. Similarly if CAD turns out to be the causal factor of BD, it can be used as an effective policy instrument in curbing BD.

We augment the earlier literature not only by testing a relatively new hypothesis for a panel of South Asian economies but also in a methodological dimension by taking into account the problem of cross section dependence in each step of the analysis. We use both first and second generation panel unit root and cointegration tests. The long run estimates of the relationship are obtained from mean group (MG)-dynamic ordinary least square (DOLS), MG-fully modified ordinary least squares (FMOLS) and common correlated effect MG (CCEMG) estimators among which the latter explicitly controls for common unobserved factors. The rest of the paper is structured as follows: Section 2 discusses theoretical underpinnings of the twin and triple deficit hypothesis and provides a review of the empirical literature. Section 3 describes the variables and econometric methodology. Section 4 presents the empirical results and Section 5 concludes the study with policy implications.

2. TWIN AND TRIPLE DEFICIT HYPOTHESIS: THEORETICAL UNDERPINNINGS AND REVIEW OF LITERATURE

The argument of relationship between budget and CAD first emerged in US under the "Reagan Fiscal Experiment." In the 1980's both US external deficit and BD increased significantly. As a result of this co movement, several economists attributed a significant portion of the deterioration in external balance to the emergence of record BDs and this causal relationship came to be known as the "TDH."

The basic transmission mechanism of this linkage in the conventional Keynesian income-expenditure approach is that increase in BD leads to increase in aggregate demand or absorption that induces imports causing CAD. In the Mundell-Fleming framework of analysis - BD causes upward pressure on interest rates that triggers capital inflows and appreciation of currency leading to deterioration in trade account.

Contrary to the above mechanisms which state a link between BD and CAD, the Ricardian equivalence hypothesis (REH) rules out the possibility of any relationship between the two deficits. Under the REH, government deficits by increasing the probability of future taxes result in equivalent reduction of consumption of forward looking economic agents and the decline of public savings is matched by increase in private savings thereby leaving national savings and hence rate of interest and aggregate demand unchanged.

The theoretical basis of the "triple deficit hypothesis" or the relationship among the savings gap, BD and CAD can be obtained with reference to the following national income identity:

$$Y = C + Ip + G + (X - M) \quad (1)$$

The identity shows that gross national product (Y) is the sum of income derived from producing goods and services under private consumption (C), private investment (Ip), government goods and services (G) and exports (X). Imports (M) are treated as a negative item to avoid the double counting of consumption or investment goods purchased at home but produced abroad.

A second basic equation in the national income accounting is based on the insight that any income received by individuals has four possible uses: It can be consumed (C), saved (Sp, for private savings), paid in taxes (T), or transferred abroad (Tr). Because gross national product is simply the sum of the income received by all individuals in the economy, we have:

$$Y = C + Sp + T + Tr \quad (2)$$

Combining (1) and (2) we obtain,

$$(X - M - Tr) = (Sp - Ip) + (T - G) \quad (3)$$

With (X-M–Tr) equaling the CAB.

The CAB is thus equal to the surplus of private savings over investment and the gap between government tax receipts and government expenditure on goods and services, that is, the government budget surplus. This view of the CAB as equivalent to the savings gap–the difference between domestic saving and investment spending–is not a theory of how the balance is determined. The identity by itself tells us nothing about the causes and interconnections of the mentioned deficits. The commonly accepted view is that BDs are the fundamental cause of twin or triple deficits and therefore the cure is to reduce the size of BDs (Szakolczai, 2006).

Empirically, a number of studies lend support the twin deficit phenomenon. Vamvoukas (1999), Lau and Tang (2009), Sahoo and Das (2012) document a direct causal impact of BD on CAD. Zietz and Pemberton (1990) in a simultaneous equation framework attribute the impact of BD on trade deficit primarily coming through rising imports due to rising absorption. Abell (1990) using vector autoregressive (VAR) model for period 1979 to 1985 for United States finds that the BD influences the trade deficit indirectly. The primary set of linkages involves causality from BD to higher interest rate, to foreign capital inflows, to appreciation of the exchange rate, and finally, to the trade deficits. Lau and Haw (2003) using Toda Yamamoto causality find that BDs lead to deterioration of current account both directly as well as indirectly in case of Thailand supporting a version of Abell (1990) causal chain. Osoro et al. (2014) using Granger causality test also report direct as well as indirect impact of BD on CAD though interest rate and exchange rate in Kenya during 1963-2012. More recently, Tang (2015) in a general equilibrium perspective takes the behavioral determinants of saving and investment into consideration and finds that BD causes CAD via short-run interest rate and real income for US.

Contrary to the TDH, the theoretical paradigm of REH is empirically supported by Enders and Lee (1990), Kouassi et al. (2004), Asrafuzzaman and Gupta (2013), Ogbonna (2014), etc.

Apart from the TDH and the REH, another strand of empirical literature supports reverse causality from CAD to BD (Alkswani, 2000; Khalid and Guan, 1999; Anoruo and Ramchander, 1998; Kouassi et al., 2004; Constantine, 2015). This phenomenon is mainly observed in the economies that are relatively open and have their domestic development dictated by the foreign balance to certain extent. A deterioration in current account leads to slower pace of economic growth and hence increases the BD through a loss of revenue or pressure on the government to increase spending on sectors affected by falling exports (Kouassi et al., 2004).

Finally, a set of studies including Darrat (1988), Islam (1998), Pahlavani and Saleh (2009), Omaniyi et al. (2012), Saysombath and Kyophilavong (2013) supports bidirectional causality or feedback effect between BD and CAD.

While a voluminous literature on the TDH is based on country specific studies, panel studies are a small part of the literature perhaps because of dearth of techniques to deal with causality in a panel setting until recently (Miteza, 2010). Lau and Behrumshah (2006) for 9 SEACEN countries find bidirectional causality between CAD and BD in a panel VAR setting for period 1980-2001 and find evidence for indirect causation running from BD to interest rate, from interest rate to exchange rate and from exchange rate to CAD. Abbas et al. (2010) drawing on a large sample of advanced and emerging economies examined the relationship between BD and CAD using panel regression and vector auto regression. On average, a strengthening in fiscal balance by 1% point of gross domestic product (GDP) was found associated with a current account improvement of 0.3-0.4% point of GDP. The association is found stronger in emerging and low-income countries, when the exchange rate is flexible, economies are open, output is above potential or initial debt levels are above 90% of GDP. Bon (2014) applies the panel differenced general method of moment Arellano-Bond estimation and pooled MG-based error correction model for 10 developing economies of Asia (with both deficits and surplus in current account) and finds a negative relationship between the two deficits. Eldemerdash et al. (2014) for a panel of Arab economies with fixed exchange rate regimes find evidence in favor of TDH in oil countries, whereas the REH holds for non-oil countries. Xie and Chen (2014) considering a sample of 11 Organization for Economic Co-operation and Development (OECD) countries, for the period 1980-2010 employ panel Granger causality (with bootstrap critical values) and report a bidirectional causality between BD and CAD. Acaravci and Ozturk (2008) examine the general validity of TDH for Turkey during the period 1987:1 to 2005:4. The empirical analysis in this paper rejects the REH and supports the Keynesian view that there is a long-run relationship between BD and current account imbalances. The empirical results also indicate that the direction of causality runs from the BD to the CAD.

As for the triple deficits hypothesis, the existing literature is indeed scarce. Earlier studies discussing the nexus among budgetary, current account and private saving deficit such as Fischer and Easterly (1990), Higgins and Klitgaard (1998), Gale and Orszag (2003), Hubbard (2006), Szakolczai (2006) and Feldstein (2008) are mainly theoretical in nature.

Among the recent studies, Ackinci and Yilmaz (2012) examined the relationship among BD, CAD and saving gap for Turkey for period 1975-2010. Using bounds test approach they found long run relationship among the three deficits and found saving and BDs to have a positive effect on CAD in long as well as short run.

Akbas et al. (2014) analysed validity of triple deficit hypothesis for Turkey during 1960-2012. Using asymmetric causality test they found a bidirectional causality between BD and CAD and between CAD and saving gap thus reaffirming the triple deficit hypothesis in Turkish economy. Bolat et al. (2014) tested relationship among BD, CAD and net savings for 15 European countries for 2002Q1-2013Q3 and found existence of triple deficit relation for only some of the countries including Poland, Portugal, Spain, and Sweden.

Sen and Kaya (2016) examined the validity of the twin and triple deficits hypotheses using bootstrap panel Granger causality analysis and an annual panel data set of six post-com-munist countries (Russia, Poland, Ukraine, Romania, the Czech Republic, and Hungary) from 1994 to 2012. The study based on panel data analysis under cross-sectional dependence and country-specific heterogeneity finds no causal relationship between BDs and trade (or current account) deficits or among BDs, private savings-investment deficits, and trade deficits.

In case of South Asia, a good number of studies assessed the TDH in the past (Acharya 2009; Mukhtar et al., 2007; Sivarajasingham and Balamurali, 2011; Saeed and Khan, 2012; Sahoo and Das, 2012; Ravinhirakumaran et al., 2016). The body of evidence however does not yield a consensus on the validity of TDH as the results are sensitive to the sampling period and methodology of investigation. Despite the growing usage of the panel econometric techniques in the investigation of the TDH, no study has so far been conducted for South Asian region in panel framework. Moreover, to the best of our knowledge, no study has so far investigated the triple deficit hypothesis in context of the South Asian economies.

3. DATA AND ECONOMETRIC METHODOLOGY

The study attempts to examine the following model:

$$CAB = \alpha_0 + \beta_1 BUD_{it} + \beta_2 SAV_{it} + \varepsilon_{it} \tag{4}$$

Where, CAB is current account balance, BUD is government's fiscal balance and SAV is the private saving investment gap. All three deficit figures are used as proportion of GDP following usual practice. The data on fiscal balance and CAB are sourced from various issues of key ındicators for Asia and the Pacific, Asian Development Bank whereas the data for saving gap are taken from world development ındicators. Since the components of domestic savings are not systematically reported we estimate the domestic private savings by deducting gross domestic public savings from gross domestic savings. Gross domestic public savings is calculated as total government revenue less current government expenditure.

The stationarity properties of the data are tested using the Maddala and Wu (1999) test (M–W) and a second generation panel unit root test, namely the Pesaran (2007) cross sectionally augmented IPS (CIPS) test. The M–W test combines the significance levels of individual Phillips–Perron or augmented Dickey–Fuller (ADF) unit root tests for each cross-section i to construct an overall test statistic based on the test suggested by Fisher (1932):

$$\lambda = -2\sum_{i=1}^{N} \ln vi \tag{5}$$

Where, v_i is the P value of the unit root test for country i. The statistic λ has a χ^2 distribution with 2N degrees of freedom where N denotes the number of panels. The null hypothesis is that all panels have a unit root versus the alternative that at least one panel is stationary. M–W test is, however, based on a restrictive assumption that individual time series in the panel are cross-sectionally independent. The CIPS test relaxes this assumption and controls for the presence of cross-sectional dependence of the contemporaneous error terms. The test is based on a cross-sectionally augmented ADF regression, which filters out the cross-sectional dependence by augmenting the ADF (p) regressions with the lagged cross-sectional mean and the lagged first differences of the cross sectional mean. The estimated model is as follows:

$$\Delta y_{it} = a_{i0} + a_{i1}t + a_{i2}y_{i,t-1} + a_{i3}\bar{y}_{t-1} + \sum_{j=0}^{p} d_{ij}\Delta\bar{y}_{t-j} + \sum_{j=1}^{p} \delta_{ij}\Delta y_{i,t-j} + v_{it} \tag{6}$$

Let $\tilde{t}_i$ denotes the t-ratio for a_{i2} in the above regression, the CIPS statistic is defined as:

$$CIPS = N^{-1}\sum_{i=1}^{N} \tilde{t}_i \tag{7}$$

To investigate the presence of long-run relationship, both first and second generation panel cointegration tests by Pedroni (1999) and Westerlund (2007) respectively are employed. Following Pedroni (1999), the estimated co-integration relationship is specified as follows:

$$Y_{it} = \alpha_i + \delta_i t + \beta_i X_{it} + \varepsilon_{it} \quad i = 1,2,\ldots.N;\ t = 1,2\ldots.T \tag{8}$$

This formulation allows for considerable heterogeneity: Fixed effect (α_i), individual deterministic trend (δ_i) and a heterogeneous slope coefficient (β_i) the term $\varepsilon_{it} = \rho_i\varepsilon_{it-1} + v_{it}$ represents the estimated residuals from the panel regression. Pedroni (1999) developed seven statistics to test the null hypothesis of no cointegration (H_0: $\rho_i = 1, \forall i$). Panel v, panel rho, panel pp and panel ADF statistics are commonly referred to as within-dimension or panel cointegration statistic and the remaining three test statistics, group rho, group pp and group ADF are based on pooling along what is commonly referred to as between dimension or group mean (GM) panel statistics. For the panel cointegration statistics the alternative hypothesis is given by H_a: $\rho_i = \rho < 1, \forall i$ and for the GM cointegration test H_a: $\rho_i < 1, \forall i$. The GM cointegration tests thus allow for heterogeneous coefficient under the alternative hypothesis.

Along with the Pedroni test we also perform the Westerlund (2007) co-integration test which delivers robust critical values through bootstrap approach even under the assumption of cross-section dependence. The test checks whether an error correction model has or not an error correction (individual group or full panel) based on the following equation:

$$\Delta Y_{it} = c_i + \alpha_i(Y_{it} - \beta_i X_{it-1}) + \sum_{j=1}^{pi} \theta_{ij}\Delta Y_{it-1} + \sum_{j=1}^{pi} \gamma_j \Delta X_{it-j} + e_{it} \tag{9}$$

Where α_i is the speed of adjustment term. If $\alpha_i = 0$, there is no error correction and the variables are not co-integrated. If $\alpha_i < 0$, the model is error correcting implying that the variables are co-integrated. Westerlund (2007) developed four panel co-integration tests without any common-factor restriction. $P\tau$ and $P\alpha$ tests are designed to test the alternative hypothesis that the panel is co-integrated as a whole, whereas the two other tests, $G\tau$ and $G\alpha$ test whether at least one element in the panel is co-integrated.

The coefficients of long-run relationship are obtained using group-mean estimators which allow for flexibility related to cross-country heterogeneity. In particular, we employ the GM-FMOLS and GM-DOLS estimators. The GM-FMOLS estimator, derived by Pedroni (2000) uses the GM of individual FMOLS estimators and corrects for endogeneity and serial correlation by estimating the long-run covariance directly. The estimator has satisfactory size and power properties even for small panels, as long as T is larger than N (Pedroni, 2000). The group-mean panel FMOLS estimator for equation (8) can be written as:

$$\hat{\gamma}_i = \hat{\Gamma}_{21,i} + \Omega^0_{21,i} - \frac{\hat{\Omega}_{21,i}}{\Omega_{22,i}}(\hat{\Gamma}_{22,i} + \Omega\frac{0}{22,i}) \tag{10}$$

Where,

$\hat{\Omega}_i = \hat{\Omega}_i^0 + \hat{\Gamma}_i + \hat{\Gamma}_i'$ and $\hat{\gamma}_i = \hat{\Gamma}_{21,i} + \Omega_{21,i}^0 - \frac{\hat{\Omega}_{21,i}}{\Omega_{22,i}}(\hat{\Gamma}_{22,i} + \Omega\frac{0}{22,i})$.
Here $\hat{\Omega}_i = \hat{\Omega}_i^0 + \hat{\Gamma}_i + \hat{\Gamma}_i'$ is the estimated long-run covariance matrix of the stationary vector consisting of the estimated residuals from the cointegration regression and the differences in X. $\Omega\frac{0}{21,i}$ is the long-run covariance between the stationary error terms ε_{it} in equation 8 and the unit root autoregressive disturbances. $\Omega\frac{0}{22,i}$ is the long-run covariance among the difference in X. $\hat{\Gamma}_i$ is the weighted sum of the autocovariances and a bar over the letters denotes the mean for *i* members. The associated t-statistic for the between-group FMOLS estimator takes the following form:

$$t_{\hat{\beta}_{GFM}} = \frac{1}{\sqrt{N}}\sum_{i=1}^{N}(\hat{\beta}_{FM,i} - \beta)(\Omega_{11,i}^{-1}\sum(X_{it} - \bar{X}_i)^2)^{\frac{1}{2}} \quad (11)$$

Where, β is a value under the null hypothesis. The above t-statistic is standard normal as T and N approach infinity.

Next, the GM-DOLS panel cointegration estimator is considered. DOLS uses the past and future values of ΔX_{it} as additional regressors to correct for endogeneity and serial correlation. The between-group panel DOLS regression can be written as follows:

$$Y_{i,t} = \alpha_i + \delta_i t + \beta_i X_{i,t} + \sum_{k=-ki}^{ki}\gamma_{ik}\Delta X_{i,t-k} + u_{i,t}^* \quad (12)$$

$$\hat{\beta}_{DOLS} + \left[\frac{1}{N}\sum_{i=1}^{N}\left(\sum_{t=1}^{T} Z_{i,t}Z_{i,t}'\right)^{-1}\left(\sum_{t=1}^{T} Z_{i,t}\hat{Y}_{i,t}\right)\right]_1 \quad (13)$$

Where, $Z_{i,t}$ is the $2(K + 1)1$ vector of regressors; $Z_{i,t} = \left(X_{it} - \bar{X}_i, \Delta X_{i,t-k}, ---\Delta X_{i,t+k}\right)$ and $\hat{Y}_{i,t} = Y_{i,t} - Y_i$. A bar over the letters denotes mean and the subscript 1 outside the bracket denotes the first element of the vector used to obtain the pooled slope coefficient. The associated t statistic for the GM estimators is constructed as follows:

$$t_{\hat{\beta}_{DOLS}} = \frac{1}{\sqrt{N}}\sum_{i=1}^{N}\left(\hat{\beta}_{D,i} - \beta\right)\left(\frac{1}{\hat{\sigma}_i^2}\sum\left(X_{it} - \bar{X}_i\right)^2\right)^{\frac{1}{2}} \quad (14)$$

Where, $\hat{\sigma}_i^2$ is the long run variance of the residuals from the DOLS regression and $\hat{\beta}_{D,i}$ is the conventional DOLS estimator. The t statistic is standard normal as T and N approach infinity. Both GM-FMOLS and GM-DOLS allow to control the likely cross-sectional dependence by including common time dummies in the model.

For the robustness of results, we employ the CCEMG estimator. CCEMG is a generalization of MG estimator of Pesaran and Smith (1995) and is consistent in presence of unobserved common factors proxied by inclusion of cross sectional averages of dependent $\left(\bar{Y}\right)$ and independent variable $\left(\bar{X}\right)$ in the regression setup. The model considered is:

$$Y_{it} = \beta'_i X_{it} + c'_i \bar{Y}_t + d'_i \bar{X}_t + \varepsilon'_{it} \quad (15)$$

To test for causality, block exogeneity/wald test has been employed. The test looks at whether the lags of any variables granger cause any other variable in VAR/vector error correction model. It determines bilaterally whether the lags of the excluded variable affect the endogenous variable by testing the null hypothesis that the lagged coefficients are significantly different from zero.

4. EMPIRICAL RESULTS

At the outset it may be appropriate to provide an overview of trends in BD and CAD for the countries. A perusal of the first three columns of Table 1 relating to BD indicates a continuous declining trend across countries. On the other hand the corresponding CAD figures also show a tendency to decline but the decline in trend is not continuous as Pakistan and Srilanka experienced a rise in CAD during 1991-2000 before registering a decline in period 2000-07.

It may be said that both BD and CAD have a tendency to move together in the sense that both are declining. The same can be said of 2008-2014 (last four columns). Besides somewhat similar trends in BD and CAD, a close correspondence in the behavior of saving gap and CAD may also be observed for India, Pakistan and Srilanka in the sense that periods with small or negative saving gap (i.e. excess of investment over savings) are associated with larger values of deficits on current account hinting at the possibility of "triple deficit hypothesis." Proceeding for a formal investigation of the relationship among these deficits, Table 2 shows the results of unit root tests. The results of M–W and CIPS unit root tests show that the null hypothesis of I(1) series can not be rejected[1].

Having established that all three series are integrated of order one, tests for panel cointegration are conducted. As revealed by Table 3 six out of the seven within and between dimension tests reject the null of no coinegration.

Therefore, it is held that cointegrating relationship prevails among the variables. Table 4 presents the results of Westerlund's cointegration test. In small datasets, as in our study with T = 30, Westerlund (2007) warns that the results of the tests may be sensitive to the specific choice of lag and lead lengths. Hence, to avoid overparametrization and the resulting loss of power, we hold the short-run dynamics fixed by taking lead and lag = 1. The results indicate that both $G\tau$ and $P\alpha$ confirm presence of cointegration at 1% while $G\alpha$ and $P\tau$ indicate presence of cointegration at 5%. This finding thus corroborates our previous results of first generation test for cointegration.

After confirming cointegration, the next step is to estimate the coefficients of long-run relationship. The estimates of long run coefficients reported in Table 5. As revealed by the table all three estimators indicate a positive and statistically significant

1 At the outset the cross sectional dependence in the data was tested using Breusch Pagan LM test. The null of cross sectional independence was rejected for all three series indicating the need of employing second generation panel unit root and cointegration tests. The results of the test are available upon request.

Table 1: Trends in BDs and CADs (as % of GDP)

Variables	1985-1990	1991-2000	2000-2007	2008	2010	2012	2014
BD							
India	−7.7	−7.5	−7.4	−8.3	−6.9	−6.9	−6.6
Pakistan	−7.8	−6.78	−3.7	−7.0	−5.9	−8.6	−4.8
Srilanka	−11.1	−9.0	−7.9	−7.0	−8	−6.5	−6
Bangladesh	−5.6	−4.3	−3.4	−4.6	−2.8	−3.2	−3.6
Nepal	−7.5	−5.9	−3.1	−2.8	−1.9	−2.2	−0.1
CAD							
India	−2.2	−1.1	−0.025	−2.2	−2.8	−4.7	−1.4
Pakistan	−3.2	−3.86	−0.125	−9.2	−2.3	−2.2	−1.3
Srilanka	−6.5	−8.3	−3.1	−9.5	−2.2	−6.7	−2.7
Bangladesh	−1.13	0.639	−0.9	0.9	3.7	−0.4	0.9
Nepal	−6.2	−5.5	1.0	3.1	−2.3	5.0	4.7
SAV							
India	2.7	5.75	6.0	4.7	3.8	0.75	4.63
Pakistan	−1.4	3.8	1.4	−3.8	0.1	0.6	−2.3
Srilanka	−0.5	−1.1	−0.6	−6.7	−0.03	−6.3	0.0
Bangladesh	−1.1	−2.4	−1.5	−2.7	−2.9	−4.5	−2.7
Nepal	−2.4	−4.6	−10.4	−17.7	−24	−21	−29.3

Source: Key indicators for Asia and the Pacific, World Development Indicators. BD: Budget deficit, CAD: Current account deficit, GDP: Gross domestic product

Table 2: Results of panel unit root tests

Test	BD	CAB	SAV
M–W	1.63 (0)	5.82 (0)	4.17 (0)
	2.37 (1)	8.74 (1)	7.47 (1)
	2.42 (2)	13.5 (2)	8.51 (2)
	9.70 (3)	17.27 (3)	11.01 (3)
CIPS	−1.89 (0)	−1.27 (0)	0.49 (0)
	0.67 (1)	−0.67 (1)	0.12 (1)
	1.06 (2)	−0.76 (2)	0.99 (2)
	0.21 (3)	0.25 (3)	0.85 (3)

Figures in parenthesis are lag lengths. An intercept and trend are included. H_0: Series is I(1) for all panel, H_1: Series is stationary for some panel. M–W: Maddala and Wu, CIPS: Cross sectionally augmented IPS, BD: Budget deficit, CAD: Current account deficit

Table 3: Results of Pedroni's panel cointegration test

Panel cointegration (within dimension)	Statistics
Panel V-statistic	0.753
Panel rho-statistic	−3.705***
Panel PP-statistic	−4.444***
Panel ADF-statistic	−4.412***
GM (between dimension)	
Group rho-statistic	−1.946**
Group PP-statistic	−3.534***
Group ADF-statistic	−3.474***

Deterministic intercept and trend included. Automatic lag length selection based on SIC with a max lag of 5. Newey-West automatic bandwidth selection and Bartlett kernel. ***, **Show significance at 1%, 5% respectively. ADF: Augmented Dickey–Fuller, GM: Group mean, SIC: Schwarz ınformation criterion

Table 4: Results of Westerlund's cointegration test

Test	Value	P value	Robust P value
$G\tau$	−2.17	0.016	0.008
$G\alpha$	−7.13	0.248	0.030
$P\tau$	−5.46	0.017	0.020
$P\alpha$	−6.47	0.011	0.015

The test takes no cointegration as null. The test regression is fitted with a constant and one lag and lead. The Kernel bandwidth is set according to rule $4(T/100)^{2/9}$. The P values are for one sided test based on normal distribution. Robust P values are for one sided test based on bootstrap replications

impact of BB on CAB. The MG-DOLS estimator suggests that, on average, a strengthening (deterioration) in BB-to-GDP ratio of 1% point is associated with an improvement (deterioration) in the current account-to-GDP ratio of about 0.41. The impact of a 1% point strengthening (deterioration) of BB on the CAB is of order 0.38 and 0.53 under MG-FMOLS and CCEMG estimators respectively.

The coefficient of saving gap is consistently positive under all three estimators but significant only under MG-DOLS and MG-FMOLS estimators. The private saving gap exerts a positive effect on CAB though the impact is weaker compared to BB. A strengthening (deterioration) in saving gap ratio of 1% point is associated with an improvement (deterioration) in the current account-to-GDP ratio of about 0.09-0.12. The error correction term (ECT) estimated by inserting the long run coefficients in the short run dynamic specification of the model turns out to be negative and statistically significant. The negative ECT shows that the system is driven to its long run cointegration path. The coefficient of ECT reflecting the speed of adjustment is estimated to be around 29-39% per year.

The results of vector error correction (VEC) granger causality/block exogeneity panel causality contained in Table 6 indicate that the null of BB not causing CAB and CAB not causing BB both can be rejected at 1% hence there is bidirectional causation between two balances. The causation also runs from saving gap to CAB lending support to the triple deficit hypothesis in the sense that BB and saving gap jointly determine CAB. The saving gap also causes BB but the causation is bit weaker in terms of statistical significance. These results are in conformity with those of Akbas and Lebe (2014) who also find saving gap to play a role in determination of both budget and CAB for G7 countries. The causation may imply that inadequate savings have a negative effect on investments, which leads to a decrease in both the export revenues and the tax revenues to be taken from these investments. As a consequence,BB and the CAB are negatively affected (Akbas and Lebe, 2014).

Table 5: Long run coefficients under alternative estimators (dependent variable: CAB)

Variables	MG-DOLS		MG-FMOLS		CCEMG	
	Coefficient	P value	Coefficient	P value	Coefficient	P value
BUDG	0.416 (0.107)	0.00	0.38 (0.11)	0.00	0.53 (0.14)	0.00
SAV	0.123 (0.05)	0.01	0.095 (0.02)	0.00	0.0078 (0.11)	0.94
ECT	−0.362***		−0.296***		−0.391***	

Figures in parenthesis are standard errors. ***Indicates significance at 1%. To control for cross sectional dependence, MG-DOLS and MG-FMOLS models are estimated including time dummies, ECT: Error correction term, FMOLS: Fully modified ordinary least squares, MG: Mean group, DOLS: Dynamic ordinary least square

Table 6: Results of VEC granger causality/block exogeneity test

Dependent variable ↓	ΔBUDG	ΔCAB	ΔSAV
ΔBUDG	-	17.909 (0.001)	9.997 (0.068)
ΔCAB	16.98 (0.001)	-	13.21 (0.010)
ΔSAV	6.460 (0.805)	3.44 (0.501)	-

The table reports Chi-square statistic with corresponding P values (in parenthesis). The lag length of VEC is 1 based on SIC. H_0: Lagged coefficients of excluded variables are not significantly different from zero. VEC: Vector error correction, SIC: Schwarz ınformation criterion

5. CONCLUSIONS AND POLICY RECOMMENDATIONS

Due to the serious implications associated with the persistent BD and CADs, the alleged causation from BD to CAD has been studied intensively in the empirical literature but the role of private saving gap in the emergence of CAD has often been ignored. In view of this gap the present study investigates the "triple deficit hypothesis" - an extension of "TDH" with inclusion of private saving gap for the panel of five major South Asian countries, namely India, Pakistan, Bangladesh, Srilanka and Nepal for the period 1985-2015. Both first and second generation panel cointegration tests indicate a long run relationship among BB, CAB and private saving gap. The long run coefficients obtained from MG-DOLS, MG-FMOLS and CCEMG indicate a positive impact of BD on CAB. The results based on two of the three estimators also indicate a positive impact of saving gap on CAB. On average, a strengthening (deterioration) in fiscal balance-to-GDP ratio of 1% point is associated with an improvement (deterioration) in the current account-to-GDP ratio of about 0.38-0.53 and a strengthening (deterioration) in private saving gap-to-GDP ratio of 1% point is associated with an improvement (deterioration) in the CAB-to-GDP ratio of about 0.09-0.12.

Through causality analysis we find a feedback relationship between current account and BB. The saving gap is also found to be causing current account and BB but the causation is bit weaker in terms of statistical significance in the latter case.

Our results hence lend support to the existence of triple deficit phenomenon for the selected South Asian economies with CAB being jointly explained by BB and private saving gap. These empirical results lead to some important policy implications. Improvement in CAB in the South Asian countries requires fiscal austerity but fiscal policy by itself cannot rectify the CAD as BDs are not fully exogenous and policy controlled. Fiscal adjustment itself requires adjustment in CADs. Since saving gap has a significant effect on both current account and BB, policy makers need to give importance to policies such as increase in per capita income growth and improved access to financial system etc. that may help increase the saving rate in these countries.

REFERENCES

Abbas, S.M., Hegbe, J.B., Fatas, A., Mauro, P., Velloso, R.C. (2010), Fiscal policy and the current account. IMF Economic Review, 59, 603-629.

Abell, J.D. (1990), Twin deficits during the 1980's: An empirical ınvestigation. Journal of Macroeconomics, 12(1), 81-96.

Acaravci, A., Ozturk, I. (2008), Twin deficits phenomenon: Empirical evidence from the ARDL bound test approach for turkey. Bulletin of Statistics and Economics, 2(A08), 57-64.

Acharya, S.P. (2009), Verification of Causality through VAR and Intervention Analysis: Modeling on Budget Deficit and Trade Deficit in Nepal. Occasional Paper No. 21, Nepal Rashtra Bank.

Ackinci, M., Yilmaz, O. (2012), Validity of the triple deficit hypothesis in turkey: Bounds test approach. The Istanbul Stock Exchange Review, 13(50), 1-28.

Akbas, Y.E., Lebe, F. (2014), Current account deficit, budget deficit and savings gap: Is the twin or triplet deficit hypothesis valid in G7 countries? Prague Economic Papers, 25(3), 271-286.

Akbas, Y.E., Lebe, F., Zeren, F. (2014), Testing the validity of the triplet deficit hypothesis for turkey: Asymmetric causality analysis. Journal of Business and Economics, 7(14), 137-154.

Alkswani, M.A. (2000), The Twin Deficits Phenomenon in Petroleum Economy: Evidence from Saudi Arabia. Available from: http://www.erf.org.eg/CMS/getfile.phpid=750. [Last accessed on 2016 Jun 15].

Anoruo, E., Ramchander, S. (1998), Current account and fiscal deficits: Evidence from India. Indian Economic Journal, 45(3), 66-80.

Asrafuzzaman, R.A., Gupta, S.D. (2013), An empirical ınvestigation of budget and trade deficits: The case of Bangladesh. International Journal of Economics and Financial Issues, 3(3), 570-579.

Bolat, S., Degirmen, S., Sengonul, A. (2014), Does triple deficits have (Un) stable causality for the EU members? Evidence from bootstrap corrected causality tests. Procedia Economics and Finance, 16, 603-612.

Bon, N.V. (2014), Current account and fiscal deficits -evidence of twin divergence from selected developing economies of Asia. Southeast Asian Journal of Economics, 2(2), 1-11.

Constantine, C. (2015), Rethinking the Twin Deficits. Available from: http://www.mpra.ub.uni-muenchen.de/58798. [Last accessed on 2016 Oct 28].

Darrat, A.F. (1988), Have large deficits caused rising trade deficits? Southern Economic Journal, 54, 879-887.

Eldemerdash, H., Metcalf, H., Maioli, S. (2014), Twin deficits: New evidence from a developing (oil vs. non-oil) countries' perspective. Empirical Economics, 47(3), 825-851.

Enders, W., Lee, B.S. (1990), Current account and budget deficits: Twins or distant cousins? Review of Economics and Statistics, 72(3), 373-381.

Feldstein, M. (2008), Resolving the global ımbalance: The dollar and the U.S. Saving rate. Journal of Economic Perspectives, 22(3), 113-125.

Fischer, S., Easterly,W. (1990), The economics of the government budget constraint. The World Bank Research Observer, 5(2), 127-142.

Fisher, R.A. (1932), Statistical Methods for Research Workers. Edinburgh: Oliver and Boyd.

Gale, W.G., Orszag, P.R. (2003), Economic effects of sustained budget deficits. National Tax Journal, 56(3), 463-485.

Higgins, M., Klitgaard, T. (1998), Viewing the current account deficit as a capital inflow. Current Issues in Economics and Finance, 4(13), 1-6.

Hubbard, R.G. (2006), The U.S. Current account deficit and public policy. Journal of Policy Modeling, 28(6), 665-671.

Islam, F.M. (1998), Brazil's twin deficits: An empirical examination. Atlantic Economic Journal, 26, 121-128.

Khalid, A.M., Guan, T.W. (1999), Causality test of budget and current account deficits: Cross country comparisons. Empirical Economics, 24, 389-402.

Kouassi, E., Mougoue, M., Kymn, K.O. (2004), Causality test of the relationship between the twin deficits. Empirical Economics, 29(3), 503-525.

Lau, E., Baharumshah, A.Z. (2006), Twin deficits hypothesis in SEACEN countries: A panel data analysis of relationships between public budget and current account deficits. Applied Econometrics and International Development, 6(2), 213-226.

Lau, E., Haw, C.T. (2003), Transmission mechanism of twin deficit hypothesis: Evidence from two neighboring countries. INTI Journal, 1(3), 159-166.

Lau, E., Tang, T.C. (2009), Twin deficits ın cambodia: An empirical study. Economics Bulletin, 29(4), 2783-2794.

Maddala, G.S., Wu, S. (1999), A comparative study of unit root tests with panel data and a new simple test. Oxford Bulletin of Economics and Statistics, 61(S1), 631-652.

Miteza, I. (2010), Fiscal deficit, current deficit and ınvestment: A panel causality framework of 20 OECD countries. Applied Econometrics and International Development, 12(1), 5-19.

Mukhtar, T., Zakaria, M., Ahmed, M. (2007), An empirical ınvestigation for the twin deficits hypothesis ın Pakistan. Journal of Economic Cooperation, 28(4), 63-80.

Ogbonna, B.C. (2014), Investigating for twin deficits hypothesis in south Africa. Developing Country Studies, 4(10), 142-162.

Omaniyi, O.S., Olasunkanmi, O., Babatunde, O.A. (2012), Empirical analysis of twin deficits in Nigeria. International Journal of Management and Business Studies, 2(3), 38-41.

Osoro, K.O., Gor, S.O., Mbithi, M.L. (2014), The twin deficits and the macroeconomic variables in Kenya. International Journal for Innovation Education and Research, 2(9), 64-85.

Pahlavani, M., Saleh, A.S. (2009), Budget deficits and current account deficits in the Philippines: A causal relationship. American Journal of Applied Sciences, 6(8), 1515-1520.

Pedroni, P. (1999), Critical values for cointegration tests in heterogeneous panels with multiple regressors. Oxford Bulletin of Economics and Statistics, 619(S1), 653-670.

Pedroni, P. (2000), Fully modified OLS for heterogeneous cointegrated panels. In: Baltagi, B., editor. Advances in Econometrics: Non Stationary Panels, Panel Cointegration and Dynamic Panels. United State: Emerald Group Publishing.

Pesaran, M.H. (2007), A simple panel unit root test in the presence of cross-section dependence. Journal of Applied Econometrics, 22(2), 265-312.

Pesaran, M.H., Smith, R.P. (1995), Estimating long-run relationships from dynamic heterogeneous panels. Journal of Econometrics, 68, 79-113.

Ravinhirakumaran, N., Selvanathan, S., Selvanathan, E. (2016), The twin deficit hypothesis in the SAARC countries: An empirical ınvestigation. Journal of the Asia Pacific Economy, 21(1), 77-90.

Saeed, S., Khan, A.M. (2012), Twin deficits hypothesis: The case of Pakistan 1972-2008. Academic Research International Part-I: Natural and Applied Sciences, 3(2), 1432-1446.

Sahoo, D., Das, A.B. (2012), ARDL co-ıntegration approach to external and ınternal sector equilibrium of India. Procedia-Social and Behavioural Sciences, 62, 812-816.

Saysombath, P., Kyophilavong, P. (2013), Twin deficits in the lao PDR: An empirical study. International Business and Management, 7(1), 62-68.

Sen, H., Kaya, A. (2016), Are the Twin or Triple Deficits Hypotheses Applicable to Post-Communist Countries? BOFIT Discussion Papers, Bank of Finland.

Sivarajasingham, S., Balamurali, N. (2011), An empirical analysis of the twin deficits: Evidence from Srilanka. Journal of Management, 7(1), 74-92.

Szakolczai, G. (2006), The triple deficit of hungary. Hungarian Statistical Review, 84(10), 40-62.

Tang, T.C. (2015), General equilibrium perspective on twin deficit hypothesis: An empirical study with US results. Global Economic Review: Perspectives on East Asian Economies and Industries, 44(2), 184-201.

Vamvoukas, G.A. (1999), The twin deficits phenomenon: Evidence from Greece. Applied Economics, 31(9), 1093-1100.

Westerlund, J. (2007), Testing for error correction in panel data. Oxford Bulletin of Economics and Statistics, 69(6),709-748.

Xie, Z., Chen, S.W. (2014), Untangling the causal relationship between government budget and current account deficits in OECD countries: Evidence from bootstrap panel granger causality. International Review of Economics and Finance, 31(C), 95-104.

Zietz, J., Pemberton, K.D. (1990), The U.S. Budget and trade deficits: A simultaneous equation model. Southern Economic Journal, 57(1), 23-34.