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Testing the Validity of Twin Deficit Hypothesis in Pacific Island Countries: An Empirical Investigation

T.K. Jayaraman
The University of the South Pacific

Chee-Keong Choong
Universiti Tunku Abdul Rahman

Siong-Hook Law
Universiti Putra Malaysia

Abstract

Pacific island countries (PICs), since the mid 1990s, have been struggling with current account deficits in their balance of payments. Declining aid inflows and contraction in their traditional exports of primary goods along with growing imports of food, fuel and capital and intermediate goods have been the causes behind current account imbalances. On the fiscal front, stagnation in revenues and rigidities in public expenditures have been responsible for overall budget deficits. Resorting to panel data analysis, this study finds evidence in support of the twin deficit hypothesis in terms of their short-and long-run relationship and suggests suitable policy measures for consideration by decision makers.

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1. Introduction

Ever since their independence in the mid 20th century, Pacific island countries (PICs) have been the recipients of substantial official development assistance (ODA) from their former colonial masters. By providing budgetary support each year, ODA inflows, which amounted to transfer of resources in foreign exchange, served as comfortable cushion against adverse balance of payment pressures as well. The PICs, which are highly dependent on imports of all categories including, food, fuel and intermediate and capital goods with a narrow range of exports and a high export commodity concentration ratio, were thus spared of exchange market pressures.

Due to changes in the priorities of the donor community after the end of the Cold War in the late 1980s, there has been a general decline in external aid inflows and consequently fall in annual budgetary support. With stagnant revenues and rigidities in public expenditure, many PICs have been incurring annual fiscal deficits since early 1990s. Being open economies, PICs began to experience external current account deficits as well, thus giving rise to the emergence of twin deficits. The objective of this paper is to examine the relationship between current account deficits and government budget deficits with a view to obtaining a better appreciation of the relationships for formulating appropriate macroeconomic policies. Due to data constraints, our study is confined to six major PICs, which include Papua New Guinea (PNG) along with three other Melanesian countries (Fiji, Solomon Islands and Vanuatu) and two Polynesian countries (Samoa and Tonga). It employs three panel data estimation models: static fixed-effect, mean group (MG) and pooled mean group (PMG) models.

The paper is organised as follows: the second section presents the trends in twin deficits experienced in Fiji, Papua New Guinea (PNG), Samoa, Solomon Islands, Tonga and Vanuatu, whereas the third section reviews recent empirical research findings on twin deficits. The fourth section outlines the modeling strategy and the fifth section reports the results of panel data analysis**.** The final section presents the conclusions with policy implications.

2. Trends in Twin Deficits in Pacific island Countries

The selected six PICs present a high degree of diversity in regard to land area and population (Table 1). However, aside from dependence on a narrow range of commodities for exports with heavy reliance on one or two commodities, along with tourism as a major foreign exchange earner and provider of jobs, they share many commonalities. These relate to structural constraints to growth: communal land tenure system, which restricts the marketability of land as an economic commodity, thereby inhibiting land related activities; isolation from major markets; proneness to natural disasters of all kinds; and external economic shocks. Foreign aid, which formed a proportion of GDP as high as 43% in Samoa and 33% in Vanuatu in 1990, declined over the next twelve years. With general decline in aid inflows, budget deficits were high during the five-year period (1990-94). The five-year average budget deficit in

Samoa was as high as 10% of GDP (Table 2). The adverse effects of two cyclones of 1991 and 1992 in terms of fall in tax revenue receipts and related rehabilitation expenditures were responsible for Samoa's budget deficits. Reform measures including downsizing government departments and sale and discontinuance of some of the state owned enterprises during 1995-2004 in Samoa improved the fiscal performance.

Fiji's fiscal policies during 1990-1999 were relatively conservative. As a result, the country experienced modest budget deficits. However, expansionary fiscal policies after 2001, as part of countercyclical measures to offset the fall in private sector investment, led to greater levels of budget deficits. On the other hand, Tonga had a consistent pattern of low fiscal deficits throughout the period. The Solomon Islands, after recording low budget deficits during 1995-99, began to incur higher deficits mainly because of fall in revenues after the inter-island based ethnic unrest. Fiscal deficits were much less during 1995-1999 and thereafter, compared to relatively higher deficits during 1990-95. The improved fiscal performance in PNG was due to fiscal consolidation measures. In Vanuatu, fiscal deficits have been hovering around 3% of GDP. Mismanagement of pension funds in the state sponsored Vanuatu National Provident Fund institution in early 1997 and subsequent bailing out measures came in the way of reducing the deficit to a sizeable extent from the previous average level of 4.6% of GDP. Improvements in budgeting and pruning non-essential expenditures gave rise to a better fiscal performance in the recent five-year period.

A review of PICs fiscal performance during last 15 years, despite conscious efforts towards public sector reforms shows that unforeseen exogenous shocks, such as natural disasters including cyclones, and man-made disasters such as political instability in Fiji and Vanuatu, and ethnic and provincial rivalries in the Solomon Islands interrupted the implementation of the ongoing fiscal reform programmes, thereby endangering the long term objective of achieving flexibility in terms of running budget surpluses in good years and deficits in lean years.

In regard to external accounts and trade, all PICs experienced deficits with the exception of PNG, which has a wider range of exports including minerals and gas. PNG was benefited by rise in world prices of mineral exports during this period. For Solomon Islands and Tonga being dependent on agricultural exports, deterioration in their terms of trade led to ever increasing trade deficits. Due to contraction in sugar production since 1996 and consequent fall in its exports as well as discontinuance of garment export quotas to the USA under the Multifibre Arrangement since the end of 2004, Fiji's annual current account deficits were rising in recent years. In the case of Samoa, there has been a marked decline in its limited exports of agricultural products. Although in the case of Samoa and Tonga inward remittances have been a substantial support, imports of both capital and consumer goods have been on the rise, resulting in current account deficits.

Table 1: Selected Key Indicators of Six PICs

	Population 2005 ('000)	Per Capita GDP 2005 (Current Prices, in US$)	Development Index Ranking (2004)	Vulnerability Index Ranking (1997)	Aid per capita 2005 (in US$)	Aid	
						1990 (% of GDP)	2005 (% of GDP)
The Pacific							
Fiji	840	2,195	90	9	61.0	3.9	1.8
Papua New Guinea	5,600	714	139	31	40.0	12.8	7.2
Samoa	181	1,672	75	20	186.0	42.6	14.5
Solomon Islands	471	550	129	11	132.0	21.7	11.0
Tonga	101	1,629	55	3	270.0	26.3	16.4
Vanuatu	215	1,493	119	1	154.0	33.0	11.7

Source: ADB (2006), IMF (2004), Jayaraman (2006), UNESCAP (2004)

Table 2: PICs: Budget, Trade and Current Account Deficits (% of GDP)

PICs	Budget Deficit Averages			Trade Deficits Averages			Current Account Deficit Averages			Broad Money Supply Averages			Growth Rates (in percent)		
	1990-1994	1995-1999	2000-2004	1990-1994	1995-1999	2000-2004	1990-1994	1995-1999	2000-2004	1990-1994	1995-1999	2000-2004	1990-1994	1995-1999	2000-2004
Fiji	3.2	3.2	5.1	14.4	11.6	17.0	2.1	0.2	7.0	55.2	46.5	42.9	2.9	3.0	2.0
PNG	3.7	0.8	1.5	-14.7	-21.0	-26.5	-3.8	-4.6	-4.3	33.5	33.3	23.9	8.9	2.4	2.1
Samoa	10.5	0.2	1.3	68.3	38.7	41.4	13.2	-5.0	0.2	40.2	33.3	38.8	-1.5	3.9	4.3
Solomon Islands	6.1	0.9	5.8	0.9	-2.1	1.1	6.6	-1.1	-1.4	28.3	30.0	29.0	4.2	3.3	-2.1
Tonga	0.0	1.1	1.1	30.0	-2.1	35.1	-1.5	6.7	2.2	26.2	33.8	43.2	1.8	1.4	3.1
Vanuatu	4.6	3.2	2.7	30.3	20.2	23.8	7.2	8.8	4.6	106.4	108.3	104.2	6.7	1.0	0.2

Source: ADB (2006); Authors' calculations.

3. A Brief Review of Past Empirical Studies

A survey of studies on the linkages between current account deficits in the balance of payments and budget deficits begins with the standard treatment of external current account deficits, which is based on the national accounting identity (Daniel *et al.*, 2006).

The external current account balance is derived as follows:

$CA = (S_{priv}-I_{priv}) + (S_{pub}-I_{pub})$

Where CA = external current account balance;

S_{priv} = private sector savings

I_{priv} = private sector investment

S_{pub} = public sector saving

I_{pub} = public sector investment

While $(S_{pub}-I_{pub})$ represents the overall fiscal balance, $(S_{priv}-I_{priv})$ is the private savings and investment balance.

Assuming investment/savings gap remains stable overtime, external current account deficit would be equal to budget deficit. This identity provides a basis for modelling the hypothesised long run relationship between current account trade deficits and budget deficits. However, we do not have any indication of the direction of linkages, both behavioural and temporal.

Under fixed exchange regime, in the Johnson's monetary approach to balance of payments model with or without capital mobility, any excess domestic absorption and in our case with private and savings gap being stable, excess government expenditure over its revenues would spill into excess demand for overseas goods and services, resulting in trade/current account deficit. Under freely floating regimes, with either partial or free capital mobility, in the Mundell-Fleming open economy model, there is interaction between budget deficit and trade deficit directly through domestic absorption and indirectly through monetary channels. As budget deficit rises, aggregate demand would increase and domestic interest rate would also rise; and if the domestic rate is higher than world interest rate there will be a capital inflow, resulting in the rise of real exchange rate; exports would fall and trade/current account would deteriorate. Thus, our modelling strategy has to incorporate both real and monetary variables.

A review of past empirical studies on both developed and developing countries shows conflicting results. A few studies (Chen and Haug, 1993; Evans, 1988, 1993; Evan and Hasan, 1994) on the US and Canadian economies concluded that there was an absence of linkage between budget and external deficits. Their conclusion indicated the possibility of existence of Ricardian equivalence proposition that economic agents anticipate budget deficits would be funded by debt, which would be financed by rise in future tax rates; accordingly they would adjust consumption towards maximising the inter-temporal welfare by increasing current savings rather than current consumption; and that there would be no effect on domestic interest rates, total savings, investment, price level and income. Earlier study by Normandin (1994), however, showed that Ricardian

equivalence proposition could be rejected for the Canadian economy but not for the US economy. Darrat (1988) in his study on the US economy noted the bi-directional causality between two deficits.

In regard to developing countries, Laney (1984) in his study of 58 countries observed the presence of causal linkage running from fiscal balance to external balance in the case of developing countries, which was absent in the case of developed countries. Similarly, Khalid and Guan (1999) noted the existence of a long run-cointegrating relationship between fiscal and trade deficits while recognizing the absence of such relationship in regard to group of developed countries.

Thus, we note the evidence collected by empirical studies is inconclusive. The results differed across countries but more significantly they differed with the employment of different econometric techniques and model specification for the same country data (Onafowara and Owoye, 2006). Past studies devised models employing variables to represent domestic absorption, which included industrial production index and variables to represent monetary influences, which included interest rate and real exchange rate.

4. Modelling Strategy

The PICs suffer from severe data constraints. National income data of the selected six PICs are available only from the mid 1980s. Hence, our study covers a 17-year period (1988-2004). The model, incorporating the real and monetary variables, therefore remains simple and is written as:

$$CAD = f(BD, RGDP, M2)$$

$$CAD_t = \beta_0 + \beta_1 BD_t + \beta_2 RGDP_t + \beta_3 M2_t + \varepsilon_t \qquad (1)$$

where

CAD = Current account deficit (percent of GDP);
RGDP = real GDP (index number); and
BD = budget deficit (percent of GDP);
M2 = broad money supply (percent of GDP)
ε_t = white noise error term

RGDP represents domestic absorption. *M2* as percent of GDP captures monetary influences, which would include changes in interest rate, inflation and consequent changes in real interest affecting trade volume. The data series are drawn from a single source, namely Asian Development Bank (2006).

Equation (1) can be estimated directly using panel data techniques. Three panel data techniques are used in this study: static fixed-effect technique and the mean group (MG) and pooled mean group (PMG) estimations. These testing models allow both cross-section and time series variation in all variables, involving a system of $N \times T$ equations (that is, N countries and T time observations). The static fixed-effect panel data model imposes the constraint that the short- and long-run coefficients as well as the variances are similar or equal across countries

(or "pooling")[1]. However, the static fixed-effect estimator based on either pooling or fixed effects, which could be applied to Equation (1), makes no attempt to take into account possibly heterogeneous dynamic adjustment around the long-run equilibrium relationship (Pesaran and Smith, 1995; Pesaran et al. 1999). Indeed, ignoring these individual country-specific effects led to biased results (Islam, 1995).

In order to overcome the possible heterogeneous dynamic adjustment process as well as to capture both long- and short-run dynamics relationship, both MG and PMG techniques proposed by Pesaran and Smith (1995) and Pesaran et al. (1999) are applied to Equation (1). Further, these techniques are suitable to the analysis of dynamic panels that have both large time observations and cross-section units.

Following Pesaran et al. (1999), Equation (1) can be estimated based on the unrestricted error correction ARDL (p,q) representation:

$$\Delta y_{it} = \phi_i y_{i,t-1} + \beta_i' x_{i,t-1} + \sum_{j=1}^{p-1} \lambda_{ij} \Delta y_{i,t-j} + \sum_{j=0}^{q-1} \gamma_{ij}' \Delta x_{i,t-j} + \mu_i + \varepsilon_{it} \qquad (2)$$
$$i = 1,2,...,N; \quad t = 1,2,...,T$$

where y_{it} is a scalar dependent variable, x_{it} is the $k \times 1$ vector of regressors for group i, μ_i represents the fixed effects, ϕ_i is a scalar coefficient on the lagged dependent variable, β_i''s is the $k \times 1$ vector of coefficients on explanatory variables, λ_{ij}'s are scalar coefficients on lagged first-difference of dependent variables, and γ_{ij}'s are $k \times 1$ coefficient vectors on first-difference of explanatory variables and their lagged values. We assume that the disturbances u_{it}'s in the ARDL model are independently distributed across i and t, with zero mean and variances $\sigma_i^2 > 0$. Further, assuming that $\phi < 0$ for all i, and therefore there exists a long-run relationship between y_{it} and x_{it} defined by

$$y_{it} = \theta_i' x_{it} + \eta_{it}, \qquad i = 1,2,,...,N; \quad t = 1,2,...,T \qquad (3)$$

where $\theta_i' = -\beta_i'/\phi_i$ is the $k \times 1$ vector of the long-run coefficients, and η_{it}'s are stationary with possibly non-zero means (including fixed effects). Equation (1) can be re-written as

$$\Delta y_{it} = \phi_i \eta_{i,t-1} + \sum_{j=1}^{p-1} \lambda_{ij} \Delta y_{i,t-j} + \sum_{j=0}^{q-1} \gamma_{ij}' \Delta x_{i,t-j} + \mu_i + \varepsilon_{it} \qquad (4)$$

where $\eta_{i,t-1}$ is the error correction term given by Equation (3), hence ϕ_i is the error correction coefficient measuring the speed of adjustment towards the long-run equilibrium.

Under this framework, Pesaran et al. (1999) develop the pooled mean group (PMG) estimator. This estimator allows the intercepts, short-run coefficients and

[1] The static fixed-effect model assumes that the slope are constant for all cross-section units, and the intercept changes over individual cross-section units but does not vary over time.

error variances to differ freely across groups, but the long-run coefficients are constrained to be the same; that is, $\theta_i = \theta$ for all i. The group-specific short-run coefficients and the common long-run coefficients are computed by the pooled maximum likelihood estimation. These estimators are denoted by

$$\hat{\phi}_{PMG} = \frac{\sum_{i=1}^{N} \tilde{\phi}_i}{N}, \quad \hat{\beta}_{PMG} = \frac{\sum_{i=1}^{N} \tilde{\beta}_i}{N}, \quad \hat{\lambda}_{jPMG} = \frac{\sum_{i=1}^{N} \tilde{\lambda}_{ij}}{N}, \quad j = 1,2,\ldots, p-1$$

$$\hat{\delta}_{jPMG} == \frac{\sum_{i=1}^{N} \tilde{\delta}_{ij}}{N}, \quad j = 0,1,\ldots, q-1, \quad \hat{\theta}_{PMG} = \tilde{\theta} \qquad (5)$$

On the other hand, the MG estimator proposed by Pesaran and Smith (1995) allows for heterogeneity of all the parameters and gives the following estimates of short-run and long-run parameters:

$$\hat{\phi}_{MG} = \frac{\sum_{i=1}^{N} \hat{\phi}_i}{N}, \quad \hat{\beta}_{MG} = \frac{\sum_{i=1}^{N} \hat{\beta}_i}{N}, \quad \hat{\lambda}_{jMG} = \frac{\sum_{i=1}^{N} \hat{\lambda}_{ij}}{N}, \quad j = 1,2,\ldots, p-1$$

$$\hat{\delta}_{jMG} == \frac{\sum_{i=1}^{N} \hat{\delta}_{ij}}{N}, \quad j = 0,1,\ldots, q-1, \quad \hat{\theta}_{MG} = \frac{1}{N}\sum_{i=1}^{N} -(\hat{\beta}_i / \hat{\phi}_i) \qquad (6)$$

where $\hat{\phi}_i$, $\hat{\beta}_i$, $\hat{\lambda}_{ij}$ and $\hat{\gamma}_{ij}$ are the OLS estimates obtained individually from Equation (2). In other words, the MG approach consists of estimating separate regressions for each country and computing averages of the country-specific coefficients (Evans, 1997; Lee et al., 1997). MG estimator is the least restrictive procedure and it allows for heterogeneity of all the parameters because it does not impose any restriction; that is, the technique estimates the coefficients independently for each country[2]. This estimator is likely to be inefficient in small country samples, where any country outlier could severely influence the averages of the country coefficients. On the other hand, the PMG has the advantage that it estimates the long-run determination of twin deficits separately from the short-run adjustment. PMG takes a reasonable middle ground between dynamic fixed effect estimator and the MG estimator, that is, it involves both pooling and averaging. PMG imposes equality of long-run coefficients ("pooling") but allows short-run coefficients and error variances to differ across countries ("averaging").

Under long-run slope homogeneity, the pooled estimators are consistent and efficient. The hypothesis of homogeneity of the long-run policy parameters cannot be assumed a priori and is tested empirically in all specifications. The presence of heterogeneity in the means of the coefficients of is examined by a Hausman-type test (Hausman, 1978) applied to the difference between the MG and the PMG. Under the null hypothesis the difference in the estimated

[2] The MG estimator provides consistent estimates of the mean of the long-run coefficients, though these will be inefficient if slope homogeneity holds.

coefficients between the MG and PMG estimators is not significant and PMG is more efficient.

5. Results and Interpretation

The empirical results using the static fixed-effect, MG and PMG panel data models are shown in Table 3. Column 1 reports the results of the static fixed-effect model, confirming the hypothesis that budget deficit leads to current account deficit. The coefficient of budget deficit is also found statistically significant. However, the coefficients of real GDP and M2 are found statistically not significant. Additionally, we find that the lagged dependent variable in the static fixed-effect model is correlated with the error term giving rise to problems of endogeneity of the explanatory variables[3], which would affect the small-sample asymptotic properties of the estimators (Caselli et al. 1996)[4]. This persistency in the explanatory variables may adversely influence the small sample and asymptotic properties of the difference estimator, and the fixed-effect estimators of the long-run effect is asymptotically biased, underestimate the average short-run effects and overestimate the average long-run effects for the twin-deficit hypothesis (Blundell and Bond 1998). Therefore, the panel fixed effect model as well as panel random effect model may suffer from biases due to unobserved heterogeneity and possible endogeneity of explanatory[5].

In order to solve this problem, we proceed to the examination of the results of MG and PMG panel data model analyses. The ARDL techniques allow us not only to incorporate cross-country heterogeneity (for instance, in the degree of budget deficit and policy regimes), but also to capture certain time-series relations that cross-section analysis alone cannot deal with. In addition, the techniques can be used to either stationary or nonstationary variables, that is, irrespective of the order of integration of each variable (Kim, et al., 2010, p. 829).

The models allow for heterogeneity in the relationship between current account deficit and budget deficit across Pacific island countries because the various estimates are not restricted to be the same across countries. Besides, the models allow us to estimate an empirical model that encompasses the long- and short-run effects of budget deficit on current account deficit using a data field consists of a relatively large sample of annual observations and countries. Moreover,

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[3] The inclusion of the lagged dependent variable as one of the explanatory variable in the panel model is termed as the dynamic panel problem in the econometric literature.

[4] Caselli et al. (1996) argued that a number of literatures have ignored the consistency problems that caused from the simultaneous presence of the country-specific effect and the lagged dependent variable as an explanatory variable that related to the country specific effect. In this case, the use of ordinary least square (OLS) will produce asymptotically biased estimates.

[5] In FEM, each cross-sectional unit has its own (fixed) intercept value, in all N such values for N cross-sectional units. This means that FEM assumes the fully homogeneous-coefficient model in which all slope and intercept parameters are restricted to be identical across countries, which is not realistic in the estimation of twin deficit hypothesis in Pacific island countries as these countries are vary in terms of their economic growth rate, current account deficit, government expenditure and money supply.

instead of averaging the data per country to isolate trend effects, both long- and short-run relationships are estimated using a panel of data pooling time-series and cross-section effects. Pesaran and Smith (1995) demonstrate that the models amount to estimating separate ARDL regressions for each group and obtain simple averages of individual group coefficients[6]. Specifically, the PMG estimator will provide consistent estimates of the average of parameters we are interested in examining the hypothesis of twin deficit in PICs[7].

Columns 2 and 3 (Table 3) present the long- and short run coefficients of MG and PMG panel data analysis models along with the error correction adjustments and joint Hausman test statistic. The PMG model imposes an assumption of common long-run effects while MG imposes no such restriction. So, the choice of these methods is based on the Hausman test. The lag order is first chosen in each country on the unrestricted model with one lag for the independent variable. This is because of the limited time span (1988-2004 or 17 observations). In this case, MG estimators may suffer from too few degrees of freedom. As reported by the joint Hausman test statistic, we do not reject the null hypothesis of the restriction of common long-run coefficients. Therefore, we focus on the PMG estimators, as MG estimators are less efficient and not as informative as the PMG estimators.

The long-run PMG estimators show that the variable, budget deficit which is statistically significant, has by far the greatest effect on current account deficit. The magnitude of the coefficient of budget deficit is 1.13. This result is in line with Baharumshah and Lau (2009), and Lau and Tang (2009), which suggesting that an improvement in government budget deficit does help in reducing current account deficits. The second effective impact comes from M2, which captures the monetary influences while real GDP has the least impact on the current account deficit. Both M2 and real GDP are also significant. These results suggest that budget deficit is far more important than both real GDP and monetary measure in determining current account deficit.

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[6] Loayza and Ranciere (2006) argue that while averaging may induce a loss of information, it is not obvious that averaging over fixed-length intervals effectively eliminates business-cycle effects. Averaging eliminates information that may be utilized to estimate a more flexible model that allows for parameter heterogeneity across countries. However, in the fact that the average effects in a dynamic model where the slope coefficients vary over countries cannot be consistently estimated from a pooled regression even when cross-sectional unit (N) and time series unit (T) are large is not a serious problem since they can be obtained directly by the mean group procedure. Nevertheless, when *T* is small the bias of the pooled estimator is likely to be a serious problem.

[7] The PMG estimator has been widely used to examine the impact of exchange rate volatility on investment (Byrne and Davis 2005), to study the effect of fiscal deficits on inflation (Catao and Terrones 2005), to test the hypothesis that the interaction between institutional quality and financial development has a separate positive influence on economic growth (Demetriade and Law 2006), to discern the linkage between financial development and economic growth (Loayza and Ranciere 2006), to investigate the relationship between financial development and trade openness (Kim et al., 2010), as well as to analyze the role of human capital on economic growth (Bassanini and Scarpetta, 2002).

Table 3: Alternative Panel Data Estimations of Pacific Island Countries

	Static Fixed-effects Estimators	PMG Estimators	MG Estimators
Dependent variable: Current account deficit (6 countries, 1988-2004)			
Long-run coefficients			
BD	0.57** (2.79)	1.13*** (4.94)	-0.29 (-0.69)
RGDP	-0.07 (-1.16)	0.09* (1.65)	-0.09 (-0.72)
M2	0.16 (1.01)	0.32** (2.44)	1.41 (1.16)
Error correction adjustment	-1 (N/A)	-0.88*** (7.48)	-0.91*** (-10.36)
H test for long-run homogeneity	-	0.39 [0.94]	
Short-run coefficients			
BD	-	0.997*** (7.48)	-0.21 (0.53)
RGDP	-	0.08*** (7.48)	-0.04 (-0.44)
M2	-	0.28*** (7.48)	0.77 (1.28)

Notes: All equations include a constant country-specific term. Figures in parentheses are *t*-statistics while figures in bracket denote p-values, determined by Hausman (H) test.
*, ** and *** indicate significance at the 10%, 5% and 1%, respectively.
$N \times T = 102$.

Looking at the short-run PMG coefficients, which are all statistically significant, the magnitudes of the coefficients of explanatory variables are smaller than those of the long-run coefficients. The results indicate that the short- run dynamics of budget deficit are consistent with the long-run dynamics of budget deficit. In other words, budget deficit is the most the dominant factor in explaining current account deficit in PICs, followed by real GDP and monetary influences.

Turning to the coefficient of the error correction adjustment, we note that it has the expected negative sign, which is also significant at 1 per cent level. This implies that in the long run the relationship runs from budget deficit, real GDP and M2 to current account deficit, and that change in the current account deficit is a function of disequilibrium in the cointegrating relationship. The magnitude of the error correction coefficient indicates that adjustment towards the long run equilibrium is about 88% per annum, suggesting any deviation from the long run equilibrium is corrected substantially in the following year.

6. Summary and Conclusions

The objective of this paper is to examine whether the twin-deficit hypothesis, namely the existence of a long-and short run relationships between budget and current account deficits is valid in respect of the Pacific island countries. Due to data constraints, the study was confined only to six countries: Fiji, Papua New Guinea, Samoa, Solomon Islands, Tonga and Vanuatu, covering a 17-year period (1988 to 2004). Among the three models employed for panel data analysis, we find the pooled mean group model (PMG) fared better in terms of econometrically acceptable results.

The empirical findings establish that budget deficit leads to current account deficit, both in the long- and short-run: one percent increase in the ratio of the budget deficit to GDP, results in the long-run (short-run) in 1.13% (0.997%) increase in current account deficit. Further, both real GDP and monetary measures are positively associated with the current account deficit, both in the long- and short-runs. These findings are consistent with the results in Laney (1984), Khalid and Guan (1999), Kouassi et al. (2004), Baharumshah and Lau (2009), and Lau and Tang (2009).

In the context of the Keynesian absorption theory, budget deficits would induce import expansion and given the export earning levels, which cannot be increased in the short-run, emergence of current account deficit is certain. Only when the imports happen to be dominated by capital goods towards enhancing productive capacity of the country through promoting physical infrastructure such as power generation, roads linking farms in the hinterland to markets and jetties and ports, thereby contributing to foreign exchange earnings in the long run, current account deficits could be of justifiable nature.

However, in the case of PICs, which presently with a limited range of exports are experiencing contraction in their exports - copra products in the case of Samoa, Solomon Islands, Tonga and Vanuatu, and sugar exports - and discontinuance of garment quotas in the case of Fiji, the current account deficits in the short-run have to be handled from the fiscal front. Only one country among PICs, namely Papua New Guinea, is better placed with a wider range of exports, which include minerals and gas.

The existence of link between budget deficit and current account deficit suggests that policy makers must embark on fiscal consolidation. The term fiscal consolidation, with reference to twin deficits, has a direct connotation, as it would imply reducing government deficit and debt accumulation, instilling fiscal discipline. The latter encourages lower interest, which would not crowd out private investment. It would also minimise debt build up, which will eventually allow for countercyclical spending to protect the poor in adverse times (Birdsall, 2004). Fiscal discipline thus fosters fiscal flexibility: building surpluses in good times and running deficits during recession.

Fiscal consolidation measures would include: (i) effective expenditure control and budget–monitoring; (ii) efficient revenue system; (iii) improved measures for responding to frequently variable non-tax revenue receipts and volatile aid inflows; (iv) re-directing aid money into capacity building investments by streamlining civil service and reducing recurrent expenditures; (v) careful debt-management; and (vi) improving foreign earnings from limited range of exports and services including tourism, by maintaining a competitive real exchange rate so that external debt servicing does not pose problems in the long run.

Referring to past fiscal consolidation experiences in PICs, including Fiji, D'Hoore (2006) notes that tightening of public expenditure in the past was generally achieved by cuts in wage and salary bill; and when the tightening proved unpopular, it was normally reversed after some time. Thus, past efforts were obviously not on a consistent basis. If fiscal consolidation episodes are short-lived, progress cannot be sustained. Half-hearted fiscal adjustment efforts, as documented in a recent study of 29 countries in Europe, Africa and Asia by Gupta et al. (2004) have failed without any lasting impacts. It is time that PICs be aware and avoid such pitfalls.

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