Is the Twin Deficits Hypothesis Relevant to Fiji?

T.K. Jayaraman[1]
Chee-Keong Choong

Abstract

Fiji has been experiencing current account deficits in its balance of payments since the late 1990s, despite the emergence of a boom in remittances. The deficits have become increasingly more pronounced since 2001 due to a decline in the country's traditional exports of sugar, a sharp fall in the exports of garments following the expiry of the Multifibre Agreement, and a decrease in the exports of gold following operational problems. On the other hand, there was a surge in imports of capital goods and machinery for the building and construction industry, due mainly to expansionary fiscal policies pursued by the government since 2001. Additionally, a steep rise in private sector credit in the post-coup years of 2000 ensued, contributing to a further widening of current account deficit. This paper seeks to investigate whether the popular twin deficit hypothesis is relevant in the case of Fiji.

I.   Introduction

Since their independence during the last quarter of the 20th century Pacific island countries (PICs) have been receiving substantial official development assistance (ODA), known as foreign aid. This proved supportive of the budget in many ways. Aside from supplementing domestic savings, steady annual aid inflows, which in 2002 ranged from a high of 49.6% of GDP for the Republic of Marshall Islands and 45% of GDP for Tuvalu, to a low of 1.8% of GDP for Fiji, financed a significant proportion of expenditures in PICs' annual budgets. Since PICs are highly dependent on imports of all categories, including food, fuel and intermedi-

---

[1] The authors express their thanks to the three anonymous referees of this Journal for their comments and suggestions for improving the paper.

ate and capital goods with a narrow range of exports, annual trade gaps have remained large. Annual aid inflows, being in foreign exchange, are a transfer of real resources to the receiving countries. As such, they not only kept domestic inflation low but also served as a cushion against pressures of current account deficits in the balance of payments on exchange rates (Jayaraman, 2006).

Following the end of the Cold War in the late 1980s, which led to changes in the donors' priorities, there has been a marked decline in aid inflows specifically earmarked for budgetary support. The donors decided to link their assistance to implementation of structural reforms in PICs. With stagnant revenues and weak tax collection machinery, the fiscal position in PICs deteriorated further.

Budget deficits are now an annual phenomenon in PICs. Being open economies, PICs began to experience external current account deficits in balance of payments as well, thus giving rise to the emergence of twin deficits, a term, which was popularised by Feldstein (1985, 1987). It is still uncertain whether budget deficits cause current account deficits or vice-versa (Chen and Haug, 1993; Evans 1988, 1993; Evans and Hasan, 1994; and Khalid and Guan, 1999).

There exists a considerable body of literature on the subject. Empirical studies conducted in various regions, which examined the possible link between the two deficits in both developing and developed countries have not reached any consensus. Fiji, which is taken as a case study in this article, has been struggling with twin deficits for quite some time. There have been notable contributions in recent years, which have greatly enriched the empirical literature on Fiji. These include Narayan and Smyth (2004), Narayan and Prasad (2003a, 2003b, 2006, 2007), Narayan *et. al.* (2006), and Narayan and Narayan (2003, 2004a, 2004b, 2005, 2006), which deal with various aspects of impacts of budget deficits including those on economic growth and prices as well as their long-run sustainability. However, these studies did not specifically deal with the validity or otherwise of the twin deficit hypothesis in regard to Fiji. We, therefore, study the relevance of the twin deficit hypothesis as applicable to Fiji. The objective of this paper is to examine the short-run temporal causality and long run relationship between current account deficits and budget deficits in Fiji with a view to obtaining better appreciation of causal linkages for formulating appropriate macroeconomic policies.

The paper is organised as follows. The second section reviews in brief a vast amount of literature on the subject; the third section gives a short descriptive account of Fiji's economy, analysing the recent trends in twin deficits experienced by the country during the last 25 years; the

fourth section outlines the modeling strategy employed for the empirical study; the fifth section reports the results; and the final section presents a summary of the study findings and policy implications.

2. A Brief Literature Survey

There are at least three distinct sets of views, which have emerged in recent years to be important for consideration by policy makers in understanding the theoretical relationship between budget deficit and current account deficit. First, the Mundell-Fleming framework asserts that under a flexible exchange regime with perfect capital mobility conditions between the country and the rest of the world, budget deficits would exert upward pressure on interest rates, which would trigger capital inflows, resulting in appreciation of exchange rate (Mundell, 1962, Fleming, 1962). The adjustment is, therefore, on exchange rate, restoring external balance. On the other hand, under a fixed exchange rate regime, with exchange controls in place, the automatic restoration of external balance does not take place as the economy would experience current account deficits, which are generally financed by running down international reserves, signifying intervention by the government. Persistent fiscal deficits would give rise to persistent current account deficits. Past experiences have shown financing the current account deficits through inflows of portfolio and direct investment is the most sustainable way, as it leads to an addition of real resources. The other two forms of financing, namely drawing down international reserves and external borrowing, do not make the current account sustainable since growing pressures on the exchange rate under a fixed exchange rate regime would have to be felt sooner or later (Intal Jr., 1991).

The second view, founded on the monetary approach to the balance of payments, is often formulated for a small country in relation to the rest of the world with which it maintains a fixed exchange rate system (Johnson, 1976). Based on the Keynesian absorption theory, the monetary approach takes the view that an increase in budget deficit would result in an increase in aggregate demand - which spills over into demand for goods and services from abroad- leading to higher imports, and consequently, given the export level, worsening current account deficits.

The third view is related to the Ricardian equivalence hypothesis, put forward by Barro (1989). This view suggests that there is no relationship between budget deficit and current account deficit because the shifts between taxes and budget deficit do not matter for the real interest rates, the level of investment, or the current account deficit. Economic agents

anticipate that fiscal deficits would result in increases in government debt, which would eventually be serviced and amortised by increases in taxes and accordingly cause behavioural adjustments and hence adjustments to aggregate demand.

The nexus between budget deficit and current account deficit, or so-called 'twin deficits hypothesis' in the developed countries, especially the United States, was tested by Laney (1984), Gordon (1986); Miller and Russek (1989), Abell (1990), McKinnon (1990), Mann (2002), Obstfeld and Rogoff (2005), Coughlin, *et al.* (2006), and Sinai (2006). There is no consensus as to whether there is a systematic association between current account deficit and budget deficit. Only a few studies concluded that these two variables were cointegrated, implying that current account deficit and budget deficit have the tendency to move together in the long run. Studies by Chen and Haug (1993), Evans (1988, 1993), and Evans 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 the 'Ricardian Equivalence' proposition. This view holds that economic agents anticipate that budget deficits would be financed by increases in future tax rates, accordingly they would adjust consumption towards maximising the intertemporal welfare by increasing current savings rather than current consumption, and, thus, there would be no effect on domestic interest rates, total savings, investment, price level and income. A study by Normandin (1994), however, showed that the 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 existence of bi-directional causality between the two deficits.

Empirical studies relating to some other countries, however, established the twin deficits hypothesis. These include Islam (1998) for Brazil, Anoruo and Ramchander (1998) for some of the Asian countries, Vamvoukas (1999) for Greece, Pattichis (2004) for Lebanon and Kouassi *et al.* (2004) for a number of developed and developing countries. Khalid and Guan (1999) noted the existence of a long run-cointegrating relationship between fiscal and trade deficits in selected developing countries while recognising the absence of such relationship in developed countries.

Thus, the evidence collected by past empirical studies on both developed and developing countries (which employed models with variables representing domestic absorption, such as industrial production index, and those variables representing monetary influences, such as interest rate and real exchange rate) is inconclusive. The results differed across countries. Furthermore, they varied significantly when the re-

searchers employed different econometric techniques with different model specifications for the same country data (Onafowara and Owoye, 2006).

3. Fiji's Economy: Trends in Twin Deficits

Fiji ranks amongst PICs as the recipient of least amount of ODA expressed as percentage of gross domestic debt (GDP); Table 1 shows selected key indicators for Fiji and PICs. Consequently, aid has not been a major component of government revenue unlike the case of other PICs. A recent IMF study of Fiji's fiscal performance observed that during most of the post-independence period, fiscal policy was appropriate with annual overall fiscal deficit rarely exceeding 5 per cent of GDP (D'Hoore, 2006: 72). Fiscal adjustments were introduced from time to time, including reductions in government recurrent expenditure such as cuts on wages and salaries following the 1987 coups. These were, however, restored when the economic situation improved.

Table 1: Fiji Among Pacific Island Countries - Selected Key Indicators

	Popula-tion 2005 ('000)	Per Capita GDP*	Dev. Index Ranking (2004)	Vulnerabil-ity Index Ranking (1997)	Aid per capita*	Aid (% of GDP) 1990	Aid (% of GDP) 2002
Cook Is.	19	2,651	62	NA	490.0	NA	28.0
Fiji	840	2,195	90	9	61.0	3.9	1.8
FSM	114	2,211	NA	NA	923.0	NA	37.4
Kiribati	90	751	129	NA	191.0	22,5	18.6
Palau	20	6,482	NA	NA	1295.0	NA	NA
PN	5,600	714	139	31	40.0	12.8	7.2
Marshall Is.	58	2,559	NA	NA	991.0	NA	49.6
Samoa	181	1,672	75	20	186.0	42.6	14.5
Solomon Is.	471	550	129	11	132.0	21.7	11.0
Tonga	101	1,629	55	3	270.0	26.3	16.4
Tuvalu	11	345	118	NA	260.0	47.2	45.0
Vanuatu	215	1,493	119	1	154.0	33.0	11.7

* 2005, Current Prices, in US$.
[Source: ADB (2004), IMF (2004), Jayaraman (2006), UNESCAP (2004)]

3.1 Structural Rigidities in Budget

Due to structural rigidities on the revenue side, total government revenue, inclusive of tax and non-tax revenues and grants, has been hovering around 26 per cent of GDP, out of which tax revenue is about 20 per cent. Income tax revenue accounted for about 7 per cent of GDP,

goods and services taxes around 9 per cent and taxes on international trade about 5 per cent.

Total government expenditures, which averaged 30 per cent of GDP in the first two decades of independence, after a decline for a brief period of two years in the current decade picked up to reach the historically highest proportion of 32 per cent of GDP in 2002. The level of expenditure was kept high in the next two years, signifying the expansionary fiscal stance of the government. Since private sector investment was dormant before the 1999 elections, due to uncertainties, and again in 2000 following a civilian coup that year, the elected government in 2001 decided to jumpstart the economy by adopting aggressive fiscal policies in the next three years. In a way, deficit financing was found easy. Excess liquidity in the economy due to poor investment environment and uncertainties that prevailed ever since the coups of 1987 helped the government to tap idle domestic resources for financing the fiscal deficits of sizeable nature by domestic borrowing (Jayaraman and Choong, 2006a) without exercising any pressure on interest rates and crowding out private investment for a while until late 2005. Table 2 shows the trends in government revenue, expenditure and fiscal balance.

Table 2: Government Revenue, Expenditure and Overall Balance

	Government Revenue (% of GDP)	Government Expenditure (% of GDP)	Overall Balance (% of GDP)
1988-2005 (Average)	26.4	30.5	-4.1
1988-1999 (Average)	26.8	30.4	-3.6
2000	24.2	27.4	-3.2
2001	22.1	28.6	-6.5
2002	25.8	34.3	-8.5
2003	24.4	32.1	-8.7
2004	24.8	31.3	-6.5
2005	24.1	27.4	-3.3
2006	25.9	28.8	-2.9

Source: Asian Development Bank (2006, 2007), Browne (2006)

The composition of government expenditures has been heavily tilted in favour of operating expenditures (including administrative expenditures on value added taxes), which in recent years accounted for 75 to 80 per cent of total expenditures. The wage and salary bill alone accounted for over 50 per cent of the operating expenditures.

The fiscal deficit more than doubled between 2001 and 2001, rising

from 3.2 per cent of GDP in 2000 to 6.5 per cent in 2001. It went up further to 8.5 per cent in 2002, reaching an unprecedented level of 8.7 per cent of GDP in 2003. It came down to 6.5 per cent of GDP in 2004 and 3.3 per cent in 2005. Since Fiji financed it fiscal deficits for a continuous period of six-years (2001-2006) by domestic borrowing (mostly from the state guaranteed Fiji National Provident Fund), total government debt also rose from a modest 44 per cent of GDP in 2001 to historically the highest level at 53 per cent of GDP in 2004, which declined slightly to 52% of GDP in 2005. With contingent liabilities such as guaranteed public debt of state owned enterprises and other statutory bodies, the debt ratio was expected to be around 60 per cent of GDP. Fiji's fiscal vulnerability indicators are given in Table 3.

Table 3: Fiji: Fiscal Vulnerability Indicators
(% of GDP, unless otherwise indicated)

	2001	2002	2003	2004	2005	2006
Revenue & Grants	22.1	25.8	24.4	24.8	24.1	25.9
Expenditure & Net Lending	28.6	34.3	32.1	31.3	27.4	28.8
Overall Balance	-6.5	-8.5	-8.7	-6.5	-3.3	-2.9
Government Debt	44.0	48.0	49.0	53.0	52.0	NA
External Debt	13.6	13.7	12.2	10.9	11.1	NA
Current Account Balance	-3.5	-0.1	-7.7	-16.4	-15.6	-24.4
Intl.Reserves (US$ Million)	NA	359	423	636	471	495
Intl.Reserves (months of imports)	4.3	3.5	3.1	3.3	3.5	NA
Exchange Rate (F$/US$)	2.3	2.2	1.9	1.7	1.7	1.7

Source: ADB (2007), World Bank (2006)

Fiji's external debt was kept deliberately low at around 11 per cent of GDP until 2005. Since Fiji is not eligible for concessional loans from international lending agencies past policies were aimed at keeping a low level of external borrowing (Jayaraman and Choong, 2007). Utilising its favourable credit rating, Fiji carried out its first ever bond issue in international bond markets in September 2006, the issue size being US$150 million.[2] The objective was that the loan proceeds would be used for

---

[2] Fiji's credit rating has fallen since January 2007, due to the December 2006 military coup and continuing distrust in the interim government by the international community. The price of the bond fell to US$86 from US$99.80 (face value of US$100) in early 2007. In late 2006, the Standard & Poors lowered Fiji's foreign currency rating from BB+ to B+ and local credit rating from BB to BB-. In March 2007, the ratings were further lowered to B and B+ respectively (RBF, 2006a).

meeting the 2007 budget deficit requirements. The bond maturity period was for five years and the coupon payment amounted to 7 per cent of the face value.

3.2 Current Account in Balance of Payments

The government's expansionary fiscal stance during a five-year period (2001-2005) contributed towards reviving private sector confidence as well. Increases in domestic credit during 2001-2005 accordingly resulted in a quick recovery of the economy. Total credit as a proportion of GDP, which fell from 44 per cent of GDP in 2000 to 41 per cent in 2001 due to the aftermath of the civilian coup in 2000, rose steadily during the following four years and was about 59 per cent of GDP in 2005. Credit to the public sector registered increases, as banks and non-bank institutions stepped up investment in government bonds. Credit to private sector also went up, as it recorded increases from 33 per cent of GDP in 2001 to 49 per cent of GDP in 2005. The credit boom also reflected a catching up from the past depressed investment climate (Jayaraman and Choong, 2006a, 2006c).

Thus, both expansionary fiscal policies and revival of private sector credit resulted in increases in aggregate demand, which spilled over into demand for foreign goods and services. Consequently, trade deficits expanded. Despite a boom in remittances since 2003 and a rebound in the tourism sector, there were considerable pressures on balance of payments. The current account deficits in the country's balance of payments were on the rise, as there was a steep fall in garment exports as the US discontinued from January 2005 its annual quota of imports from Fiji. Added to the loss of export earnings, sugar exports fell as production reached low levels and gold exports declined due to mining operation problems.

Table 4 presents details on current account deficits in the balance of payments along with budget deficits. The current account deficits mounted rapidly from 7.7 per cent of GDP in 2003 to record the highest figure of 24.4 per cent in 2006 (ADB, 2007). While the persistent fiscal deficits were financed from increased public borrowing, current account deficits were financed under Fiji's fixed exchange rate regime by a steady drawdown from international reserves. Fiji's reserve position weakened gradually from 2002 (6.3 months of import cover) to 2006 (3.2 months of imports cover).

As Fiji's international reserves were seen declining from 2002 onwards for the following four years, pressures were mounting on the exchange rate during the second half of 2006 resulting in speculative at-

tacks, as rumours were rife about imminent devaluations. It was then clear that fiscal deficits and the build up of public debt of record size would eventually take a toll on the country's currency (Jayaraman and Choong, 2006b). In December 2006, the Reserve Bank of Fiji (RBF) imposed, exchange controls on transactions under capital account and introduced credit ceilings along with increases in interest rates on RBF lending facilities to commercial banks (RBF, 2006b).

Table 4: Budget and Current Account Deficits

Year	Current Account Deficit (% of GDP)	Budget Deficit (% of GDP)	Broad Money (M2) (% of GDP)
1979-89 (Average)	2.1	5.9	41.2
1990-94 (Average)	2.1	4.6	55.2
1995-99 (Average)	1.6	4.7	55.9
2000	2.9	3.2	43.2
2001	3.5	6.5	39.1
2002	0.1	8.5	39.8
2003	7.7	8.7	45.7
2004	16.4	6.5	46.6
2005	15.6	3.3	54.0
2006	24.4	2.9	56.2

Source: ADB (2006, 2007)

While the foregoing analysis of trends in Fiji's budget deficits, and trade and current account deficits has shown the emergence of seemingly unsustainable twin deficits in recent years, the empirical study given in the next section seeks to examine their long run association.

4. Modelling Strategy

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).

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

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

$(S_{pub} - I_{pub})$ represents the overall fiscal balance, while $(S_{priv} - I_{priv})$ is the private savings and investment balance. Assuming private savings/investment remained stable over time, external current account balance would be equal to overall fiscal balance. Alternately, 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 deficits and budget deficits. However, we do not have any indication of the direction of behavioural or temporal linkages.

As cautioned by studies, including El-Khouri (2002) of the IMF, one has to be careful in moving from this identity to the assumption that a simple causal relationship exists between budget and current account deficits. A widening of the budget deficit might increase the current account deficit but it can also reduce the private sector investment–saving balance through crowding out private investment. Similarly, an increase in the budget deficit might increase private saving, as argued by Barro (1989), since individuals might recognise that future tax burdens would be higher due to increases in public debt servicing burden. Thus, the extent to which fiscal and external deficits are linked depends on other variables as well, including money supply, since monetisation of fiscal deficits would lessen the immediate impact of debt servicing burden.

Under fixed exchange regime, in Johnson's (1972) 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/current account 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, leading to a fall in exports and a deterioration in trade balance/current account balance.

Thus, our modelling strategy has to incorporate both real and monetary variables as follows:

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

Where: CAD = Current account deficit (per cent of GDP);
$RGDP$ = real GDP (index number); and
BD = budget deficit (per cent of GDP);
$M2$ = broad money supply (per cent of GDP)

RGDP represents domestic absorption and M2 monetary influences. The latter includes changes in interest rate, inflation and real interest affecting trade volume. The data series are drawn from a single source, namely Asian Development Bank (2006). While focusing our attention on Fiji, we note the time span of data series of Fiji is not available for a full period from 1970, though the country gained independence in 1970. The IMF data series on balance of payments begins only from 1979. Hence, our study uses the available data series covering a 27-year period (1979-2005). Since Fiji depends heavily upon tourism earnings, besides earnings from traditional sugar export, we use current account deficits (*CAD*), rather than trade deficits.

For testing the existence of long-run relationship between current account deficit and budget deficit, we employ the bounds testing approach developed by Pesaran, *et al.* (2001). One of the advantages of this technique is that it has better small-sample properties than cointegration techniques developed by Engle and Granger (1987) and Johansen and Juselius (1990). In addition, Pesaran, *et al.* (2001) demonstrate that, within autoregressive distributed lag (ARDL) model, the ordinary least squares (OLS) estimators of the short-run estimates are consistent while the ARDL based estimators of the long run coefficients are super-consistent in the small sample size[3]. The Appendix to this paper outlines the methodology in detail.

5.   Empirical Results

Before proceeding with the cointegration analysis, we conducted unit root tests in regard to time series of the variables employed in the study. Although the bounds testing procedure does not require the same order of integration, testing for the presence of a unit root in each of the variables is crucial to investigate the properties of the series under study and avoid spurious regressions. Theoretically, if a series is trend-stationary and no inspection of the order of integration is made when implementing the testing procedure, there may arise high probabilities of making a type II error (see Taylor, 1993).

In Table 5, we report the results of three types of unit root tests: (i) the Augmented Dickey-Fuller (ADF); (ii) the modified non-parametric Phillips-Perron unit root test by Ng and Perron (2001), known as MZa

---

[3] This technique has been widely applied on various issues in the Fijian economy. See, for example, Narayan and Narayan (2004a&b), Narayan and Smyth (2005), Narayan and Narayan (2005), Narayan, *et al.* (2006), and Gounder, *et al.* (2007).

test; and (iii) the KPSS test, proposed by Kwiatkowski, et al. (1992), which relies on the null hypothesis that the series under study is an I(0) stationary process.

Table 5: Results of Unit Root Tests (Sample Period: 1979-2005)

Variables	ADF Test		Ng and Perron Test, MZa		KPSS Test	
	Level (Constant with Trend)	First Difference (Constant without Trend)	Level (Constant with Trend)	First Difference (Constant without Trend)	Level (Constant with Trend)	First Difference (Constant without Trend)
CAD	-2.114 (0)	-6.545* (0)	-7.756 (0)	-13.520* (0)	0.165* (3)	0.284 (5)
BD	-3.751* (1)	-6.025* (0)	-12.395 (0)	-12.152* (0)	0.091 (1)	0.356 (13)
RGDP	-2.704 (0)	-4.788* (1)	-6.927 (0)	-9.016* (1)	0.182* (3)	0.284 (10)
M2	-1.389 (0)	-3.462* (0)	-3.902 (0)	-12.232* (0)	0.129 (3)	0.112 (1)

Note: The ADF critical value at 5 per cent level is –2.9640 and –3.5629 for constant without trend and constant with trend regressions, respectively. These critical values are based on Mckinnon. The optimal lag is selected on the basis of Akaike Information Criterion (AIC). The Ng and Perron critical value is based on Ng and Perron (2001) critical value and the optimal lag is selected based on Spectral GLS-detrended AR based on SIC. The null hypothesis of the test is: a series has a unit root. The KPSS critical value is based on KPSS (1992, Table 1) and the optimal lag is selected based on Newey-West using Bartlett kernel. The null hypothesis of the KPSS test is: a series is stationary. The asterisk * denotes the rejection of the null hypothesis at the 5 per cent level of significance. The figures in brackets denote number of lags. CAD=current account deficit; BD=budget deficit; RGDP=real GDP; M2=broad money supply.

Based on the results reported in Table 5, we found that BD and M2 are integrated at different orders, either I(0) or I(1) process, depending on the use of the unit root tests. For other series such as CAD and RGDP, the findings are consistent, that is, integrated at I(1), regardless of the use of ADF, Ng-Perron and KPSS unit root tests. Obviously, under such conditions of mixed integrated order conditions of variables, the use of cointegration procedures such as Johansen (1988, 1991) and Johansen and Juselius (1990) are not appropriate.

The results of the unrestricted error correction model (UECM) adopted under bounds testing procedure are shown in Table 6.

The empirical finding in Table 6 provides strong evidence in favour of cointegration between *BD* and *CAD*. Table 6 shows that the calculated *F*-statistic of the *CAD* equation (7.76) is statistically significant at 1 per cent level[4].

---

[4] The full results of the unrestricted error correction model are available upon request. The estimated coefficient of the variables is shown in Equation (2).

Table 6: Bound Test for Cointegration Analysis

Dependent Variable	Computed F-statistic			
CAD	7.76***			
BD	2.47			
RGDP	1.99			
M2	2.50			
Critical Value	Pesaran, et al. (2001)[a]		Narayan (2005)[b]	
	Lower bound value	Upper bound value	Lower bound value	Upper bound value
1 per cent	3.41	4.68	4.54	6.37
5 per cent	2.62	3.79	3.13	4.44
10 per cent	2.26	3.35	2.58	3.86

[a] Critical values are obtained from Pesaran, et al. (2001), Table CI(iii) Case III: Unrestricted intercept and no trend, p. 300.
[b] Critical values are obtained from Narayan (2005), Table case III: unrestricted intercept and no trend, p. 1988.
*** indicates significance at 1 per cent level.

The estimated equation for current account deficit as the dependent variable is shown as follows[5]:

$$CAD = -50.99 + 3.23BD*** + 0.08RGDP*** + 0.36M2**$$ (5)
$$(-4.40) \quad (3.20) \quad\quad (3.17) \quad\quad (2.34)$$

Note: ** and *** indicate significance at 5 per cent and 1 per cent levels. Figures in parentheses are two-sided calculated "*t*" values.

Hence, the null hypothesis of no cointegration relationship is rejected. On the other hand, the calculated *F*-statistic in the equations of *BD*, *RGDP* and *M2* is respectively smaller than the respective lower bound value [using either Pesaran, et al.'s (2001) or Narayan's (2005) critical values], thus leading us to conclude that there is only one cointegration equation. Our finding is in line with the findings of Enders and Lee (1990), Alse and Bahmani-Oskoee (1992), Biswas, *et al.* (1992),

[5] We also included trend variable (trend) and dummy variable (crisis) to measure the political events and coup in the estimation of Equation 5 and the result is shown as follows (figures in parentheses are two-sided calculated 't' values):

CAD = -67.20 + 0.82BD** + 0.29RGDP** + 0.30M2** – 0.91 trend – 2.54 crisis
(-4.51)   (3.53)   (3.42)   (3.43)   (-1.83)   (-1.15)

However, the trend and dummy variables are not significant at 0.05 level. Therefore, we decided to drop these variables from Equation 5. The omission of these variables does not change the conclusions. That is, the sign, size, and statistical significance of all the other explanatory variables (budget deficit, real GDP and M2) remain the same as those reported in Equation 5.

Tanner and Liu (1994), Khalid (1996), Khalid and Guan (1999) and Kouassi, *et al.* (2004).

It is found that in the long run, budget deficit, real GDP and money supply have a direct and significant impact on the current account deficit. In terms of the magnitudes of the coefficients, budget deficit with a coefficient of 3.23 has far greater impact on current account deficit. The result with regard to real GDP indicates that higher domestic growth, *ceteris paribus*, would worsen the nation's current account balance because of increases in demand for imports of goods and services; this accords well with theory.

On the other hand, positive impacts of both money supply and budget deficit on current account deficit are not surprising. As shown by Narayan, *et al.* (2006), the positive link is established through inflation and import prices. That is, an increase in government budget deficits and money supply would raise price levels. Indeed, Dewan *et al.* (1999) showed that approximately 75 per cent of the long-run movement in the Fijian domestic prices is fuelled by import prices. In line with existing studies, it is concluded that domestic absorption, budget deficit and money supply are positively associated with CAD in the long run.

Various diagnostic tests – tests of normality, autocorrelation, heteroskedasticity in the error term and misspecification error – were conducted to examine the validity and reliability of the long-run regression models. The results of the tests are summarized in Table 7. We do not reject the null hypotheses of no autocorrelation, the error terms being normally distributed and homoskedasticity. The RESET test indicates that the model is correctly specified. In addition, Figures 1 and 2 plot the CUSUM and CUSUMSQ statistics when CAD is the dependent variable. The results indicate absence of instability in the coefficients as the plot of the CUSUM and CUSUMSQ statistics are confined within the 5 per cent critical bounds of parameter stability. This indicates that the structure of the parameters have not diverged abnormally over the period of the analysis.

Table 7: Diagnostic Tests for Equation (5)

Diagnostic Test	Null Hypothesis	Equation (5)
Jarque-Bera test	H_0: Normality of error term	χ^2 = 1.2606 [0.5324]
Breusch-Godfrey Serial Correlation LM Test	H_0: No autocorrelation	F(2) = 0.1292 [0.8803]
ARCH Test	H_0: Homoskedasticity	F(1) = 0.4694 [0.5015]
Ramsey RESET Test	H_0: The model is correctly specified	F(2) = 1.7500 [0.2280]

Note: Figures in square brackets are probability values of the test statistics. Figures in parentheses are the lag lengths used for the appropriate diagnostic tests.
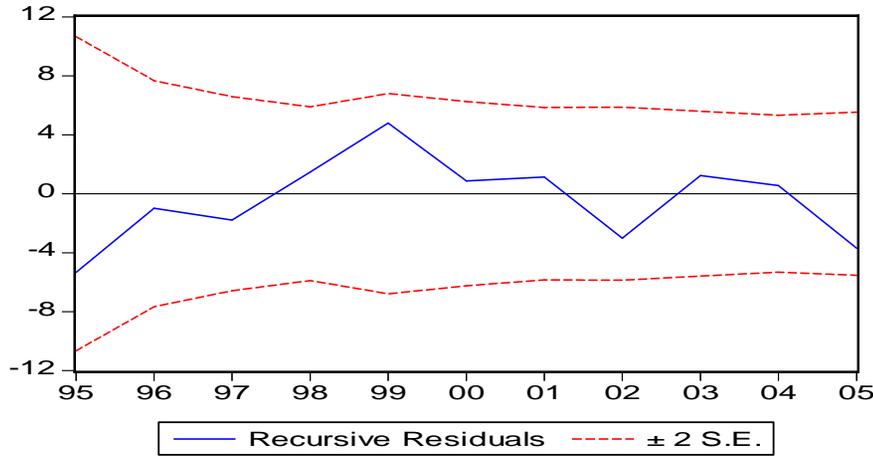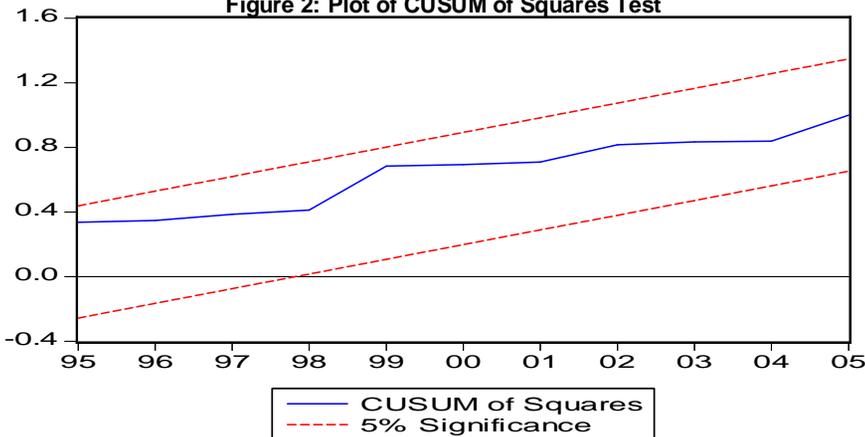
Figure 1: Plot of CUSUM Test

at 1 per cent level. A significant ECT is indicative of long-run causality running from *BD*, *RGDP* and *M2* to *CAD*. It may be noted that ECT emerges significant only in the case of the equation with CAD as the dependent variable.

Table 8: Summary of Temporal Causality Results based on Parsimonious Vector Error-correction Model (PVECM)

Dependent Variable	F-statistic				ECT (t-statistics)
	ΔCAD	ΔBD	ΔRGDP	ΔM2	
ΔCAD	-	3.64**	3.12*	3.01*	-0.5773*** (-3.92)
ΔBD	4.34**	-	4.90**	2.62*	-0.2846 (-1.77)
ΔRGDP	3.64*	2.97*	-	2.72	-0.3177 (-1.47)
ΔM2	1.34	1.57	2.15	-	-0.2641 (-0.83)

Note: *, ** and *** indicate significance at 10 per cent, 5 per cent and 1 per cent levels, respectively. Figures in parentheses are calculated t-statistics.

The magnitudes of ECT (0.5773) in the current account deficit (CAD) regression, indicates that adjustment towards the long-run relationship is about 57.73 per cent per annum. This implies that any deviation from the long-run equilibrium is corrected to the extent of about 58%, in the equation with CAD as the dependent variable in the following year[6]. However, none of the error correction terms in the remaining equations is found significant, indicating absence of evidence of any long-run causality running respectively from the relevant variables to *RGDP*, *BD* or *M2*. Thus, we have only one long run causality link running from real GDP, budget deficit and money supply to current account deficit, which confirms the result of only one cointegration equation obtained from the bounds testing approach.

In the short-run, we observe the existence of a bi-directional causality between (i) *CAD* and *BD;* (ii) *CAD* and *RGDP;* (iii) *BD* and *RGDP*, Further, we observe there is a causality running from *M2* to *CAD* and *BD*.

Figure 2: Plot of CUSUM of Squares Test

After examining the long-run relationship between current account deficit and its determinants, we apply the Granger-causality tests within a parsimonious vector error correction model (PVECM) to examine the short-run causality among the variables. The Granger causality results are reported in Table 8. For the equation with *CAD* as dependent variable, the coefficient on the error correction term (ECT) is negative and significant

_____

[6] Once the equilibrium conditions represented by the cointegrating relations are imposed, the VECM describes how in each time period economic growth is adjusting towards its long-run equilibrium state. Because the variables are supposed to be cointegrated, in the short term deviation of output from its long-run equilibrium path will feed back on its future changes in order to force its movement towards the long-run equilibrium state. The coefficient of the error-correction term, however, represents the proportion by which the long-run disequilibrium in the dependent variables is corrected in each short-term period.

Based on these causality relationships, it appears that there are two channels in which budget deficits influence current account deficit in Fiji. The first is the direct causal relationship from budget deficit to current account deficit, and the second is the indirect channel through real GDP, that is, higher budget deficit leads to higher real GDP; higher real GDP further worsens the current account deficit.

6. Summary of Findings and Policy Implications

This paper examined the relationship between Fiji's budget deficit and current account deficit. Utilising time series covering a 27-year period (1979-2005), the study employed the bounds testing approach for examining the long run relationship and short-run temporal causality between the two deficits. The study results confirmed the existence of a long run relationship between budget deficit and current account deficit, with causality link running from domestic absorption, budget deficit and money supply to current account deficit.

These findings are consistent with the results in Laney (1984), Khalid and Guan (1999), and Kouassi, *et al.* (2004) regarding a positive relationship between budget deficit and current account deficit in other developing countries. Further, the study findings established the existence in the short run of a bi-directional causality between the two deficits, and bi-directional causality between budget deficit and domestic absorption, as well as bi-directional causality between current account deficit and domestic absorption. Furthermore, it is found that causality ran from money supply to current account and budget deficits.

Policy implications of the study findings, especially in the context of Fiji's poor export performance during the last three years, are clear. The immediate prospects of an increase in earnings from sugar exports are dim with the preferential treatment accorded by European Union being phased out during the next three years (2007-2009). It is apparent that with current production and processing deficiencies at farm and factory levels, and the high business costs and high unit labour costs relative to other garment-manufacturing countries, Fiji cannot hope to compete with major producers of sugar and garment. The competitiveness of Fiji's garment exports appear to be doubtful despite the extension of SPARTECA for another seven years by Australia and lowering SPARTECA's rules of origin requirement for domestic content from 35 per cent to 25 per cent.

Restoring the pre-eminent position of sugar rests on certain premises. These include raising sugar production from the present (2006) level of 343, 000 tons to projected level of 488,000 tons in 2008 and 2009. The

basic assumptions here relate to the promised support by the EU in exchange for the lowering of the preferential price and the refurbishment of the mills funded by the Indian government. Furthermore, it is conditional to the impasse over the agricultural leasehold system being resolved soon, at least by end of 2007. With regard to the garment industry, the only hope is to develop and exploit niche markets – that is, establishing markets for specialised products for which it can charge a price that will more than cover its relatively high costs of participating in international trade. Being able to move in this direction depends on many things but importantly on product design and marketing (UNESCAP, 2007).

The lack of growth drivers, especially in the country's export sector is of considerable concern. Since Fiji is fortunately endowed with good fertile land and industrious agricultural labour, the best prospects, as of now, seem to lie in agriculture. With the implementation of an Asian Development Bank project for development of alternative livelihoods for cane farmers, who had to move out of the industry because their leases had expired, there is greater scope for raising the capacity of the sector to replace the large imports of horticultural products for the tourism sector. Further, it is understood that World Bank is examining the feasibility of producing electricity from sugarcane. Expanding power generation and finding economic alternatives to oil generation would also contribute to reducing the import bill for fuel. In the context of volatility in oil prices, this will be an important import substitution measure as well. For example in 2005, the increase in petroleum-based product prices added about F\$150 million to the import bill. In 2006, the price increase added another F\$160 million to the import bill (UNESCAP, 2007).

Protective tariff measures for encouraging import substitution have been proposed in the 2007 Budget. These include increases in the tariffs on most imported fruits and vegetables from 3 per cent to 27 per cent and from 15 per cent to 27 per cent on products such as cream, cheese, yoghurt, and pork. Past experiences in developing countries have shown that import substitution through tariff protection has not been successful. Once an appropriate investment environment is created (Narayan and Prasad and Hince, 2003b), private sector would automatically pick up the signals and enter into profitable areas of investment, including both import competing and export oriented industries. Towards this purpose, the present legislative and regulatory investment environment has to be improved[7].

---

[7] There are three measures of effectiveness of the investment and business environment assembled in a recent World Bank/International Finance Corporation exercise

Furthermore, a recent study by Stewart (2006) pointed out that the observed fall in real exchange rate due to rise in budget deficits in most of the island countries during the last ten years has not led to any notable rise in exports, and that there is no strong positive correlation between depreciating currency and increasing exports. Obviously, this suggests, 'a range of other factors such as inadequate infrastructure, high transport costs, lack of marketing faculties, product quality issues and regulatory and other constraints may be limiting production and other supply responses' (Stewart: 109-110).

Developing new export products and nurturing them is a long term measure. This calls for all-round and sustained efforts with a view to promoting economic growth through quality investment in infrastructure, improving governance and creating an investor friendly environment. This would take time. Therefore, our focus should be on the immediate future. The urgency is due to the fact that the study finding established the presence of short-term causality, besides long-term causality between budget and current account deficits.

The existence of feedback causality between budget deficit and current account deficit suggests that policy makers must embark on fiscal adjustment measures (Daniel *et al.* 2006), which are expected to facilitate external adjustment as well (Easterly *et al.*, 1994). The term 'fiscal consolidation', with reference to twin deficits, has a direct connotation, as it would imply reducing government deficit and debt accumulation (Jayaraman, 2007).

The fiscal consolidation measures 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 (Jayaraman, 2007).

The fiscal consolidation measures, which were indicated in the in-

on cost of doing business (International Finance Corporation 2006): (i) the number of days that it takes to register a business; (ii) the number of days it costs for settling contract disputes; and (iii) enforcing a contract, i.e., collecting an outstanding debt through the courts. Though Fiji has done better than other island countries in the region, it is far behind New Zealand. For example, while it takes 2 days for registering a property and 109 days to settle a contract dispute in New Zealand, the corresponding number of days in Fiji is 48 and 397 days.

terim government's revised budget for 2007, included reduction in operating expenditures through trimming off the number of ministries and departments from 36 to 16, by cutting wages and salaries of civil servants by 5 per cent across the board, by downsizing the civil service size through lowering the retirement age limit from 60 to 55, and freezing the vacant positions. There are good examples of successful experiences of fiscal consolidation in the region, which can be emulated. Recent experiences in Papua New Guinea (PNG) show those fiscal consolidation efforts undertaken for a continuous period of three to four years, did record some notable achievements in reducing deficits. For four years in a row beginning from 2002, PNG undertook fiscal consolidation measures with all seriousness avoiding the past mistakes of going on a fiscal spending spree, when the export boom in oil and natural gas and other mineral products brought substantial revenues. As a result, PNG ran an overall fiscal balance during the past four years, meeting all domestic and external interest payment obligations (Marciniak, 2006).

Samoa's recent fiscal reform experiences are also relevant. Civil service restructuring, which began in 2001 by downsizing the Ministry of Public Works, was carried through until 2003. The programme was successful in reducing the number of ministries from 28 to 13. There were reductions in staffing numbers as well (through natural attrition and a freeze on funding for vacant positions) which brought down public sector wage well below that of regional comparator countries (Leigh, 2006). In 2006, the overall budget deficit was 0.4 per cent of GDP. Fiscal consolidation measures enabled Samoa to re-direct more funds into growth enhancing investment projects. The composition of public expenditure in Samoa differed much from that of comparator countries, contributing to strengthening fiscal consolidation measures for longer lasting impacts.

Referring to Fiji's fiscal consolidation experiences in the past, D'Hoore (2006) notes that tightening of public expenditure in the past was achieved by cuts in wage and salary bill and if 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; they also do not have any lasting impact. It is time that Fiji be made aware of and avoid such pitfalls.

Appendix
A Note on the Econometric Modelling Procedure

Following Pesaran, et al. (2001), we form the vector autoregression (VAR) of order p (VAR (p)) for the twin deficit model:

$$Z_t = \mu + \sum_{i=1}^{p} \beta_i Z_{t-i} + \varepsilon_t \qquad \textbf{[1]}$$

where Z_t is the vector of both X_t and Y_t, where Y_t is the dependent variable (*CAD*) and X_t is the vector matrix representing a set of explanatory variables (*RGDP*, BD and M2);

$\mu = [\mu_Y, \mu_X]'$;

t is a time or trend variable, and

β_i is a matrix of VAR parameters for lag i.

According to Pesaran, et al. (2001), the dependent variable must be I(1) variable, but the regressors, or explanatory variables can be either I(0) or I(1).

We can further develop a Vector Error Correction Model (VECM) as:

$$\Delta Z_t = \mu + \alpha t + \lambda Z_{t-1} + \sum_{i=1}^{p-1} \gamma_i Y_{t-i} + \sum_{i=0}^{p-1} \gamma_i X_{t-i} + \varepsilon_t \qquad \textbf{[2]}$$

where $\Delta = 1 - L$ and $\alpha = [\alpha_Y, \alpha_X]$.

We partition the long-run multiplier matrix as follows:

$$\lambda = \begin{bmatrix} \lambda_{YY} & \lambda_{YX} \\ \lambda_{XY} & \lambda_{XX} \end{bmatrix}$$

The diagonal elements of the matrix are unrestricted, so the selected series can be either I(0) or I(1). If $\lambda_{YY} = 0$, then Y is I(1). In contrast, if $\lambda_{YY} < 0$, then Y is I(0).

VECM procedures described above are important in testing of at most, one cointegrating vector between dependent variable (Y_t) and a set of regressors (X_t). Further, following the assumptions made (unrestricted intercepts and no trends) and restrictions imposed ($\lambda_{XY} = 0, \mu \neq 0$ and $\alpha = 0$) by Pesaran, *et al.* (2001) in Case III, we re-formulate Equation (2) to derive the following Unrestricted Error Correction Model (UECM) to examine the long run relationship between budget deficit and current account deficit.

$$\Delta CAD_t = \beta_0 + \beta_1 CAD_{t-1} + \beta_2 RGDP_{t-1} + \beta_3 BD_{t-1} + \beta_4 M2_{t-1} + \sum_{i=1}^{p} \beta_5 \Delta CAD_{t-i}$$

$$+ \sum_{i=0}^{p} \beta_6 \Delta RGDP_{t-i} + \sum_{i=0}^{p} \beta_7 \Delta BD_{t-i} + \sum_{i=0}^{p} \beta_8 \Delta M2_{t-i} + u_t \qquad \textbf{[3]}$$

where u_t is the white noise error term; Δ is the first difference operator; and p is lag structure, which is determined by Akaike's information criterion.

There are two steps in testing the cointegration relationship between CAD and its explanatory variables. First, we estimate Equation (3) by ordinary least square (OLS) technique. Second, we examine the long run relationship by imposing the restriction that all estimated coefficients of lagged one level variables equal to zero. That is, the null hypothesis is $\beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$. In order to test the null hypothesis, following Pesaran, *et al.* (2001), we apply either standard Wald test or *F*-statistic, which has a non-standard distribution that depends on few factors such as sample size, the inclusion of intercept and trend variable in the estimation, and number of regressors. If the *F*-statistic obtained from the restriction is less than lower bound critical value, we do not reject the null hypothesis of no long run relationship. In contrast, if the computed *F*-statistic is greater than upper bound critical value, then we reject the null hypothesis and conclude that there appears steady state long run equilibrium between the variables under study. However, if the *F*-statistic falls within lower and upper bound critical values, then the results are inconclusive and the stationarity properties of the series must be examined and investigated.

Narayan and Narayan (2005) and Narayan (2005) argue that the use of Pesaran, *et al.*'s (2001) critical values for small sample study may produce misleading results because the critical values calculated are generally lower than those generated by Narayan who used similar GAUSS code used by Pesaran, *et al.* (2001). Narayan (2005) has generated a new set of critical values ranging from 30 to 80 observations. Since the sample size in our study is small (that is, 27 observations) and as the critical values provided by Pesaran, *et al.* (2001) are calculated on the basis of large sample sizes of 500 and 1000 observations and 20000 and 40000 replications respectively, we propose to use the critical values provided by Narayan (2005).

References

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

Alse, J. and M. Bahmani-Oskooee (1992) 'Are the Twin Deficits Really Related? A Comment'. *Contemporary Policy Issues* 10: 108-111.

Anoruo, E. and S. Ramchander (1998) 'Current Account and Fiscal Deficits: Evidence From Five Developing Economies of Asia'. *Journal of Asian Economics* 9: 487-501.

Asian Development Bank (ADB) (2004) *Key Indicators of Asian and Pacific Developing Countries 2005*. Manila: Asian Development Bank.

Asian Development Bank (ADB) (2006) *Key Indicators of Asian and Pacific Developing Countries 2004*. Manila: Asian Development Bank.

Asian Development Bank (ADB) (2007) *Asian Development Outlook 2007*. Manila: Asian Development Bank.

Barro, R. J. (1989) 'The Ricardian Approach to Budget Deficits'. *Journal of Economic Perspectives* 3 (Spring): 37-54.

Biswas B, G. Tribedy and P. Saunders (1992) 'Further Analysis of the Twin Deficits'. *Contemporary Policy* 10: 104-108.

Browne, C. (2006) *Pacific Island Economies*. Washington, D.C.: International Monetary Fund.

Chen, B. and A. A. Haug (1993) 'The Twin Deficits Hypothesis: Empirical Evidence for Canada'. *Mimeograph*, York University.

Coughlin, C. C., M. R. Pakko and W. Poole (2006) 'How Dangerous is the U.S. Current Account Deficit?' *The Regional Economist*: 5-9.

Daniel, J., J. Davis, M. Fouhad and C. V. Rijckeghem (2006) *Fiscal Adjustment for Stability and Growth*. Pamphlet Series No: 35. Washington, D.C.: International Monetary Fund.

Darrat, A. F. (1988) 'Have Large Budget Deficits Caused Rising Trade Deficits?' *Southern Economic Journal* 54: 879-887.

Dewan, E., S. Hussein and S. Morling (1999) 'Modelling Inflation Processes in Fiji'. Working Paper 1999-02, Reserve Bank of Fiji, Suva.

D'Hoore, A. (2006) 'Fiji', Chapter 8 in C. Brown (ed.) *Pacific Island Economies*. Washington, D.C.: IMF.

Easterly, W., C. A. Rodriguez, and K. Schmidt-Hebbel (1994) *Public Sector Deficit and Macroeconomic Performance*. New York: Oxford University Press.

El-Khouri, S. (2002) 'Fiscal Policy and Macroeconomic Management' in M.S. Khan, S. Nsouli and C.H. Wong (eds). *Macroeconomic Management: Programs and Policies,* Washington, D.C.: International Monetary Fund: 201-228.

Enders, R. F. and B. S. Lee (1990) 'Current Account and Budget Deficits: Twins or Distant Cousins?' *Review of Economics and Statistics* 72: 373-381.

Engle, R. F. and C. W. J. Granger (1987) 'Cointegration and Error-correction: Representation, Estimation and Testing'. *Econometrica* 55: 251-276.

Evans, P. (1988) 'Are Consumers Ricardians? Evidence for the United States'. *Journal of Political Economy* 96: 983-1004.

Evans, P. (1993). 'Consumers are not Ricardian: Evidence from Nineteen Countries'. *Economic Inquiry* 31: 534-548.

Evans, P. and L. Hasan (1994) 'Are Consumers Ricardian? Evidence for Canada'. *Quarterly Review of Economics and Finance* 34: 35-40.

Feldstein, M. (1985) 'American Economic Policy and the World Economy'. *Foreign Affairs* October: 985-1008.

Feldstein, M. (1987) 'Correcting the Trade Deficit'. *Foreign Affairs* July: 795-806.

Fleming, J. M. (1962) 'Domestic Financial Policies Under Fixed and Floating Exchange Rates', *IMF Staff Papers* 9 (November): 369-379.

Gordon, R. J. (1986) 'U.S. Fiscal Deficits and the World Imbalance of Payments'. *Hitotsubashi Journal of Economics* 27: 7-41.

Gounder, N., P. K. Narayan, and A. Prasad (2007) 'An Empirical Investigation of the Relationship between Government Revenue and Expenditure: The Case of the Fiji Islands'. *International Journal of Social Economics* 34(3): 147-158.

Gupta, S., B. Clements, E. Baldacci and C. Mula-Granados (2004) 'The Persistence of Fiscal Adjustments in Developing Countries'. *Applied Economics Letters* 11: 209-212.

Intal, Jr. P. (1991) 'Current Account Imbalances and Exchange Rate Policy'. *Asian Development Bank Review* 9(2): 90-109.

International Finance Corporation (2006) *Doing Business 2007: How to Reform*. Washington, D.C.: International Finance Corporation and World Bank.

International Monetary Fund (IMF) (2004) *International Financial Statistics Yearbook 2004*. Washington, D.C.: IMF.

Islam, M. F. (1998) 'Brazil's Twin Deficits: An Empirical Examination'. *Atlantic Economic Journal* 26: 121-128.

Jayaraman, T. K. (2007) 'Role of Fiscal Policy in Resilience Building: Experiences of Small Island States', *Paper Presented at the International Conference on Resilience Building* hosted by the Commonwealth Secretariat and the Institute of Small and Island States, University of Malta, Valletta, Malta, April 23-25.

Jayaraman, T. K. (2006) 'Macroeconomic Reform and Resilience Building', in L. Briguglio, G. Cordina and E. J. Kisanga (eds.). *Building Economic Resilience of Small States*, Malta: Islands and Small States Institute and London: Commonwealth Secretariat, pp. 33-58.

Jayaraman, T. K. and C. K. Choong (2006a) 'Public Debt and Growth in the South Pacific Islands: A Case Study of Fiji'. *Journal of Economic Development* 31(2): 107-131.

Jayaraman, T. K. and C. K. Choong (2006b) 'Why Fiji's Exchange Rate is under Pressure?' USPEC *Working Paper No.33*, Suva: Department of Economics, The University of the South Pacific.

Jayaraman, T. K. and C. K. Choong (2007) 'Will External Borrowing Help Fiji?' USPEC *Working Paper No.2*, Suva: Department of Economics, The University of the South Pacific.

Johansen, S. (1988) 'Statistical Analysis of Cointegration Vectors'. *Journal of Economic Dynamics and Control* 12: 231–254.

Johansen, S. (1991) 'Estimation and Hypothesis Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models'. *Econometrica* 59: 1551-1580.

Johansen, S. and K. Juselius (1990) 'Maximum Likelihood Estimation and Inference on Cointegration with Applications for the Demand for Money'. *Oxford Bulletin of Economics and Statistics* 52: 169-210.

Johnson, H. G. (1972) 'Monetary Approach to Balance of Payments Theory'. *Journal of Financial and Quantitative Analysis* 7(2): 1555-1572.

Johnson, H. G. (1976) 'Monetary Approach to Balance of Payments Theory', in J.A. Frankel and H.G. Johnson (eds). *Monetary Approach to the Balance of Payments*, London: Allen and Unwin: pp. 147-167.

Khalid, A. M. (1996) 'Ricardian Equivalence: Empirical Evidence from Developing Economies'. *Journal of Development Economics* 54: 413-432.

Khalid, A. M. and T. W. Guan (1999) 'Causality Tests of Budget and Current Account Deficits: Cross Country Comparisons'. *Empirical Economics* 24(3): 389-403.

Kouassi, E., M. Mougoue, and K. O. Kymn (2004) 'Causality Tests of the Relationship between the Twin Deficits'. *Empirical Economics* 29, 503-525.

Kwiatkowski, D., P. C. B. Phillips, P. Schmidt and Y. Shin (1992) 'Testing the Null Hypothesis of Stationarity against the Alternative of a Unit Root'. *Journal of Econometrics* 54: 159-178.

Laney, L. O. (1984) 'The Strong Dollar, the Current Account, and Federal Deficits: Cause and Effect'. *Economic Review, Federal Reserve Bank of Dallas* January: 1-14.

Leigh, L. (2006) 'Samoa' in Browne, C. (ed.). *Pacific Island Economies*. Washington, D.C.: IMF.

Mann, C. L. (2002) 'The U.S. Current Account Deficit Sustainability'. *Journal of Economic Perspectives* 16(3): 131-152.

Marciniak, P. (2006) 'Papua New Guinea', in Browne, C. (ed.). *Pacific Island Economies,* Chapter 13. Washington, D.C.: IMF.

McKinnon, R. I. (1990) 'The Exchange Rate and the trade balance'. *Open Economies Review* 1: 17-38.

Miller, S. M. and F. S. Russek (1989) 'Are the Twin Deficits Really Related?' *Contemporary Policy Issues* 7: 91-115.

Mundell, R. A. (1962) 'The Appropriate Use of Monetary and Fiscal Policy for Internal and External Stability'. *IMF Staff Papers* 9: 70-79.

Narayan, P. K. (2005) 'The Saving and Investment Nexus for China: Evidence from Cointegration tests'. *Applied Economics* 37: 1979-1990.

Narayan, P. K., and S. Narayan (2003) 'The Sustainability of Fiji's Budget deficit: An Econometric analysis'. *Pacific Economic Bulletin* 18: 77-90.

Narayan, P. K., and S. Narayan (2004a) 'Are Exports and Imports Cointegrated? Evidence from two Pacific Island Countries'. *Economic Papers* 23(2): 152-164.

Narayan, P. K., and S. Narayan (2004b) 'The J-Curve Effect: Evidence from Fiji'. *International Review of Applied Economics* 18: 369-380.

Narayan, P. K. and S. Narayan (2005) 'An Empirical Analysis of Fiji's Aggregate Import Demand Function'. *Journal of Economic Studies* 32: 158-168.

Narayan, P. K. and S. Narayan (2006) 'Savings Behaviour in Fiji: An Empirical Assessment'. *International Journal of Social Economics* 33: 468-480.

Narayan, P. K., S. Narayan and A. D. Prasad (2006) 'Modelling the Relationship between Budget deficits, Money Supply and Inflation in Fiji'. *Pacific Economic Bulletin* 21: 103-116.

Narayan, P. K. and B. C. Prasad (2003a) 'A Survey of Sectoral Performance and Constraints: The case of Fiji'. *Fijian Studies* 1: 3-28.

Narayan, P. K., and B. C. Prasad (2003b) 'Fiji National Budget 2003: Building a Resilient Economy?' *Pacific Economic Bulletin* 18: 91-107.

Narayan, P. K. and B. C. Prasad (2006) 'Productivity Differential and the Relationship between Exports and GDP in Fiji: An Empirical Assessment Using the Two Sector Model'. *Journal of the Asia Pacific Economy* 11: 106-122.

Narayan, P. K. and B. C. Prasad (2007) 'The Long-run Impact of Coups on Fiji's Economy: Evidence from a Computable General Equilibrium Model'. *Journal of International Development* 19: 149-160.

Narayan, P. K. and R. Smyth (2004) 'Trade Liberalisation and Economic Growth in Fiji: An Empirical Assessment Using the Bounds Testing Approach'. *Journal of the Asia Pacific Economy* 9: 96-115.

Narayan, P. K. and R. Smyth (2005) 'Temporal causality and the dynamics of democracy, emigration and real income in Fiji'. *International Review of Applied Eco-*

nomics 19(2): 245-263.

Ng, S. and P. Perron (2001) 'Lag length selection and the construction of unit root tests with good size and power'. *Econometrica* 69: 1519-1554.

Normandin, M. (1994) *Budget Deficit Persistence and the Twin deficits Hypothesis*. Quebec: Centre for Research on Economic Fluctuations and Employment, University of Quebec.

Obstfeld, M. and K. Rogoff (2005) 'Global Current Account Imbalances Exchange Rate Adjustments'. *Brookings Papers on Economic Activity* 1: 67-146.

Onafowara, O. A. and O. Owoye (2006) 'An Empirical Investigation of Budget and Trade Deficits: the Case of Nigeria'. *The Journal of Developing Areas* 39(2): 153-174.

Pattichis, C. (2004) 'Budget and Trade Deficits in Lebanon'. *Applied Economics Letters* 11: 105-108.

Pesaran, M. H., Y. Shin and R. Smith (2001) 'Bounds testing approaches to the analysis of level relationships'. *Journal of Applied Econometrics* 16(3): 289-326.

Reserve Bank of Fiji (RBF) (2006a) *Quarterly Review, December 2006*. Suva: RBF.

Reserve Bank of Fiji (RBF) (2006b) *Monetary Policy Statement*: *November 2006*. Suva: RBF.

Sinai, A. (2006) 'Deficits Expected Deficits, Financial Markets, and the Economy'. *North American Journal of Economics and Finance* 17: 79-101.

Stewart, R. (2006) *An Economic Survey of Developing Countries in the Pacific Region.* Canberra: AusAid.

Tanner, E and P. Liu (1994) 'Is the Budget Deficit "Too Large"? Some Further Evidence'. *Economic Inquiry* 32: 511-518.

Taylor, M. P. (1993) 'Modelling the Demand for U.K. Broad Money, 1871–1913'. *Review of Economics and Statistics* 75(1): 112-117.

United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) (2004) *Economic and Social Survey 2004*. Bangkok: UNESCAP.

United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) (2007) *Economic and Social Survey 2007*. Bangkok: UNESCAP.

Vamvoukas, G. A. (1999) 'The Twin Deficits Phenomenon: Evidence from Greece'. *Applied Economics* 31: 1093-1100.

World Bank (2006) *Global Development Finance, Volume 1: Country Tables.* Washington, D.C.: World Bank.

T.K. Jayaraman, School of Economics, Faculty of Business and Economics, The University of the South Pacific, Laucala Bay Road, Suva, Fiji Islands. E-mail: jayaraman_tk@usp.ac.fj, Tel: (679)323 2178; Fax (679)323 2522

Chee-Keong Choong, Department of Economics, Faculty of Accountancy and Management, Universiti Tunku Abdul Rahman, Lot PT 21144, Jalan Sungai Long, Bandar Sungai Long, Cheras, 43000 Kajang, Selangor D.E., Malaysia. E-mail: choongck@mail.utar.edu.my. Tel: (603)90194772; Fax: (603) 90197062