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Exchange market pressure in a small Pacific Island country: a study of Fiji: 1975-2005

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Abstract

Purpose – Under the fixed exchange rate regime Fiji's currency, which is pegged to a basket of currencies of its major trading partners, has been experiencing severe pressures. The purpose of this paper is to study annual exchange market pressure (EMP) over a 31-year (1975-2005) period and attempt to determine the factors behind EMP.

Design/methodology/approach – The paper employs the autoregressive distributed lag (ARDL) bounds testing procedure, which is applied to a multivariate model covering four variables, namely EMP in index numbers, and budget deficit, domestic credit to private sector and external debt, all the three expressed as percentages of gross domestic product. Additionally, an uncertainty variable is added to the regression analysis with a view to finding out whether political uncertainty has been responsible for speculative attacks on currency. Existence of a cointegration vector is then investigated. It is then followed by Granger-causality tests in an error-correction model with view to exploring the short- and long-term relationships between the variables.

Findings – The study findings are: there existed a long-run relationship between EMP and budget deficit, domestic credit to private sector, external debt and political uncertainty; and EMP was positively related to budget deficit, domestic credit to private sector and external debt as well as speculative pressures exercised by political uncertainty.

Originality/value – The empirical study on EMP in the South Pacific Island countries and in Fiji in particular is the first of its kind. The paper is expected to promote further interest in the studies of currencies of small island countries.

Keywords Pacific region, Islands, Fiji, Currencies, Exchange rates

Paper type Research paper

1. Introduction

The concept of exchange market pressure (EMP) and a framework to measure it were first introduced and developed by Girton and Roper (1977) to reflect the principle that an excess demand or supply of foreign currency could result in changes both in the price of foreign exchange and a change in the position of foreign reserves of the home country. The EMP framework has emerged to be crucial to both fixed and flexible exchange rate regimes, under varying types of exchange rate management.

Recent empirical studies on various countries utilising the EMP framework have suggested suggest that changes in monetary policy, wealth accumulation and real exchange rate can explain exchange market pressure (Girton and Roper, 1977; Modeste, 1981; Burdekin and Burkett, 1990; Mah, 1995; Eichengreen *et al.*, 1994, 1995,

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1996; Weymark, 1995, 1997; Pentecost *et al.*, 2001). Specifically, the factors which have been identified to exert pressures on exchange market in the developing economies are primarily macroeconomic in nature.

Fiji, a small island nation in the South Pacific has been experiencing severe pressures on its exchange rate for some time since mid 2006, mainly due to its rapid recovery during 2001-2005, following the civilian coup of 2000. Economic recovery was triggered by the countercyclical measures initiated by the interim government in 2001. These were continued later on by the elected government with sizeable fiscal deficits each year thereafter. Annual deficits from 2001 to 2006 were financed through public borrowing (Jayaraman and Choong, 2006a).

The gradual return of political stability after the 2001 coup contributed to revival of consumer confidence as well, which was marked by a steady rise in domestic credit to private sector, beginning with a modest increase in borrowings for consumer durables in 2002 and soon spilling over into the real estate market (Jayaraman and Choong, 2006b). The consequences of a domestic credit boom and continuous fiscal deficits manifested themselves in growing pressures on the country's balance of payments. Fiji's economy by 2005 had already been hit hard by the declining sugar exports, discontinuance of garment import quotas by the USA and the closure of the country's only gold mine, all contributing to poor export performance. The trade deficit widened further in 2006, increasing to about F$1.9 million from F$1.5 billion in 2005.

With rise in imports for capital and consumer goods over the period, there was a steady decline in Fiji's foreign exchange reserves during the recovery period. The gross international reserves decreased from F$1,046 million (equivalent to 5.6 months of import cover) in 2004 to F$822 million (equivalent to 4.0 months of import cover) in 2005. Since there was no let up in rise in domestic credit expansion, accompanied by sluggish export performance and escalating imports, the depletion in international reserves continued without any respite during 2006, despite a successful, the first ever bond issue for US$150 million in mid June 2006. The drop in reserves fanned rumours of devaluation and reportedly led to some speculative transactions by businessmen. At the end of 2006, the international reserves were around F$820 million sufficient to cover 3.3 months of imports (Reserve Bank of Fiji (RBF, 2007)).

In response to the slowly deteriorating situation since the mid 2005, the country's monetary authority, RBF raised its indicator interest rate from 1.75 to 2.25 per cent in October 2005, as a measure towards controlling the growth in credit. Against the relentless growth in domestic credit in the next six months, RBF resorted to drastic steps in 2006 towards tightening its monetary stance, which included two rounds of increase in interest rate by 1 percentage point each time, one in February 2006 and another in June 2006, and a rise in the statutory minimum reserve ratio from 5 to 7 per cent for commercial banks (RBF, 2006c). Before these measures could take full effect towards dampening the domestic demand, a military coup that took place on 5 December 2006, further aggravated the already fragile balance of payments position. Following the political events of 5 December 2006, RBF took pre-emptive measures on 6 December 2006, to safeguard the financial system and stem capital outflows. These included fresh curbs on credit, including a credit ceiling on commercial banks' lending activities, raising interest rates offered by RBF (2007) on lending facilities to commercial banks as well as further tightening of exchange control measures in regard to current and capital account transaction in the balance of payments.

There have been severable notable contributions on Fiji in recent years, which have greatly enriched the empirical literature. These include contributions by Narayan (2004), Narayan and Narayan (2003, 2004a, b, 2005, 2006, 2007, 2008a, b), Narayan and Prasad (2003a, b, 2006, 2007, 2008), Narayan *et al.* (2007a, b, 2006)), Narayan and Singh (2007a, b), Narayan and Smyth (2004) and Prasad *et al.* (2007). These and other studies dealt with Fiji's several aspects: fiscal policies (Narayan and Narayan, 2004a, 2006; Doessel and Valadkhani, 2003); monetary policies (Rao and Singh, 2006, 2005; Waqabaca and Morling, 1999); trade, balance of payments and exchange rate policies including effects of past devaluation on the economy (Singh, 2006; Narayan, 2006; Dulare, 2005; Narayan and Narayan, 2007; Narayan and Smyth, 2004, 2005; Reddy, 1997; Fontana, 1998; Jayaraman, 1993). However, there is no study available so far, exclusively devoted to exchange market pressure in Fiji. Although Fiji figured in a time series-cross sectional study by Bird and Mandilaras (2006), who utilised the panel data of 45 countries in Latin America and the Caribbean and East Asia and the Pacific regions, covering a 31-year period (1970-2000), the two authors did not discuss specifically the case of Fiji in any detail.

We are, therefore, motivated to undertake a study of EMP in Fiji with particular focus on its determinants. Since all the relevant data on various variables for 2006 are not yet available, we utilise the available data covering a 31-year period (1975-2005). The remainder of the paper is organised on the following lines: the second section reviews the trends in balance of payments and international reserves. The third section outlines the methodology adopted for the empirical analysis and reports results. The fourth and last section presents a summary, listing some conclusions of policy implications.

2. Fiji's balance of payments and international reserves

Since April 1975, Fiji has been following the fixed exchange regime under which the exchange rate of the Fiji dollar is linked to a basket of currencies of its five major trading-partners: Australia, Japan, New Zealand, the UK and the USA. From the beginning of 2000, the British pound was replaced by euro. The weights in the basket are based on a three-year moving average of Fiji's direction of trade, which are reassessed annually, but are not disclosed. On a daily basis, the exchange rate is determined in terms of buying and selling rates for US dollars and communicated to commercial banks.

The fixed rate regime seems to have served the economy well in terms of providing an anchor for inflation and inflationary expectations. Price stability, which is one of the two objectives of RBF's monetary policy, the other being maintenance of adequate foreign reserves, has been a notable achievement (Table I) during recent years (International Monetary Fund (IMF, 2002)).

Fiji's monetary authority has been making periodical adjustments to the exchange rate. The Fiji dollar was devalued twice in 1988, by a total of 34 per cent with a view to stemming the capital outflows consequent to the two military coups of 1987, which demoralised the private sector confidence in the economy. Another round of devaluation by 20 per cent was resorted to in 1998 as a preventive step to meet the eventualities arising out of the Asian financial and currency crises of October 1997. These two devaluations were defended on the grounds that they were resorted to as the required corrective measures for improving the competitiveness of the Fiji dollar.

Years	Annual growth (per cent)	Annual inflation (per cent)	Budget deficits (percentage of GDP)	Domestic credit (percentage of GDP)
1975-1984 (average)	2.6	9.0	5.8	27.7
1985-1994 (average)	1.9	6.1	5.3	45.4
1995-1999 (average)	3.1	3.3	5.5	47.4
2000	−1.7	3.0	6.6	44.2
2001	2	2.3	9.4	40.8
2002	3.2	1.6	8.7	41.2
2003	1	4.2	9.2	46.7
2004	5.3	3.3	6.9	48.4
2005	0.7	2.7	4.3	59.0

Table I.
Fiji: selected key indicators

Sources: ADB (2006) and IMF (2006)

Aside from these two major adjustments by way of substantial devaluation, RBF has not been effectively intervening in the market. It allows the exchange rate varying within the existing bound from +/− 0.07 per cent of the central rate. The IMF (2002) was reported to have advised RBF for widening the band to +/− 2 per cent. Exchange controls on capital movements, which came to be imposed during the post coup years of 1987-1990 and 2000-2001, were withdrawn, as soon as the conditions improved leaving the current account transactions in the balance of payments free. However, there still remained some quantitative restrictions on offshore portfolio and direct investments by the Fiji National Provident Fund and other resident nonbank financial institutions, companies and individuals as well as in regard to payments for certain items of procurement overseas. These were subject to case-by-case approval by RBF when in excess of specified threshold amounts in Fiji dollars. But, most of the transaction limits were rarely reached; and virtually all transactions were approved and processed within three days. As IMF (2004) noted in their more recent consultations with RBF under Article IV of the IMF Charter, main restrictions appear to be on capital transactions by residents.

The overall balance in Fiji's external accounts was fairly comfortable until 2005. The two devaluations in 1988 and the one in 1998 not only helped Fiji to ward off expectations of speculative attack on the currency but also contributed towards restoring competitiveness of the country's exports. Emergence of new exports in the efforts towards diversification, such as garments and spices, mineral water and other herbal-based consumer goods also helped the country to record positive overall balance until 1999. However, in the years soon after 2000, expansionary fiscal policy measures and credit expansion resulted in bulging trade and current account deficits. The situation was exacerbated by a continuous decline in traditional exports such as sugar and gold, besides the discontinuance in 2005 by the USA of its import quota of garments from Fiji. As against the annual growth rate of 3.5 per cent in exports during 1990-2005, exports during the five year period of 2001-2005, increased only at a mere 0.9 per cent per annum. The trade and current account deficits rose during the five-year period, simultaneously along with expanding fiscal deficits and increases in domestic credit to private sector. The trade and current account deficits as percentages of GDP reached the historically high figures at 27 per cent and 17 per cent of GDP in 2005 (Table II) (RBF, 2006a).

Years	Trade balance (percentage of GDP)	Current account (percentage of GDP)	BOP overall balance (percentage of GDP)	International reserves (F$ million)	International reserves (months of imports)	Exchange rate (US$/F$)
1975-1984 (average)	−6.7	−3.80	−1.3	120.7	6.2	0.90
1985-1994 (average)	−10.4	−6.64	2.1	325.1	6.1	1.39
1995-1999 (average)	−11.6	−0.15	2.1	728.7	6.4	1.64
2000	−10.9	−2.87	−0.9	1,039.0	7.1	2.13
2001	−10.8	−7.74	1.2	994.4	6.2	2.28
2002	−14.7	−0.14	2.3	902.1	6.1	2.19
2003	−23.4	−7.79	−1.0	943.6	5.7	1.90
2004	−18.5	−17.12	−2.2	1,045.6	5.0	1.73
2005	−27.2	−16.65	4.7	822.4	4.0	1.69

Sources: ADB (2006), IMF (2006) and RBF (2006a)

Table II.
Fiji: balance of payments and international reserves

The pressures on the international reserve position soon began to be felt as there was a steady decline in reserves in terms of months of import cover. From a comfortable position of 7.1 months of import cover in 2000, the international reserves declined to 5.7 months in 2003, 5.6 months in 2004 and 4.0 months in 2005. In May 2006, the international reserves reached the lowest ever figure of F$649 million, sufficient to cover only 2.8 months of imports. Falling exports and escalating import demand, despite rise in short-term interest rate by RBF gave rise to speculations of about the currency devaluation (Narayan, 2006; Narayan and Narayan, 2006). The next section undertakes a quantitative analysis of exchange market pressure.

3. Exchange market pressure: methodology

Exchange market pressure is studied against the background of a fixed exchange rate regime, under which monetary authorities intervene to maintain the rate at some desired level. Weymark (1993) refers to such a regime, as an intermediate system, under which interventions generate simultaneous changes in the exchange rate and foreign exchange reserves. In the fixed exchange rate system, money supply has two components, domestic credit and net foreign assets. Under the assumption that the authorities did not employ domestic credit changes to influence the exchange rate levels, Girton and Roper (1977) used the term exchange market pressure for referring to the magnitude of money market disequilibria that must be removed either through reserve or exchange rate changes. In such circumstances, exchange market pressure is the simple sum of the percentage changes in exchange rate and in foreign exchange reserves. Using a different model, which allowed intervention in terms of changes in domestic credit as well as changes in reserves, Roper and Turnovsky (1980) found that excess demand for money was equal to a linear combination of changes in exchange rate and in the monetary base.

Weymark (1995, p. 278) proposed a general definition of exchange market pressure as follows:

> Exchange market pressure measures the total excess demand for a currency in international markets as the exchange rate change that would have been required to remove the excess

demand in the absence of exchange market intervention, given the expectations generated by the exchange rate policy actually implemented.

The exchange market pressure, so defined, measures the size of the exchange rate change that would have occurred if the authorities refrain from intervening in the foreign exchange market. Weymark (1995) then proceeded to construct an open economy model under certain assumptions. These are:

- domestic price level is influenced by both the level of foreign prices and the exchange rate but purchasing power does not necessarily hold;
- domestic output and the foreign price level are exogenous;
- the domestic market is well developed and the domestic and foreign assets are perfect substitutes;
- domestic residents hold domestic currency for transaction purposes and speculative balances for foreign claims; and
- foreign and domestic interest rates are linked through an uncovered interest parity condition.

Weymark (1995) derived a summary statistic[1] for measuring exchange market pressure (EMP) in Canada, which fulfils the critical conditions, namely perfect capital mobility and substitutability of financial assets between Canada and USA and the industrialised world.

In the context of the undeveloped nature of financial sector in Fiji together with the situation that domestic and foreign assets are not freely traded substitutes and capital is not so mobile, the model employed by Weymark (1995) is not appropriate for Fiji's economy. Recognizing the need for a more realistic model, we utilise the EMP measure developed by Girton and Roper (1977) and then modified and applied by Eichengreen *et al.* (1996) and Bird and Mandilaras (2006).

We calculate EMP as follows:

$$\mathrm{EMP} = \alpha(d\log \mathrm{NEER}) + \beta\,(d\log \mathrm{IR}) - \gamma(d\log \mathrm{INTRES}) \tag{1}$$

where NEER, nominal effective exchange rate; IR, short-run interest rate (measured as treasury bill rate); and INTRES, international reserves.

According to Eichengreen *et al.* (1996), this framework is appropriate for those countries with intermediate exchange rate regimes, prone to speculative attack on the currencies[2]. Increase in the exchange rate (defined as units of domestic currency per unit of foreign currency), denoting depreciation of domestic currency, and increase in short-term interest rate and decrease in international reserves would lead to a rise in the value of EMP index.

In their study, Bird and Mandilaras (2006) suggested that the weights α, β and γ be calculated by the corresponding ratios of one over the standard deviation of each variable divided by the sum of all three ratios. For example, the weight for nominal effective exchange rate can be obtained as follows:

$$\alpha = \frac{1/\mathrm{SD}_{d\log \mathrm{NEER}}}{1/\mathrm{SD}_{d\log \mathrm{NEER}} + 1/\mathrm{SD}_{d\log \mathrm{IR}} + 1/\mathrm{SD}_{d\log \mathrm{INTRES}}} \tag{2}$$

where SD is the standard deviation.

This weighting scheme was developed to avoid the dominance of volatile variable in EMP calculation by assigning the more volatile variable with low weight and vice versa (Bird and Mandilaras, 2006).

4. Data and empirical findings

The data for the study are drawn from *International Financial Statistics* of IMF (2006) and *Global Development Finance 2006* published by the World Bank (2006), covering the 31-year period (1975-2005). They include foreign exchange reserves (in Fiji dollars), real GDP (in Fiji dollars), inflation (in per cent), nominal effective exchange rate (units of Fiji dollar per US dollar), budget deficit (as per cent of GDP), external debt (as per cent of GDP) and domestic credit (as per cent of GDP).

Table III presents the calculated EMP values from 1975 to 2005. As shown in Figure 1, EMP values exhibit a stable trend during 1975-1987, with pronounced volatility towards the end of 1980s and in the early 1990s. The substantial increases in EMP values are apparently due to speculative pressures exercised by political

Year	EMP
1975	−0.0388
1976	−0.0012
1977	0.0003
1978	0.0318
1979	0.1354
1980	0.0049
1981	0.0474
1982	0.0295
1983	0.0242
1984	0.0941
1985	−0.0048
1986	−0.0615
1987	0.2828
1988	−0.9075
1989	0.9187
1990	0.5701
1991	0.2018
1992	−0.3026
1993	−0.2152
1994	−0.0871
1995	0.1931
1996	−0.0592
1997	−0.1520
1998	−0.3320
1999	−0.0009
2000	1.0513
2001	−0.8316
2002	0.2866
2003	−1.0763
2004	7.9360
2005	0.5940

Note: The EMP values are calculated by authors

Table III.
Estimated values of EMP

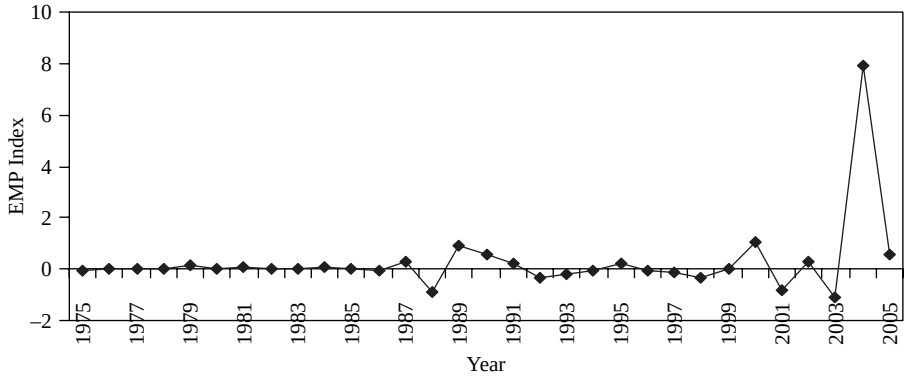

Figure 1.
The movement of EMP in Fiji: 1975-2005

uncertainty caused by the two military coups in mid 1987. Upward pressure, which was introduced in the foreign exchange market in 1987, continued to linger on until 1992. After 1992, the EMP values again became relatively stable with minor fluctuations until 1998. The EMP fluctuated up and down significantly after 1998, reaching its peak in 2004.

The factors influencing EMP in the developing economies are primarily macroeconomic in nature. These include fiscal deficits, external debt and private sector domestic credit. Fiscal deficits are financed through domestic borrowing as well as external borrowing. Disadvantages of domestic borrowing for deficit financing are obvious: it would crowd out private investment by raising interest rates. On the other hand, external borrowing has no such impact in the short run, as it brings in real resources from overseas and adds to money supply. Though the choice is left to the governments, borrowing in overseas commercial markets depends upon the international rating status. Further, external debt servicing involves interest and instalment payments in foreign exchange, which requires the projects funded by external debt should not only generate sufficient revenues in local currency, but also adequate incremental foreign exchange for debt servicing in the future. Insufficient foreign exchange would contribute to build up of balance of payment difficulties eventually exercising pressures on exchange rate.

Fiji's budget deficits in recent years were financed through public borrowing. This was in accordance with a deliberate policy decision taken in the late 1980s, as part of the 1987 post-coup economic action agenda, to reduce external debt. The government began to retire most of the outstanding debt payment due to both World Bank and Asian Development Bank[3] well before their due dates of maturity (Jayaraman and Ratnayake, 1996). Further, it was decided to limit external borrowing to fund only revenue generating physical infrastructure projects. The result was that the outstanding total external debt stock, which consisted of both government and private sector, was reduced from 44 per cent of GDP in 1988 to below 10 per cent of GDP in the second half of the 1990s. Since 2004, the total external debt stock has been hovering around 8 per cent of GDP (Table IV).

Consequently, deficit financing in subsequent years came to be accomplished mainly through domestic public borrowing until 2005. Owing to the prevailing poor private investment climate in 2000-2004 and the resultant excess liquidity conditions, the government found that domestic borrowing was easy and convenient without

Year	Country's external debt (as percentage of GDP)	Government external debt (as percentage of GDP)	Government external debt (as percentage of total government debt)
1975-1984 (average)	22.7	20.2	NA
1985-1994 (average)	29.2	27.1	NA
1995	12.8	7.1	13.4
1996	10.4	6.4	12.1
1997	10.5	6.6	11.3
1998	12.1	7.5	18.8
1999	9.1	5.3	14.1
2000	8.4	5.8	14.1
2001	7.3	5.3	11.9
2002	8.1	5.0	10.3
2003	9.4	4.1	8.0
2004	8.1	5.7	7.3
2005	8.1	3.6	6.8

Sources: World Bank (2006) and RBF (2006a, b)

Table IV.
Fiji's external debt

exercising any upward pressure on interest rates. The Fiji National Provident Fund, which is statutorily empowered to collect monthly contributions at stipulated percentages of wages and salaries from the employees and employers in the formal sector of the country's economy, has been the major institution, funding the fiscal deficits to the extent of 70 per cent. In October 2006, the government decided to tap the overseas markets. Encouraged by the country international rating Ba2 by Moodys and BB by Standard and Poors (RBF, 2006b), the government floated a bond issue for US$150 million, which was oversubscribed within a few days (RBF, 2006b). External borrowing by the government was defended on the grounds of further requirements of funds for investing in new capital projects and the need for diversifying sources of financing, as it was feared that continuous tapping of the domestic market was likely to crowd out private investment.

In addition to budget deficits, credit expansion, and external debt, we have to consider one more factor while investigating the causes behind pressures on exchange rate. This is with regard to political stability. Episodes of high values in EMP, especially in 1987, which witnessed the first ever-military coup and in the post coup years of 1987-1992, and again in 2000 were due to political conditions. Although the economic recovery has been brought about by expansionary fiscal policies to compensate the fall in private investment, the contemplated controversial measures, including the bill for amnesty to the perpetrators of the year 2000 coup and other related steps, continues to contribute to the lingering political uncertainty. It is, therefore, hypothesised that EMP is positively associated with domestic credit to private sector, budget deficit, external debt and political uncertainty. Accordingly, we write the relationship as follows:

$$\mathrm{EMP} = f(\mathrm{DCGDP}, \mathrm{BUDDEF}, \mathrm{EXTDEBT}, \mathrm{UNCINDEX}) \tag{3}$$

where DCGDP, domestic credit to private sector as percentage of GDP; BUDDEF, budget deficit as percentage of GDP; EXTDEBT, external debt as percentage of GDP; UNCINDEX, uncertainty index[4].

For investigating any possible existence of long-term relationships amongst EMP, DCGP, BUDDEF, EXTDEBT and UNCINDEX, we apply the autoregressive distributed lag (ARDL) bounds testing procedure proposed by Pesaran *et al.* (2001). The bounds testing procedure has several advantages to its credit, as compared to the Johansen and Juselius multivariate cointegration test. These are:

- it allows testing for the existence of a cointegrating relationship between variables in levels irrespective of whether the underlying regressors are *I*(0) or *I*(1);
- it is considered more appropriate than the Johansen-Juselius multivariate approach for testing the long run relationship amongst variables when the data are of a small sample size (Pesaran *et al.*, 2001); and
- ARDL covers both the long-run and short-run relationships of the variables tested.

For these reasons, this technique has been widely applied on the various issues in the Fijian economy. For example, Narayan and Narayan (2004a, b, 2005), Narayan and Smyth (2005), Narayan *et al.* (2006) and Gounder *et al.* (2007).

To test the determinants of EMP, the following unrestricted error correction model (UECM) of the ARDL model is estimated:

$$\begin{aligned}\Delta \mathrm{EMP}_t = {} & \beta_1 \mathrm{EMP}_{t-1} + \beta_2 \mathrm{DCGDP}_{t-1} + \beta_3 \mathrm{BUDDEF}_{t-1} + \beta_4 \mathrm{EXTDEBT}_{t-1} \\ & + \beta_5 \mathrm{UNCINDEX}_{t-1} + \sum_{i=1}^{n1} \beta_6 \Delta \mathrm{EMP}_{t-i} + \sum_{i=0}^{n2} \beta_7 \Delta \mathrm{DCGDP}_{t-i} \\ & + \sum_{i=0}^{n3} \beta_8 \Delta \mathrm{BUDDEF}_{t-i} + \sum_{i=0}^{n3} \beta_9 \Delta \mathrm{EXTDEBT}_{t-i} \\ & + \sum_{i=0}^{n4} \beta_{10} \Delta \mathit{UNCINDEX}_{t-i} + \varepsilon_t \end{aligned} \tag{4}$$

where ε_t is the disturbance term. The null hypothesis of testing the long-run relationship of this model is $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$, and the alternative hypothesis is at least one $\beta_j \quad (j = 1, 2, 3, 4, 5)$ does not equal to zero. If the computed *F*-statistic of ARDL bound testing is higher than the upper bound value, we reject the null hypothesis and conclude that there is a long-run equilibrium relationship among variables. In contrast, if the *F*-statistic is lower than the lower bound value, we cannot reject the null of no long-run equilibrium relationship among variables. However, if the *F*-statistic lies within the upper bound value and lower bound value, then the results are inconclusive.

Table V indicates the estimated results of the ARDL-UECM model based on equation (4). Since the calculated *F*-statistic (54.99) for the equation with EMP as dependent variable is greater than the critical values provided by Pesaran *et al.* (2001) and Narayan (2005) at 1 per cent significance level, we conclude that there is a long run relationship between EMP, and domestic credit, budget deficit, external debt and UNCINDEX. Since the F-statistic for each of the remaining equations is below the upper bound value, we conclude that there is only one cointegrating equation.

Dependent variable	*Computed F-statistic*			
EMP	54.99*			
DCGDP	2.49			
BUDDEF	2.99			
EXTDEBT	1.69			
	Pesaran et al. (2001)[a]		*Narayan (2005)*[b]	
Critical value (per cent)	*Lower bound value*	*Upper bound value*	*Lower bound value*	*Upper bound value*
1	3.41	4.68	4.54	6.37
5	2.62	3.79	3.13	4.44
10	2.26	3.35	2.58	3.86

Notes: *Indicates significance at 1 per cent level. [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

Table V. Bound test for cointegration analysis

The long run equation is given as follows:

$$\mathrm{EMP} = \underset{(-6.47)}{-12.98} + \underset{(4.88)}{1.96}\mathrm{DCGDP}^{***} + \underset{(2.74)}{9.37}\mathrm{BUDDEF}^{***} + \underset{(3.20)}{0.02}\mathrm{EXTDEBT}^{***} + \underset{(2.26)}{0.58}\mathrm{UNCINDEX}^{*} \quad (5)$$

Note: *, ** and *** indicate significance at 10, 5 and 1 per cent levels. Figures in parentheses are calculated "t" values. The goodness of fit of the estimated model is reflected in the high adjusted *R*-squared (0.9794). Further, the diagnostic tests including Jarque-Bera normality test, Breusch-Godfrey Serial Correlation LM Test, ARCH Test and Ramsey's misspecification test show that the estimated equation (5) is acceptable (Table VI). Tests on the stability of the model in terms of CUSUM test and CUSUM of square test (Figures 2 and 3) confirm that the model is stable over the sample period.

In equation (5), it is found that the signs of the explanatory variables are in accordance with theoretical expectations, confirming their hypothesised positive association with EMP. Further, the estimated coefficients are found statistically significant. In the estimated equation (5) we observe that budget deficit has the greatest impact, when judged in terms of the magnitude of its coefficient (9.37) on EMP, followed by domestic credit to private sector, political instability and external debt with magnitudes of 1.96, 0.58 and 0.02, respectively. The findings are in line with our early discussion that a rise in

Diagnostic test	Null hypothesis	Equation (5)
Jarque-Bera test	H_0. Normality of error term	$\chi^2 = 4.1364$ [0.1264]
Breusch-Godfrey serial correlation LM test	H_0. No autocorrelation	$F(1) = 4.3331$ [0.1058]
ARCH test	H_0. Homoskedasticity	$F(1) = 1.0514$ [0.3158]
Ramsey RESET test	H_0. The model is correctly specified	$F(1) = 2.1232$ [0.2188]

Notes: Figures in square parentheses are probability values of the test statistics. Figures in parentheses are the lag lengths used for the appropriate diagnostic tests

Table VI. Diagnostic tests for equation (5)

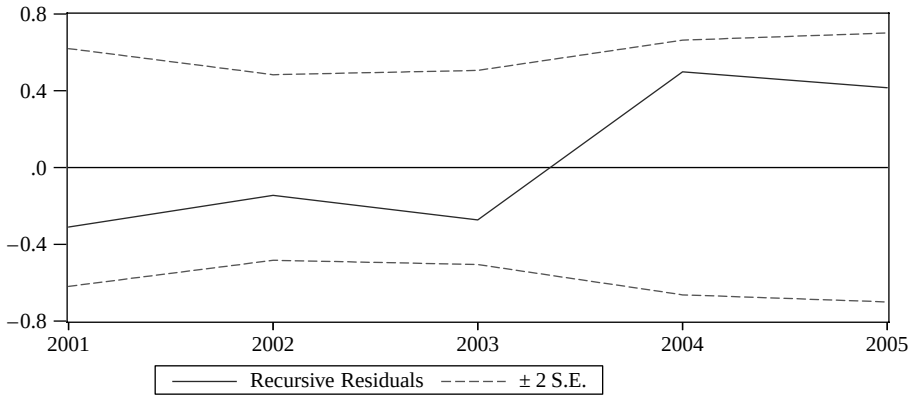

Figure 2.
Plot of CUSUM test

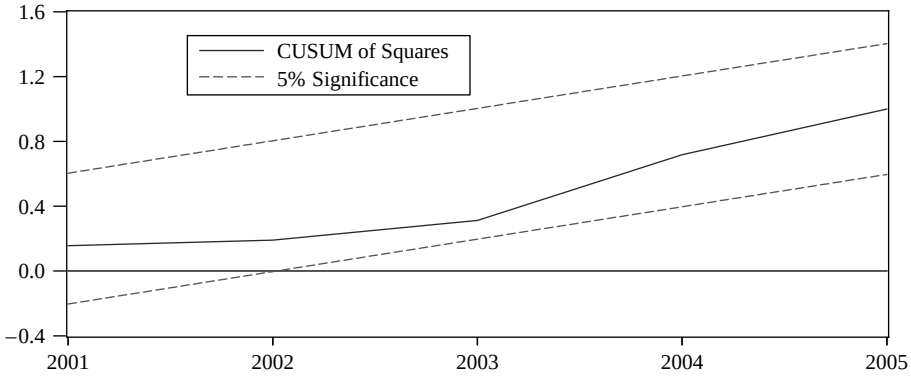

Figure 3.
Plot of CUSUM of squares test

budget deficit and external debt resulting from an increase in government spending would lead to decline in foreign exchange reserves. Inadequate foreign exchange reserves would contribute to the build up of balance of payment difficulties, which may ultimately exert pressures on exchange rate, causing an increase in capital outflows, resulting in the intervention of the monetary authority with a view to protecting international reserves and maintaining exchange rate stability.

The confirmation of existence of a long run relationship between EMP with its macroeconomic determinants in equation (5) leads us to infer that there must be Granger causality at least in one direction. In order to examine the short-run causality relationship between these variables, Granger causality tests are conducted and reported in Table VII. The results indicate that the error correction term with the required negative sign is significant in EMP equation at 5 per cent in Table VII. The ECT term is not significant in any other equation. Adjustment towards the long run equilibrium is 94.68 per cent suggesting that any deviation from the long run equilibrium is corrected substantially in the following year. These findings establish the presence of a long-run relationship between EMP, domestic credit, budget deficit, external debt and UNCINDEX. The results also show the existence of bi-directional causality between EMP and external debt.

Dependent variable	*F*-statistic ΔEMP	ΔDCGDP	ΔBUDDEF	ΔEXTDEBT	ΔUNCINDEX	ECT (*t*-statistics)
ΔEMP	–	1.48	3.04*	3.48*	0.60	−0.9468** (−2.23)
ΔDCGDP	0.81	–	0.41	1.24	0.71	−0.0198 (−1.02)
ΔBUDDEF	1.10	1.29	–	1.42	1.08	−0.0042 (−0.32)
ΔEXTDEBT	3.57*	3.36*	1.73	–	12.57***	−0.2976 (−1.18)

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

Table VII.
Granger causality tests

5. Conclusions and policy recommendations

This paper undertook an empirical investigation of the causes behind exchange market pressures experienced by Fiji during a 31-year period (1975-2005). Utilizing the calculation procedure appropriate for a fixed exchange rate regime, annual pressures on exchange rate were estimated. Econometric analysis, employing the ARDL bounds testing procedure, established that exchange market pressures were directly influenced by budget deficit, domestic credit to private sector and external debt as well uncertain political conditions.

The policy implications are straightforward. Mounting pressures on exchange rate, if left uncontrolled under a fixed exchange rate regime, would only fan fears of devaluation, giving rise to speculative attacks on the currency. Devaluation of the currency would then be a self-fulfilling prophecy. The government should, therefore, do well to take appropriate timely steps to rein in public sector expenditures and control growth in domestic credit.

In the current context of persistent twin deficits, the standard remedy is fiscal adjustment (Daniel *et al.*, 2006), which is expected to facilitate external adjustment as well. Giving a broader definition, Daniel *et al.* (2006) clarified that fiscal adjustment would mean change in fiscal stance, either tightening or loosening, as the situation would warrant. The term, fiscal adjustment with reference to twin deficits, has a direct connotation: it would imply reducing government budget deficit and debt accumulation. The fiscal adjustment measures include:

- effective expenditure control and budget-monitoring;
- efficient revenue system;
- improved measures for responding to frequently variable non-tax revenue receipts and volatile aid inflows;
- re-directing aid moneys into capacity building investments by streamlining civil service and reducing recurrent expenditures;
- careful debt-management; and
- 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.

Reducing government spending, as a remedy to reduce annual fiscal imbalances and accumulation of debt, is not found as easy as expansionary spending. This was borne

by public reactions in March 2007 to the initiatives announced by the interim government in Fiji with a view to put an end to the six-year (2001-2006) non-stop expansionary fiscal spending. These fiscal consolidation measures, which were indicated in the interim government's revised budget for 2007, included reduction in the operating expenditures through trimming the number of ministries and departments from 36 to 16, by cuts in wages and salaries of civil servants by 5 per cent across the board and by downsizing the civil service size through lowering the retirement age limit from 60 to 55 and freezing the vacant positions. Public reaction was that reduction in government spending would lead to recession. It was argued that if government applied brakes on public spending, even in pursuit of a well-intentioned attempt to balance the budget, the fall in aggregate demand would lead to unemployment and there would be an economic slow down.

Recent empirical investigations of fiscal consolidation experiences in industrial countries (McDermott and Westcot, 1996a) have shown that fears of a slowdown in the short-run would be offset by gains in the long run. The non-Keynesian economic literature based on neoclassical models (IMF, 1996; Alesina and Perrotti, 1995) argued that sustained fiscal adjustment in terms of budget and debt reduction would result in lower interest rates, exchange rate depreciation and give rise to "positive expectational effects" that would even swamp the traditional undesirable effects of fiscal contraction such as unemployment and recession (McDermott and Westcot, 1996b).

The argument in favour of reduced government spending runs on the following lines:

- a smaller budget would reduce the perceived risk that a government might depreciate its debt through high inflation in the future (paying off debt with cheaper money);
- a reduction in the perceived risk would then lead to fall in interest rates; and
- this will be followed by reduction in default risk premium interest rates, as budget reduction would improve the image of government in terms of its solvency.

It is further argued that compression of public expenditure especially through reduced public salaries and wages, would also have an impact on private salaries and wages as well and hence would raise profitability and competitiveness, thus stimulating investment and exports (IMF, 2001; Alesina *et al.*, 1998); and that budget reduction would send out signals to households and businesses alike that future tax burdens would be lowered, as debt financing by government would fall and consequently households would increase their consumptions and businesses would increase their investment spending and the eventual outcome would be an increase in output.

There are no studies on impact of fiscal adjustment in the Pacific Island countries, comparable to the studies conducted by McDermott and Westcot (1996a). The apparent reason is that such fiscal adjustment measures were never implemented in the Pacific region on a sustained scale as has been done in industrial countries. An important study by Gupta *et al.* (2004) on the persistence of fiscal adjustments in 29 developing countries in different regions (which did not include the Pacific region) under the IMF supported programmes in the 1990s show that:

- persistence of fiscal adjustment is positively determined by certain factors[5], which include reallocation of recurrent expenditures to productive capital projects; and
- negatively influenced by large outlays of wages and salaries.

Fiji's fiscal consolidation in the past was not persistent. It was only patchy. Tightening of public expenditure had been achieved, for example soon after the 1987 coups, by cuts in wage and salary bill and freeze on civil service numbers and their salaries. Once the tightening proved unpopular, it was reversed after some time (D'Hoore, 2006). If consolidation episodes are short-lived, progress could not be sustained and fiscal adjustment efforts would end in failure, without any lasting impacts (Gupta *et al.*, 2004).

Turning to the monetary aspects, we should acknowledge that Fiji's monetary authorities have done well in ensuring the stability of the internal and external value of its currency. Fiji's price stability has been facilitated by the wise policy of pegging its exchange rate to the basket of currencies of its major trading partners, whose central banks have been targeting inflation. Fiji cannot afford to lose the gains of a fixed regime enjoyed over the past decade, all of a sudden, by unwise policies amounting to fiscal indiscipline and lack of attention to maintenance of political stability.

Notes

1. $EMP_t = \Delta e_t + \eta \Delta r_t$, where EMP, exchange market pressure; e, log of exchange rate (units of domestic currency per one unit of foreign currency; $\eta = -[(a_2 + b_2)]^{-1}$, a_2 being the coefficient of e in the estimated regression equation for log of domestic price level as dependent variable, the other independent variable being the log of foreign price level and b_2 being the coefficient of interest rate in the estimated regression equation with log of money demand as the dependent variable, the other independent variables being log of domestic price level and log of real output.; and $\Delta r_t = [h_t R_t - h_{t-1} R_{t-1}]/M_{t-1}$, where h_t is the money multiplier in period t, M_{t-1} is the inherited money stock in period t, and R_t is the stock of foreign exchange reserves in period t.
2. We choose to use the Eichengreen *et al.* (1996) and Bird and Mandilaras (2006) measure of exchange market pressure, because as in Girton and Roper (1977) and Tanner (2001), the weights applied to the variables in equation (1) are model-specific. Indeed, Tanner (2001, p. 315) reveals that this is acceptable if, as here, a standard monetary model is used.
3. Fiji, with a per capita income higher than the stipulated threshold per capita income level, is not eligible to borrow on concessional terms (which generally comprise easy terms such as low rate of interest at 1 per cent, known as service charge and a long period of maturity of about 30-40 years) from the international funding agencies. Such loans on concessional terms involve more than 25 per cent grant element, falling under the description of overseas development assistance or foreign aid. Incidentally Fiji receives the least foreign aid among all Pacific Island countries, which is less than 4 per cent of GDP (Jayaraman and Choong, 2006c).
4. For UNCINDEX, we employed the probit estimation procedure to calculate the estimated frequencies of the probability of a change in and of government. We formed a (0-1) dummy variable for political changes as a starting point for the estimation of a probit model that enabled the calculation of the probabilities. The variables that explained the variations in UNCINDEX are real GDP and inflation. The detail of the calculations is shown in the Appendix.
5. These are: reallocation of recurrent expenditures to capital outlays is positively related to the persistence of fiscal adjustment; large levels of wages and salaries, transfers and subsidies

increases the probability of ending a fiscal adjustment; for each 1 percentage point of GDP increase in cumulative fiscal adjustment, the probability of ending the fiscal consolidation episodes falls by 4 per cent; the countries with larger cumulative reductions in the deficit are likely to abandon their adjustment efforts than others; and countries, which start the consolidation process with high-budget deficits, are more likely to end it prematurely.

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Appendix. Note on estimation procedure for calculating political UNCINDEX

For calculating the political UNCINDEX, we take into account the probability of unexpected changes in government on the basis of such unanticipated happenings in the past. The latter included two military coups of 1987 and a similar coup, this time of civilian nature in 2000, both them resulting in the overthrow of elected governments within a matter of few days of assumption of office.

We employed a probit model for calculating the estimated frequencies of the probability of a change in and of government. First, we formed a (0-1) dummy variable for political changes as dependent variable (POLUNC), which assumed the value of unity in the year when there was a change in government and zero for other years when there was no such abrupt and unanticipated change. Second, we used two explanatory variables to explain the changes in POLUNC, namely real GDP (RGDP) and inflation (INF).

A positive change in overall economic performance (real GDP) would give rise to people's general satisfaction with government's macroeconomic policy and good governance, whereas inflation would give rise to feelings of dissatisfaction with the government performance. It is hypothesized that higher the RGDP (inflation rate), the greater (lesser) is the satisfaction with the government's ability to govern politically as well as move the country towards growth and prosperity.

For estimating political UNCINDEX, we estimate a probit model with POLUNC as dependent variable and the selected macroeconomic variables as explanatory variables. The data on RGDP and inflation are taken from *International Financial Statistics* database of IMF (2006).

The results of the probit model for estimation of the probability of government change due to economic performance are given below:

$$\mathrm{DUMPOL}_t = \Phi\left(\underset{(3.04)}{0.0006\mathrm{RGDP}_t^{***}} - \underset{(-2.88)}{21.4041\mathrm{INF}_t^{***}}\right)$$

***Indicates significance at 1 per cent level. Figures in parentheses representing calculated "*Z*" values.

The signs of the explanatory variables are consistent with a priori assumptions and significant at 1 per cent significance level. The estimated frequencies of the probability of a government change, or UNCINDEX are presented in Table AI.

Table AI.
Political UNCINDEX in Fiji: 1975-2005

Year	UNCINDEX
1975	0.05748
1976	0.04483
1977	0.02995
1978	0.02956
1979	0.52103
1980	0.61954
1981	0.28266
1982	0.26323
1983	0.06581
1984	0.28115
1985	0.17376
1986	0.77744
1987	0.45425
1988	0.26154
1989	0.36284
1990	0.60688
1991	0.41263
1992	0.78974
1993	0.89954
1994	0.9832
1995	0.99158
1996	0.99958
1997	0.99812
1998	0.99932
1999	1.00000
2000	1.00000
2001	1.00000
2002	1.00000
2003	1.00000
2004	1.00000
2005	1.00000