FIJI NATIONAL UNIVERSITY

College of Business, Hospitality &Tourism Studies

Working Paper Series

No. 02/13

Title

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Date: April 2013

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This paper presents work in progress in the College of Business, Hospitality and Tourism Studies, FNU. Comments are welcomed from all stakeholders and should be addressed to the corresponding author.

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Abstract

Ever since the two coups in 1987, Fiji's domestic investment climate has continued to remain uncertain. Aside from the lingering effects of these two coups, their re-occurrences of coups in 2000 and 2006 resulted in further setbacks. Against this background, government has been pushing hard to promote public expenditure not only to make up for the deficiency caused by private investment but also for promoting growth enhancing public infrastructure investment in the face of stagnant revenues. This paper looks at the relationship between the resultant budget deficits and private investment in a multivariate framework. The study findings are that budget deficits as such did not support private investment. The paper indicates the need for further research in regard to components of public expenditure.

Keywords: Fiscal policy, Investment, Economic growth, Cointegration, VECM.

I. Introduction

Growing concerns with poor economic performance by Pacific island countries (PICs) in recent years and inadequate response to the adverse impact of the world economic recession since 2008 following the financial crisis in the United States have provoked criticism about PICs' budgetary policies. Due to stagnant public revenue position and increase in annual recurrent expenditures, budget deficits have become annual occurrences (UN ESCAP 2012, Asian Development Bank 2012).

This study takes a closer look at the relationship between public spending and private investment. According to the neoclassical theory, a prolonged period of annual budget deficits arising out of annual government spending exceeding revenues would adversely affect incentives for private sector to save and invest, and as a result, budget deficits crowd out private investment, thereby affecting economic growth (Bernheim 1989, Bahmani-Oskooee 1999). On the other hand, the Keynesian economists argue that when private sector is weak and when in times of poor business sentiment, expansionary public spending with budget deficits would raise general optimism, thereby encouraging private investment, known as "crowd-in effect".

For the testing the hypothesis, whether or not budget deficits have crowded out private investment in PICs, this paper undertakes an empirical study of Fiji. The choice of Fiji among the 14 PICs is influenced by the availability of a longer and consistent time series of data on investment, budget deficits and national accounts for a thirty year period (1982-2011) for a meaningful econometric analysis.

Fiji's case is unique among all PICs. Although a leader among the PICs in terms of a more significant manufacturing capability with skilled labor force and entrepreneurial skills and a resultant diversified range of exports, its political instability caused by two coups in 1987 and their haunting effects during the next two decades has introduced an ever present element of uncertainty in private sector investment decision making. The paper takes into account the uncertain investment climate as well

This paper is organized on the following lines: the second section attempts a brief review of empirical studies; the third section gives an overview of investment trends and budgetary policies in Fiji and economic growth; the fourth section outlines the modeling and methodology; the fifth section presents the results; and the last section presents conclusions with policy implications.

II. Brief review of Empirical Literature

The neoclassical theoretical stand that budget deficits would only have adverse effects on private investment had been tested from time to time. The findings of empirical studies are not unanimous. While Ram (1986) found government activities have had positive impact on economic performance in number of countries and Bahmani-Oskooee (1999) and Ang (2009) concluded that public investment stimulated private investment in the long run, Mitra (2006) and Ghali (1998) reached a contrary finding. The finding was that government investment had a crowding out effect on private investment. Since the findings of these

studies were inconclusive, empirical studies undertaken from time to time and in different regions on the impact of budget deficits on private sector continue to retain their attention from academic researchers.

Government expenditure on infrastructure in developing countries may be more valuable than in the developed countries. Returns from infrastructure in developing countries are expected to be higher than the corresponding ones in developed countries, as there are greater positive externalities flowing from such investments. Examples in this regard include new roads in the rural areas, linking marketing centers or jetties or harbors. It is generally assumed that public investment in infrastructure; education and health belong to this category (Aschauer 1989; Kneller et al. 1999). In these cases, public investment is said to crowd-in private investment.

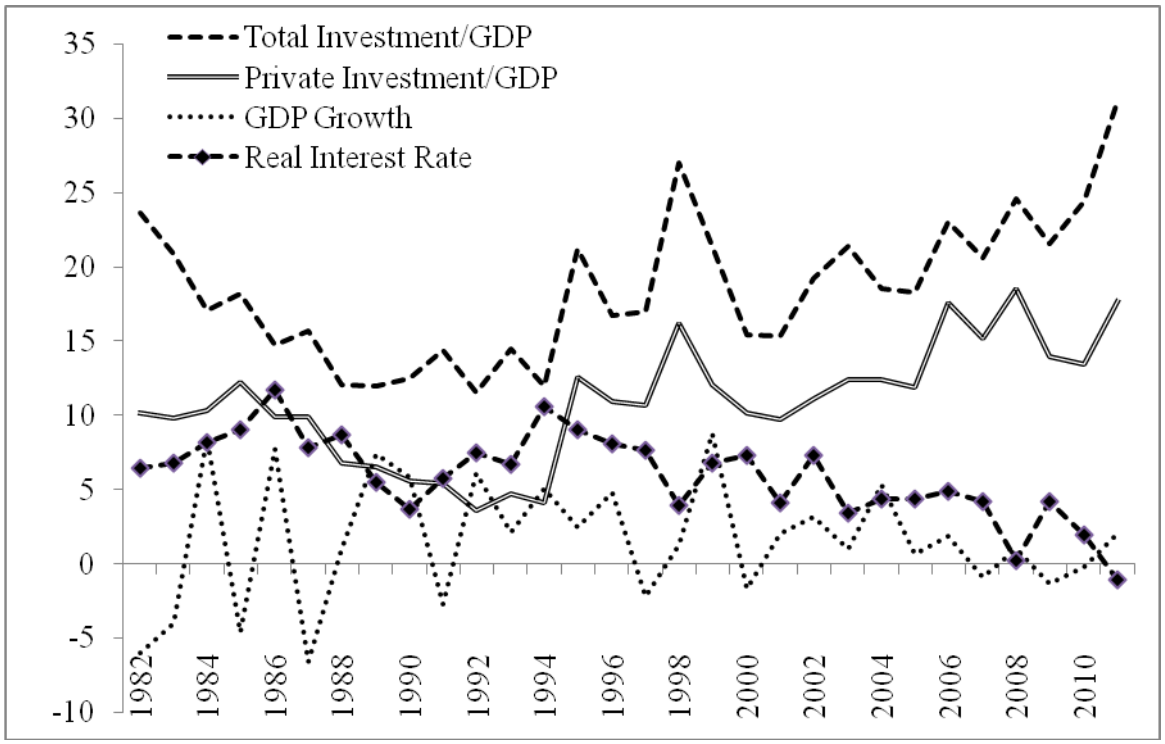
If resources are scarce, public investment may reduce pool of resources available to the private sector and in turn decrease credit flows to private sector (Ramirez 1996). In such cases, public investment is said to crowd-out private investment opportunities (Buiter 1977). The user cost of capital is an important factor in any investment decision by the private sector. Expansionary monetary policies through increase in money supply would encourage private investment. If inflation is kept under control, and fall in nominal interest rate would lead to fall in real interest rate and encourage investment.

While government investment expenditures are supportive in general to economic activities in developing countries, expenditures on operating the harbors or maintenance of roads would amount to consumption. So it is essential to distinguish between pure investment and consumption expenditures. However for developing countries, due to paucity of data on government finances, disaggregated expenditures into various components are not available on a consistent basis to arrive at reliable time series.

III. An Overview

Fiji's economic growth in first decade of independence (1970-1980), though impressive, was marred by frequent occurrence of cyclones. It was on average better than what was experienced in the next two decades, especially after 1987 (Figure 1). The first set of two coups, which occurred in 1987, introduced uncertainties in investment climate ever since then. Economic growth during the first decade of independence was accompanied by relatively high rate of investment, ranging from 15 percent to more than 25 percent of GDP (Figure 1). The data for the earlier years of independence on government finances were scanty and no consistent time series data on budget revenues and expenditures were available. Hence our study focuses is confined to next three decades (1982-2011).

Figure 1: Annual GDP Growth Rate, Private Investment-to-GDP, Total Investment-to-GDP, and Real Interest Rate (percent)



Source: Fiji Islands Bureau of Statistics and Reserve Bank of Fiji

The annual average growth rate during 1980-1989 was 0.8 percent. It rose to 3 percent on average rate during 1990-1999 but declined on average in 2000s and previous last years as well. As indicated earlier, the economic growth rates have been less than 1percent during 2005-2010. The total investment, as a proportion of GDP, has generally been fluctuating since 1982 from peak of 23.6 percent (public investment: 13.4 percent and private investment 10.2 percent).

Table 1: Fiji: Real GDP Growth rates and Investment: 1980-2011

Year	Annual GDP Growth Rate (percent)	Total Investment (percent of GDP)	Private Investment (percent of GDP)
1980-1989 (Ave)	0.76	18.63	10.16
1990-1999 (Ave)	3.16	16.82	8.59
2000-2004 (Ave)	1.96	17.96	11.16
2005-2009 (Ave)	0.29	21.62	15.44
2010	-0.18	24.40	13.40
2011	2.02	31.18	17.70

Source: Fiji Island Bureau of Statistics and Reserve bank of Fiji

Figure 1 also exhibits a reverse relationship between private investment as percent of GDP and real interest rate in percent. A decrease in the real interest rate which reduces the real

borrowing cost should increase investment spending. The real interest rate has generally been declining from the peak of 11 percent in 1986 to lowest 3.7 percent in 1990, which was a result of increasing inflation rate that Fiji witnessed during that period. During 1991-1994 the real interest rate rose to 7 percent on average. Since 2008, real interest rate has been declining due to expansionary monetary policy in tandem with fiscal policy for fighting recessionary impact of global economic downturn.

IV. Data, Modeling and Methodology

The paper uses the data series, which relate to a thirty-year period (1982-2011), assembled from different sources. While investment data series are drawn from the Fiji Islands Bureau of Statistics (2012), national income data series are obtained from the *World Bank Development Indicators* (World Bank 2013). The budget balance data are sourced from Asian Development Bank (2012) and interest rate, inflation and real exchange rate from International Monetary Fund (2012).

Table 2 presents descriptive statistics of variables employed in the study.

Table 2. Summary Statistics of Time Series

Period	Real Private Investment (Million FJ$)	Real GDP (Million FJ$)	Real Budget Deficit (Million FJ$)	Real Interest Rate (%)	Real Effective Exchange Rate (index, 2005=100)
1982-1986 (Ave)	330.83	3158.77	187.32	8.45	148.42
1987-1991(Ave)	226.04	3339.35	146.86	6.28	104.02
1992-1996 (Ave)	289.65	3948.41	114.57	8.39	105.97
1997-2001 (Ave)	517.99	4415.60	180.25	5.95	95.44
2002-2006 (Ave)	652.82	4970.86	197.31	4.87	97.33
2007-2011 (Ave)	813.07	5154.27	136.62	1.90	94.29
1982-2011 (Ave)	471.73	4164.54	160.49	5.97	107.58
1982-2011(standard deviation)	239.39	786.28	70.32	2.85	19.81
1982-2011 (maximum)	959.69	5215.55	319.90	11.70	153.46
1982-2011 (minimum)	132.90	2995.15	10.03	-1.05	87.88

Source: As stated in the text.

Model

It is hypothesized real private investment (RPI), as a dependent variable is positively influenced by general buoyancy of the economy. That is, when the economy is on an expansionary path with all round optimism in the economy about the future, private sector investment is also on the rise. Accordingly, we include the variable real GDP (RGDP). To test the relationship between RPI and budget balance, we include budget deficits in real terms (BD) as a variable. A priori we cannot say what would be the sign of budget deficit. If the sign of the coefficient emerges to be positive we could confirm the direct relationship on the lines of the "crowd-in" effect; and if the sign happens to be negative, we can confirm an indirect relationship between budget deficit and private investment.

Besides the two variables of RGDP and BD, we include real interest rate in percent (average lending rate minus inflation) and real exchange rate. The relationship between private investment and real interest is obvious and the sign of real interest rate is expected to be negative. In the case of real exchange rate, the sign of the variable could be either: if the sign is negative, it would indicate a decline in REER means greater competiveness of Fiji's exports of goods and services including tourism; and hence a lower REER would lead to higher investment in foreign exchange earning activities. If the sign of REER is positive, appreciation of the exchange rate would lead to investment in import substitution activities. The model is written as follows:

(1)

$$\ln RPI_t = \beta_0 + \beta_1 \ln RGDP_t + \beta_2 \ln RBD_t + \beta_3 RI_t + \beta_4 \ln REER_t + \beta_5 \ln REER_t + \beta_6 Coup_t + \beta_7 StrBr_t + \varepsilon_t$$

Where:

RPI = real private investment at constant 2005 prices (million FJ$);
RGDP = real gross domestic product at constant 2005 prices (million FJ$);
RBD = real budget deficit at constant 2005 prices (million FJ$);
RI = real interest rate (percent);
REER = real effective exchange rate (index);
Coup = dummy variable to capture lingering effects brought by military coups. *Coup* = 1 for years 1987~1994, 2000~2001 and 2007, *Coup* = 0 for the other years.
StrBr = dummy variable to capture the effects of structural breaks, which are observed from estimated errors and based on Wald tests on parameter restrictions. *StrBr* = 1 for years when structural breaks are observed, *StrBr* = 0 for the other years.

The hypotheses to be tested are: (i) ln*RGDP* and ln*RPI* are directly associated; hence sign of the estimated coefficient ln*RGDP* should be positive; (ii) ln*RBD* and ln*RPI,* could be either positively or negatively associated; hence sign of ln*RBD* can be positive or negative; (iii) ln*RI* and ln*RPI* are inversely related; hence sign of ln*RI* should be negative; (iv) ln*REER* and ln*RPI* are either positively or negatively associated; hence sign of the estimated coefficient ln*REER* could be either be positive or negative; and (v) *StrBr* and *Coup* are both inversely related to ln*RPI* related; hence signs of *StrBr* and *Coup* should be negative.

Unit Root Test and Engle-Granger Cointegration Test
Before undertaking the econometric analysis, the first critical step is to verify the order of integration of each of the data time series. We resort to augmented Dickey-Fuller (ADF) tests for checking the presence of unit roots using the following equation:

$$\Delta V_t = \alpha + \delta T + \rho V_{t-1} + \sum_{i=1}^{m} \vartheta_i \Delta V_{t-i} + u_t$$

(2)

Where Δ is the first difference operator, *V* is individual series, and *T* is time trend. Inclusion of intercept and/or time trend is based on the observation that whether the series has a drift or time trend. The number of lagged difference terms to be included should be enough to make the error term uncorrected. Evidence of unit root for each variable is found if the null hypothesis of $\rho = 0$ is not rejected, otherwise we have evidence that *V* is stationary, i.e.

I(0). If *V* is non-stationary, we test for unit root of first difference of *V*, and *V* is said to be integrated of order one, i.e. I(1) if ΔV becomes stationary.

If all variables are found integrated of order one, the next step is to investigate whether the residual from the OLS estimation of Equation (1) is stationary or not. If the estimated residual $\hat{\varepsilon}_t$ is stationary, we can conclude that there is cointegration relationship between ln*RPI* and explanatory variables stated in the above. This process is called Engle-Granger cointegration test.

Error Correction Model

The cointegrating relationship indicates the existence of a long-run relationship while short-run effects can be obtained from an error correction model (ECM):

$$\Delta \ln(P)_t = \phi + \sum_{j=1}^{P} \varsigma_j \Delta \ln(P_{t-j}) + \sum_{i=1}^{K} \sum_{j=0}^{P} \xi_{ij} \Delta X_{j,t-i} + \eta \hat{\varepsilon}_{t-1} + e_t \quad (3)$$

Where X_j is the vector of explanatory variables in Equation (1), and $\hat{\varepsilon}_{t-1}$ is one lag of the cointegrating error estimated from Equation (1). The maximum number of lags *p* can be determined by using Akaike information criterion, Schwarz critierion or Hannan-Quinn criterion. Long-run equilibrium between ln*RPI* and *X*s will be evidenced by a negative coefficient of the error correction term (ECT), η which captures the rate of adjustment at which a short-run disequilibrium is corrected.

V. Results

Results of Unit Root Test and Cointegration Test

For ascertaining the order of integration of the variables in our model, we applied the augmented Dickey-Fuller test for unit root. Before proceeding to calculate the τ statistic, an important step is to establish the optimal lag length to be used. Using the Schwarz Bayesian Criterion, we find that 2 lags are optimal for this exercise. The ADF test statistics for log-levels of variables under consideration are found smaller than the 5 per cent critical value. When we subject the first difference of these variables to the ADF test, we find the test statistics exceed the 5 per cent level critical value, leading us to conclude that all variables described in the above are each integrated of order one, i.e. $\mathrm{I}(1)$.

Our next aim is to investigate whether or not real private investment (ln*RPI*) and budget deficit (ln*RBD*) share a long-run relationship. To achieve this, as noted earlier, we proceed to test for the presence of long-run relationship in Equation (1). As shown in Table 3, the estimated residuals are stationary, which leads us to the conclusion of a long-run relationship between the dependent variable ln*RPI* and all the explanatory variables including ln*RBD*.

Table 2 Results of Augmented Dickey-Fuller Tests

	Level				**First difference**			
	Options	***# lags***	***τ-stat***	***p*-value**	***Options***	***# lags***	***τ-stat***	***p*-value**
ln*RPI*	Constant	2	-0.847	0.8049	Constant	1	-3.543	0.0069

ln*RGDP*	Constant + Trend	2	-1.123	0.9252	Constant	1	-4.366	0.0003
ln*RBD*	Constant	2	-2.501	0.1152	Constant	1	-6.727	0.0000
RI	Constant	2	-0.505	0.8910	Constant	1	-4.747	0.0001
ln*REER*	Constant	2	-2.935	0.1511	Constant	1	-3.257	0.0169
$\hat{\varepsilon}_t$	None	0	-5.770	0.0000				

Long-run elasticities and short-run disequilibrium

Given the cointegrating relationship identified by the Engle-Granger cointegration test, the OLS estimation of Equation (1) yields non-spurious long-run effects of explanatory variables on price level in Fiji. To correct for autocorrelation in the error term upon OLS estimation of Equation (1), an autoregressive model is developed and estimation yields results as follows:

$$\ln \hat{R}PI_t = -8.86 + 1.26 \ln RGDP_t - 0.18 \ln RBD_t - 0.01 RI_t + 0.54 \ln REER_t$$
$$t = (-2.10)\ (3.35) \qquad (-3.81) \qquad (-0.87) \qquad (1.56)$$

$$- 0.20 Coup_t - 0.52 StrBr_t + 0.49 \ln RPI_{t-1}$$
$$t = (-2.32) \qquad (-3.86) \qquad (5.00)$$

(4) $\quad \overline{R}^2 = 0.9314$

Diagnostic tests upon Equation (4) are summarized in Table 3. Since all *p*-values for the first four diagnostic tests are greater than 5%, providing strong evidence of do not rejecting the null hypotheses, leading to our conclusion that the OLS estimates are free from heteroskedasticity, autocorrelation, model misspecification, or non-normality problem. Multicollinearity does not exist among controlling factors since the mean variance inflation factor is less than the benchmark value 5.

Table 3: Diagnostic Test Results

Test	**The Null Hypothesis**	**Test statistic**	***p*-value**
Breusch-Pagan test	Constant variance of error	$chi^2(1) = 0.03$	0.8636
Breusch-Godfrey LM test	No serial correlation in the	$chi^2(1)$ =	0.4474
Ramsey RESET test	Model has no omitted	F(3, 18) = 0.43	0.7362
Joint skewness and	Error term is normality	$chi^2(2) = 1.10$	0.5783
Mean Variance Inflation Factor (VIF)	No multicollinearity if Mean VIF is less than 5	Mean VIF = 2.95	

With reference to the research questions posed in the study, the empirical results confirm that budget deficit has a strong and negative effect on private investment. Specifically, given the other factors remain unchanged, a 10 percent increase in budget deficit decreases private investment by 1.8 percent. We also find that a strong correlation between economic performance and private investment. The coefficient on ln*RGDP* of 1.26 indicates that a 10 percent rise in real GDP is associated with 12.6 percent rise in real private investment. The other two controlling factors, namely real interest rate (*RI*) and real effective exchange rate (ln*REER*), are found statistically not significant in explaining variation in real private

investment, although real interest rate emerged with a theoretically expected negative sign and REER with positive sign.

The coefficient of dummy variable *Coup,* is significant and with negative sign. The coefficient of -0.20 indicates that, given other factors remain changed, an occurrence of military coup on average leads to 0.2 percentage points' decline in growth rate of real private investment. Similarly, an occurrence of structural break is on average associated with 0.52 percentage points' decline in growth rate of real private investment.

Short-run disequilibrium is further assessed from the error correction model in Equation (3), and the OLS estimation yields results as follows:

$$\begin{aligned}\Delta \ln \hat{R}PI_t &= -0.03 + 2.20\Delta \ln RGDP_t - 0.09\Delta \ln RBD_t \\ t &= (0.78)\ (2.20) \qquad\qquad (-2.03) \\ &\quad - 0.03\Delta RI_t + 1.27\Delta \ln REER_{t-2} - 0.61StrBr_t - 0.50\hat{e}_{t-1} \\ t &= (-1.70) \qquad (2.05) \qquad\qquad (-5.04) \qquad (-1.82) \\ \overline{R}^2 &= 0.6196\end{aligned} \tag{5}$$

Diagnostic tests, which were carried out for Equation (5) confirmed that Equation (5) is free from heteroskedasticity, autocorrelation, model misspecification, non-normality and multicollinearity problems. Test results are not reported here to conserve space, but available upon request.

The OLS estimation of the ECM provides strong evidence of important dynamic effects of controlling factors on real private investment. To summarize, assuming other factors remain unchanged, a one percentage point increase in real GDP growth is associated with 2.20 percentage point's increase in real private investment growth. Similarly, a one percentage point increase in real budget deficit growth leads to 0.09 percentage points decline in real private investment; a percentage point increase in change of real interest rate results in 0.03 percentage points decline in real private investment; a one percentage point rise in real effective exchange rate increases real private investment growth by 1.27 percentage points; while an occurrence of structural break discourages private investment and leads to 0.61 percentage points decline in real private investment growth.

The error correction term is highly significant and has a negative coefficient – 0.50, suggesting that on an average haft of disequilibrium will be corrected within one year. In the other words, it takes only two years for the disequilibrium to be corrected, which is a fast adjustment. In addition, the ECM explains 62 percent of fluctuation in private investment.

VI. Conclusion

Fiji has been experiencing decline in the ratio of annual investment to GDP due to deterioration in investment climate since the late 1980s. With a view to compensating the fall in private sector investment activities, government has been stepping up annual public expenditure. Despite substantial revenue raising efforts, rise in expenditure has resulted in annual budget deficits.

This paper undertook a study on the impact of budget deficits on private investment. The results show that budget deficits did not serve the purpose as they had a negative impact on private investment. Further, interest rate changes did not have any significant effect on investment. On the other hand, it is confirmed that political instability affecting investor confidence has been confirmed to have had a significant adverse impact on investment.

The policy implications are clear. The public expenditure component needs a close scrutiny: how far the various projects undertaken as part of capital budget each year could be considered growth enhancing and supportive of private investment. In other words, it is the composition of public investments in capital budget that matters; and not the quantum as such. Secondly, the gestation period of each component has to be considered. If the projects do not get completed in time, due to long-drawn out procedures in issue of tenders and the resultant delays in their finalization and eventual approvals, the results are sub-optimal and the expected objectives of supporting private investment are not realized.

This opens up a vista of further research possibilities.

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