MODELLING OUTPUT FLUCTUATIONS IN FIJI

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Abstract

Fiji's economy is continually buffeted by a range of internal and external disturbances making it difficult to identify a growth profile that accords with developed economies notion of a business cycle. This paper identifies the main exogenous influences underpinning short-term fluctuations in output and develops a simple model of the business cycle that is relevant for Fiji.

In the short term, supply-side shocks dominate the pattern of growth. Empirically, shifts in agricultural production account for more than half of the annual change in economy-wide output and income. The external sector also plays an important role with changes in external demand influencing the year-to-year pattern of growth. Other factors including monetary policies play a role, but only at the margin.

In the medium term, the pattern of growth is closely linked to the growth of Fiji's major trading partners. Empirically, Fiji's economy moves roughly one-for-one with these foreign economies. Adjustment is relatively quick, with international integration through trade and investment flows, and informational and financial linkages ensuring that developments in the main trading partner economies are quickly transmitted to Fiji's economy.

1.0 Introduction

Over time economies grow in line with increasing resources and better technology. Population increases, more land is brought into production, and firms acquire more machinery. New methods of production are introduced. However, the pattern of growth is generally uneven. Economies undergo periods of expansion followed by periods of contraction as output fluctuates around its longer-run growth path.

These recurring cycles of expansion and contraction – widely known as business cycles – are not desirable. During contractions, resources are not fully employed. People are unemployed, some capital is idle and less output is produced than if an economy was operating at its potential. On the other hand during rapid expansions, the demand for output often exceeds the capacity of an economy to supply output, increasing inflation and weakening a country's external position. These imbalances eventually constrain growth and cause output to weaken – sometimes sharply. In some cases, these adjustments are brought about by policy makers. In other cases, where policy makers fail to act, market forces often bring about more severe adjustments.

Stabilisation policies are generally undertaken by policy-makers to moderate these cyclical fluctuations in output and employment. Central banks have an important role in this area. With price stability a primary goal of central banks, moderating swings in economic activity can help minimise inflationary or deflationary impulses arising from temporary mismatches between demand and supply conditions in the economy.

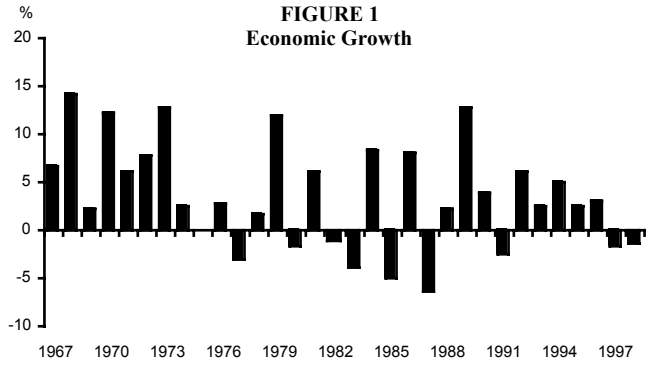
Active macroeconomic management requires an understanding of the forces behind these short-term fluctuations in economic activity. While there are several generic models available, the nature of the relationships varies from country to country. This paper develops a simple model of output fluctuations that is relevant for Fiji.

The rest of the paper is organised as follows: Section 2 outlines the evolution of economic activity in Fiji over the past three decades with particular attention to the respective influences of foreign and domestic factors. Section 3 briefly describes the economic theory underpinning a conventional macro-model of short-run economic growth. An error-correction model of economic activity is developed allowing both the long-run equilibrium relationship and the short-run dynamics to be estimated in a single step. Section 4 presents the empirical results. Section 5 concludes the paper.

2.0 Patterns of Economic Growth

The pace of economic growth in Fiji over the past few decades has been low, averaging about 3 1/2 percent over the past 30 years and around 3 percent over the past decade; the pattern of growth has been very volatile (Figure 1). Although there have been protracted periods of strength and weaknesses during this period, the extreme shifts in output have generally obscured the underlying growth path of the economy and masked any evidence of the broad swings in activity, usually associated with more traditional business cycles.

FIGURE 1
Economic Growth



More characteristically, the economy has followed a pattern of slow growth, punctuated by short episodes of excessive, and then sharply reduced, output. Underpinning these outcomes has been a mix of domestic and foreign influences. On the domestic front, Fiji's concentration of output on a narrow range of agricultural commodities, particularly sugar, has seen the economy subject to large fluctuations in response to weather-

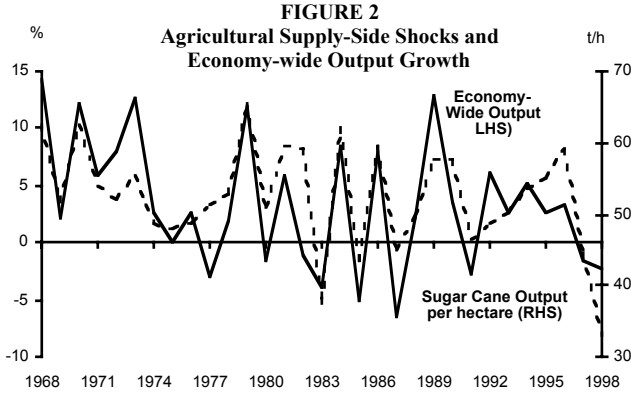
related shifts in primary production. Political developments have also played an important role on some occasions. On the international front, Fiji's dependence on export-led growth has seen output buffeted by shifts in global economic conditions. Domestic policy settings have also played a role.

2.1 Domestic Factors

On the domestic front, the primary exogenous influence on output appears to have been supply-side shocks originating in the agricultural sector. Agricultural products account for a substantial part of Fiji's output, currently around 20 percent. In the past, this sector has been characterised by extreme volatility with sharp swings in output due to adverse weather conditions and, at times, industrial disputes.

A measure of this volatility is shown in Figure 2, which shows the annual production of sugar cane *per hectare* over the past three decades. This is only a proxy for the production variability in the broader agricultural sector, but it clearly shows the expansionary and contractionary supply-side impulses routinely propagated by this sector. Because of the strong linkages between this sector and the rest of the economy, these sharp swings have been translated into large swings in economy-wide measures of output (Figure 2).

FIGURE 2
Agricultural Supply-Side Shocks and Economy-wide Output Growth



Other areas of primary production, particularly mining, have also been volatile. The non-agricultural sector, on the other hand, has grown more smoothly.

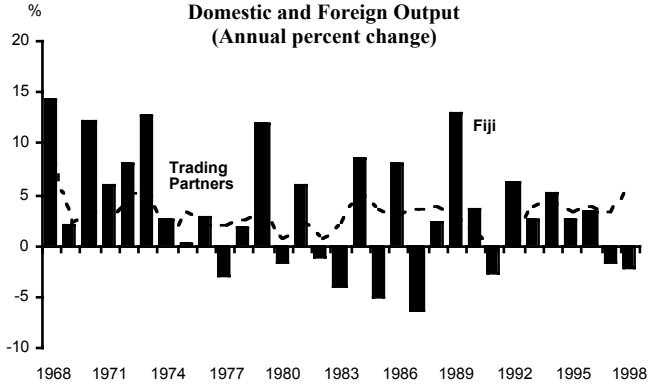
Political factors also have been important on particular occasions. Output fell sharply following the coups in 1987, and rose sharply in 1992 following the resumption of parliamentary government. Confidence effects are likely to have been important during these episodes.

2.2 Foreign Factors

Fiji is a small open economy and it is not surprising that foreign factors have a significant influence on the pace and pattern of growth. Over the past 30 years, economic activity in Fiji has broadly tracked that of the major overseas economies. Although the swings in output in Fiji have been far more extreme, partly because of the supply-side influences identified above, the timing and direction of changes in output accord reasonably well with those in Fiji's main trading partners.

Underpinning this co-movement are strong trade linkages between Fiji and its major trading partners. Around two-thirds of Fiji's output of goods and services is exported and, although substantial parts of this are likely to be determined by supply considerations (including, for example, sugar), fluctuations in trading-partner economies are likely to impact heavily on demand for Fiji goods and on domestic production (Figure 3). Other linkages may also be important. Overseas studies have found that trade linkages explain only a small part of the correlation of business cycles among other countries – other factors, including financial and informational linkages also increase international integration and underpin more synchronised business cycles.

FIGURE 3
Domestic and Foreign Output
(Annual percent change)

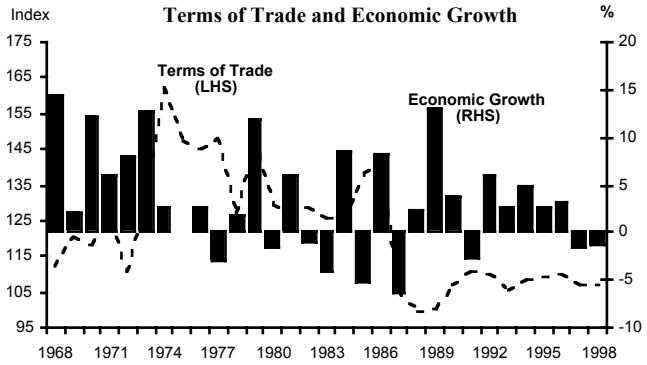


In addition to direct influences on domestic production through the demand for exports, international forces are also likely to have an indirect influence on domestic production through relative price effects. With such a heavy reliance on exports, a very narrow commodity export base, and an

export composition that differs markedly from import composition, it is likely that Fiji will be subject to large terms of trade shocks. With a very open economy, and the nominal exchange rate pegged, this is likely to be reflected in pronounced swings in domestic income with subsequent effects on domestic consumption, investment and production.

Indeed, the terms of trade – the ratio of a export prices to import prices – have moved quite sharply at times in response to shifts in world prices of Fiji's major export commodities such as sugar and gold. The correlation with economic activity, however, looks weak (Figure 4).

FIGURE 4
Terms of Trade and Economic Growth

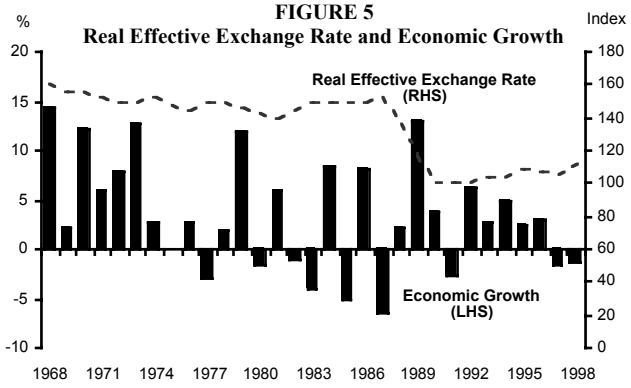


In economies with more flexible exchange rate arrangements, terms of trade shocks are sometimes moderated by offsetting movements in the real exchange rate. However, in Fiji, any offsetting movement of the real exchange rate must come through adjustments to the domestic price level rather than through the nominal exchange rate. In practice, the real effective exchange rate has been very stable in Fiji, with the exception of

the sharp fall in the second half of the 1980s and again in January 1998, due to the nominal exchange rate devaluation.

Graphically, there is little evidence of a strong correlation between the real effective exchange rate and short-run changes in economic growth (Figure 5). However, this is not unexpected, since under the pegged exchange rate arrangements more of the adjustment to domestic and external shocks is forced onto the real economy. This non-correlation should not be interpreted as if the exchange rate is not an important influence on the cycle in Fiji. As in most countries – particularly small open economies like Fiji – the exchange rate potentially exerts a powerful influence on demand and production.[1]

FIGURE 5
Real Effective Exchange Rate and Economic Growth



[1] In the Reserve Bank of New Zealand's Monetary Conditions Index (MCI), for example, a two percentage point change in the exchange rate is weighted equally to a one percentage point change in

2.3 Monetary Policy

Overseas studies have found that monetary policy settings play an important role in the dynamics of business cycles. In Fiji, the effects of monetary policy on economic activity are likely to be weaker and less clearly defined than in some of these countries, but nonetheless significant.

In Fiji, monetary policy settings in the past have been conditioned by the pegged exchange rate arrangements operating over the period which effectively constrained the Reserve Bank's capacity to conduct a fully independent monetary policy. However, capital controls and sterilised intervention have provided the Bank with some measure of independence.

In practice, the Reserve Bank has operated a relatively passive monetary policy over much of the past three decades. Quantitative controls regulating bank reserve requirements were changed very infrequently and then by only small amounts. Ceilings on lending and deposits rates were also changed infrequently, up until their removal in the second half of the 1980s.

In the 1990s the conduct of monetary policy through quantitative controls was downgraded by the Bank in favour of more market-based mechanisms, and the use of open market operations with Reserve Bank Notes becoming the main instrument of monetary policy.

Despite this relatively passive framework, there is no doubt that monetary conditions have varied considerably over the past few decades. Significant changes in the growth rate of financial aggregates and the level

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short-term interest rates. The exchange rate also plays a substantial role in the Bank of Canada's MCI and in the Reserve Bank of Australia's assessment of monetary conditions.

of financial prices (and the evolution of goods and services prices) points to variable liquidity conditions from year to year.

There is no single indicator of the stance of policy over this period although from the mid seventies real short-term interest rates provide an indication of policy settings and the state of monetary conditions. In the early part of the period Treasury Bill rates were sold at tap, at a price determined by the Reserve Bank; after 1982, the price was market-determined, but continued to reflect the Reserve Bank's desired liquidity settings. From the mid-1970s to the mid-1980s this rate also was the benchmark rate used by the Bank in determining the Minimum Lending Rate – the rate at which the Reserve Bank would lend money to commercial banks.[2] From 1989, yields on RBF Notes provide an indication of monetary conditions. From 1997, the use of interest rates as the main instrument of monetary policy was formally adopted.

Graphically, there is no clear relationship between real short-term interest rates and economic growth (Figure 6a) or between growth in the real monetary aggregates and economic growth (Figure 6b). However, the volatility induced by supply-side shocks is likely to mask any underlying relationship. More formal econometric tests are necessary to try to isolate the different influences. As we will see below, once we control for other

[2] The rate was lowered in 1975 and linked to the Treasury Bill rate (with a 1 percent premium). At the time, Treasury Bills were issued under a tap system at a fixed rate of discount. Rates rose with Bill rates through the late 1970s and by 1980 had reached 7.5 percent. Rates continued to rise through the early 1980s in line with Treasury Bill rates and by 1984 had reached 11 percent. Treasury Bill tenders were introduced in 1982, but rediscount rates for Treasury Bills and promissory notes continued to be linked to Treasury Bill yields. In the second half of the 1980s the MLR was used even more aggressively as the Reserve Bank attempted to influence (signal) market rates. The rate was unchanged at 6 percent from 1992. In 1997 it was linked to a market-determined short-term interest rate.

influences on economic activity, a closer relationship between interest rates and output becomes apparent.[3]

FIGURE 6a
Real Short-Term Interest Rates and Economic Growth

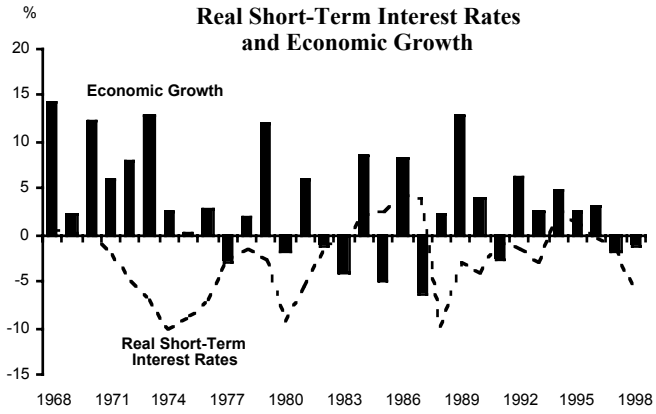
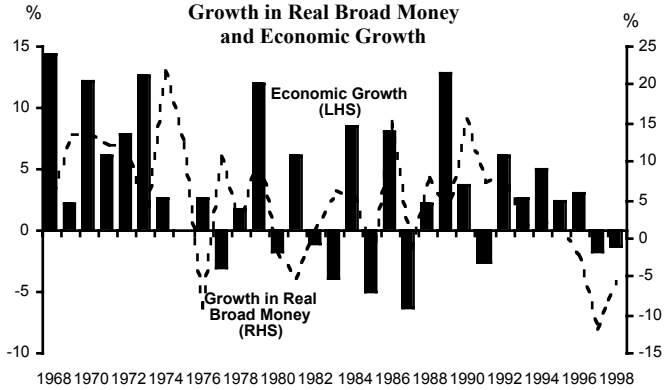


FIGURE 6b
Growth in Real Broad Money and Economic Growth



[3] In the econometric work, the real interest rate, rather than the real money supply is used as a policy indicator. With quantity controls used infrequently, financial aggregates have been effectively demand- rather than supply-determined. They do not satisfy the necessary criteria of independence. Interest rates have been varied more frequently in the past and are currently used as the policy instrument.

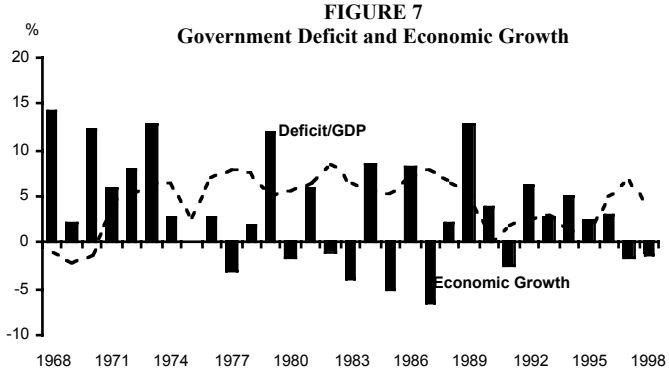
2.4 Fiscal Policy

The role of government in influencing economic growth is conjectural. In the short term, it is likely that an expansionary fiscal policy will stimulate growth. Increased government spending, or a cut in tax rates, is likely to raise aggregate demand and increase output and employment. In addition, interest rates are likely to rise, crowding out private spending and moderating the expansion. An inappropriately expansionary fiscal policy might even lower output. For example, lower business and consumer confidence may put further upward pressure on interest rates, lowering private consumption and investment spending.

In practice, fiscal policy is likely to have different effects at different stages of the business cycle.[4] This makes it difficult to discern a stable and consistent relationship between fiscal policy and economic growth graphically (Figure 7) or to estimate stable parameters empirically.

[4] Of course, in the long run, fiscal expansion is not likely to have a positive effect on growth. With output capacity limited by resources and technology, excessive fiscal expansion creates excess demand for goods, higher inflation and higher interest rates. Private spending is reduced in line with the increase in government spending. This is generally confirmed by empirical studies (Barro (1991), Fisher (1993), IMF (1996)). In some cases there is even a negative association between government spending and growth. Barro (1991), for example, finds that a rise in government consumption expenditure of 1 percent of GDP results in a fall in private investment of around _ of a percent of GDP; a rise in government investment expenditure has no measurable effect on private investment[4]. Fisher (1993) notes that an increase in the budget deficit is associated with lower capital accumulation and lower productivity growth. A rise in the fiscal deficit of 1 percentage point is estimated to result in a _ percentage point lower rate of growth.

FIGURE 7
Government Deficit and Economic Growth



In Section 3, we incorporate fiscal policy and the other potential exogenous influences on economic activity, into a more formal model of short-run economic growth that is amenable to estimation and testing.

3.0 A Conceptual Framework

The model developed below is a variant of the standard open-economy, flexible prices IS model and has the same theoretical underpinnings as the model developed by Gruen and Shuetrim (1994). The model reflects the Keynesian notion that output is demand determined in the short run. Demand for domestic output is the sum of domestic demand and foreign demand. Domestic demand depends on real income, the real interest rate and the terms of trade, and net foreign demand depends on domestic and foreign income, the real exchange rate and the terms of trade.

The general form of the model is[5]:

$$\begin{aligned}\Delta y_t = b_0 &+ \sum_{i=1}^{l} b_{1i}\Delta y_{t-i} + \sum_{i=0}^{m} b_{2i}\Delta y^*_{t-i} + \sum_{i=1}^{n} b_{3i} r_{t-i} \\ &+ \sum_{i=0}^{o} b_{4i}\Delta tot_{t-i} + \sum_{i=0}^{q} b_{5i}\Delta reer_{t-i} + b_6 S_t \\ &+ \sum_{i=0}^{r} b_{7i} g_{t-i} + c_1 y_{t-1} + c_2 y^*_{t-1} + \upsilon_t\end{aligned} \qquad (1)$$

where y and y^* are the logarithms of Fiji and foreign GDP, r is the real short-term interest rate, *tot* is the logarithm of the terms of trade, *reer* is the logarithm of the real effective exchange rate, S is an agricultural supply-side variable and g is the government deficit as a percentage of nominal GDP. Dummies were also included to control for the effects of the political events of 1987 and 1992.

While much of the model is standard, the inclusion of a supply-side agricultural variable requires comment. The variable plays a similar role to the Southern Oscillation Index used by McTaggart and Hall (1993) and Gruen and Shuetrim (1994) to capture the influence of weather on agricultural production and on growth of the broader economy. The proxy measure used here is sugar cane production *per hectare*.

The inclusion of the interest rate term also deserves comment. In traditional models, the nominal interest rate is determined by equilibrium conditions in the money market. However, it is widely recognised that in most countries, the central bank now effectively sets the short-term interest rate as the main instrument of monetary policy (Edey, 1989, 1990, and Edey and Romalis, 1996). Although financial controls were used in Fiji

[5] The levels of the terms of trade and the real effective exchange rate were also initially included in

for much of this period, interest rates (particularly the MLR) were used more actively for much of the period and interest rates are now formally recognised as the main instrument of monetary policy. The specification of the monetary policy variable, while it represents a compromise, ensures that the structure of the model continues to be applicable within the current operating framework. Note that a 1-year lag of the real short-term interest rate is used, consistent with overseas studies that find monetary policy acts with a lag of roughly six to eighteen months (OECD, 1996 and Lowe, 1993).

In a non-stochastic, static-state equilibrium, the long-run solution is

$$y = -\left(\frac{b_0}{c_1}\right) - \left(\frac{c_2}{c_1}\right) y^* \qquad (2)$$

with the long-run constant (b_0/c_1) and long-run elasticity of domestic output with respect to trading partner output (c_2/c_1).

4.0 Empirical Results

4.1 Data

The data are largely sourced from the IMF International Financial Statistics, although in some cases domestic sources are used (see Appendix). Some of the series were constructed from primary data - methods of construction are also detailed in the Appendix. Most series are available from 1966, although the interest rate data are only available from 1975. The data are generally of poor quality.

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the general model but were dropped after early testing.

Before estimating the model, it is necessary to examine the time-series properties of the data. These are determined using the testing strategy recommended by Perron (1988). Table 1 shows the standard Augmented Dickey-Fuller test (ADF) (Said and Dickey 1984) and the Phillips and Perron (1988) test where a unit root null hypothesis is tested against a stationary alternative. Empirically, (the logs of) domestic and foreign output, the terms of trade, and the real effective exchange rate appear to be I(1); the other terms are I(0).

Table 1: Unit Root Tests

Estimation period: 1966 - 1998

Variable	Dickey-Fuller Test		Phillips-Perron Test	
	I(1)	I(2)	I(1)	I(2)
Fiji output	-3.240	-4.084*	-2.885	-6.750**
Trading partner output	-3.388	-3.418**	-2.683*	-4.557**
Agricultural shocks	-3.559*	-5.381**	-6.402**	-12.441**
Real interest rate	-2.907	-4.045*	-2.978	-6.277**
Real exchange rate	-2.726	-3.209	-2.108	-2.928
Terms of trade	-2.445	-5.102**	-2.392	-6.631**
Government Deficit	-2.377	-4.851**	-2.239	-5.637**

Notes: **(*) denotes significance at the one (five) percent levels. The critical values for the Augmented Dickey-Fuller tests are -3.675 and -2.967 at the one and five percent levels respectively. The critical values for the Phillips-Perron tests are -3.666 and -2.963 at the one and five percent levels respectively. The real short-term interest rate is only available from 1975.

4.2 Estimation

The model (equation 1) is estimated over the period 1975 to 1998 as an unrestricted error correction model (ECM). This approach enables the long-run equilibrium relationship and the short-run dynamics to be estimated simultaneously. This approach is recommended over the two-

step Engle-Granger procedure, particularly for finite samples, where ignoring dynamics when estimating the long-run parameters can lead to substantial bias.[6]

One of the advantages of this specification is that it isolates the speed of adjustment parameter, c_1, which indicates how quickly the system returns to equilibrium after a random shock. The significance of the error correction coefficient is also a test for cointegration. Kremers, Ericsson and Dolado (1992) have shown this test to be more powerful than the Dickey-Fuller test applied to the residuals of a static long-run relationship. Another reparameterisation, the Bewley (1979) transformation, isolates the long-run or equilibrium parameters and provides t-statistics on those parameters. Inder (1991) shows these approximately normally distributed t-statistics are less biased than the Phillips-Hansen adjusted t-statistics.

To obtain the preferred equation, a general unrestricted ECM was estimated. Insignificant regressors were sequentially deleted to arrive at the preferred specification reported in Table 3. F- tests were conducted on the omitted variables to ensure that they were insignificant.

4.3 Diagnostics

Before turning to the results, it is necessary to consider the statistical properties of the model. The model was tested for normality, serial correlation, autoregressive conditional heteroskedasticity, heteroskedasticity, and stability. The results, reported in Table 2, suggest

[6] Banerjee et al. (1993) and Inder (1994) show that substantial biases in static OLS estimates of the cointegration parameters can exist, particularly in finite samples, and that unrestricted error

Table 2: Diagnostics

			Probability
Normality:			
Jarque-Bera statistic	χ^2 -statistic	0.538	0.764
Serial Correlation:			
Breusch-Godfrey Serial Correlation LM Test	F-statistic	0.189	0.829
AR Cond. Heteroskedasticity:			
ARCH LM Test	F-statistic	0.015	0.903
Heteroskedasticity:			
White Heteroskedasticity Test	F-statistic	0.633	0.790
Stability:			
Chow Breakpoint Test (mid sample)	F-statistic	0.458	0.830

Notes: **(*) denotes significance at the one (five) percent levels. No terms were significant at these levels.

the model is well specified. The diagnostics indicate that the residuals are normally distributed, homoskedastic and serially uncorrelated and the parameters appear to be stable.

5.0 Results

The results of empirical tests are promising although some important caveats apply. In particular, it should be remembered that because the short-term interest rate data are only available from 1975, the model has

correction models can produce superior estimates of the cointegrating vector.

been estimated with relatively few observations. Although the coefficients are unbiased, they are likely to be imprecisely estimated. As a rough check on the results, the model is also estimated over the longer period 1966 to 1998, with the nominal interest rate held constant prior to 1975.[7]

The results from estimating the models over the two periods are shown in Table 3. Although the discussion refers to the model estimated over the shorter period, the results are remarkably similar.

Overall, the model fits the data reasonably well (Figure 8), although the standard errors suggest that, from a practical policy perspective there is still a substantial margin of error. The equation's standard error is 0.02 percent, indicating that about two thirds of the time, the predicted value is within about 2 percentage points of the actual value. This lack of precision should be interpreted against the large swings in output that have been experienced over the sample period – even including the period of relative stability in the first half of the 1990s, the standard deviation in the annual growth of real output has exceeded 5 percentage points.

[7] Other nominal rates, which are available prior to 1975, were relatively stable during that period, so our constraint may not be too misleading. The real rate was allowed to vary in the estimation.

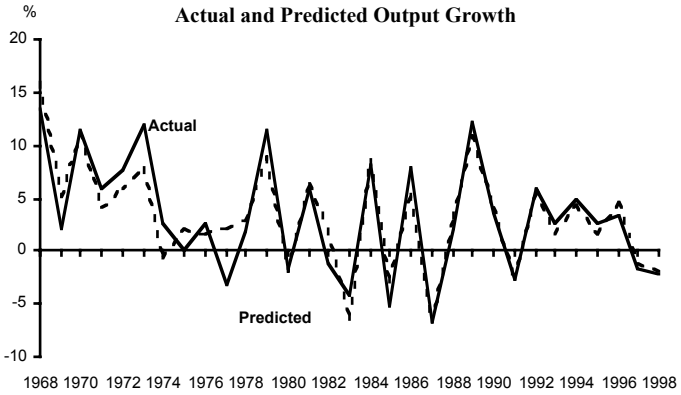
Table 3: Determinants of Economic Growth (Unrestricted ECM)

Dependent variable: economic growth; estimation period 1975 - 1998 (1966-1998)

Explanatory variables: short run	1975 - 1998	1966 - 1998 (constant nominal interest rate pre-1975)
Constant	0.817**	0.543**
	(2.931)	(4.435)
Agricultural supply-side shocks $_t$	0.004**	0.004**
	(6.022)	(7.643)
ΔTrading partner GDP $_t$	0.977**	1.015**
	(7.369)	(5.100)
Real Short-term Interest Rate $_{t-1}$	-0.003**	-0.004**
	(-3.228)	(-4.440)
Dummy (1987)	-0.047**	-0.044**
	(-4.518)	(-6.929)
Dummy (1992)	0.062**	0.064**
	(14.818)	(15.271)
Explanatory variables: long run		
GDP $_{t-1}$	-0.359**	-0.262**
	(-5.760)	(-5.890)
Trading partner GDP $_{t-1}$	0.347**	0.253**
	(6.822)	(4.649)
Implied long-run coefficient	0.9677	0.9625
Summary statistics		
Adjusted R^2	0.840	0.821
σ	0.022	0.023

Notes: t-values are in parentheses. **(*) denotes significance at the one (five) percent levels. For the long-run explanatory variables, the implied long-run coefficients were calculated as the ratio of the relevant long-run ECM coefficients to the long-run coefficient on the lagged dependent variable; the Bewley transformation was applied to obtain interpretable t-statistics. The cointegration test proposed by Kremers, Ericsson and Dolado (1992) is employed. σ is the standard error of the equation.

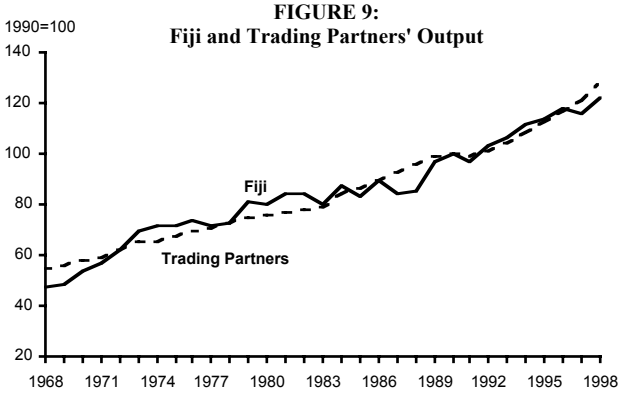
FIGURE 8
Actual and Predicted Output Growth



Long run

One of the most important results to emerge from the study is the strong empirical support for robust output linkages between Fiji and its main trading partners. This is not surprising given the openness of Fiji's economy, but it is nonetheless comforting to see it confirmed so strongly by the data. There is strong evidence of a cointegrating vector with the relevant ECM coefficient very significant. The coefficient on the trading partner term is close to one indicating that, over the past two or three decades, output in the Fiji economy has moved almost one-for-one with that of Fiji's main trading partners (Figure 9).

FIGURE 9:
Fiji and Trading Partners' Output



The close relationship between Fiji and foreign output point to the importance of trade and investment flows, and international financial and informational linkages in underpinning Fijian growth. From a policy perspective, it points to the potential gains to be had from building linkages between Fiji and the faster-growing economies such as those in North-East and South-East Asia.

Short-run

In the short-run, the results highlight the substantial impact of fluctuations in agricultural output on the pattern of growth. By itself, variations in the average production per hectare of sugar cane (a proxy for more general agricultural shocks) have accounted for more than half of the annual changes in output that have occurred over the past two decades.

While this is not surprising given the important role played by agriculture in the economy, it should be remembered that the broad

category of crops currently accounts for a little over 10 percent of total production and even at the start of the sample period in the mid 1970s, agricultural output accounted for less than a quarter of total production.[8] This highlights two factors. First, agricultural production is a very volatile component of output (the standard deviation in the percentage change over the past two decades of our agricultural shock proxy is well over 20 percentage points) and despite its relatively modest size, it tends to dominate shifts in economy-wide output. Second, the flow-on effects of agricultural outcomes to the broader economy are considerable.

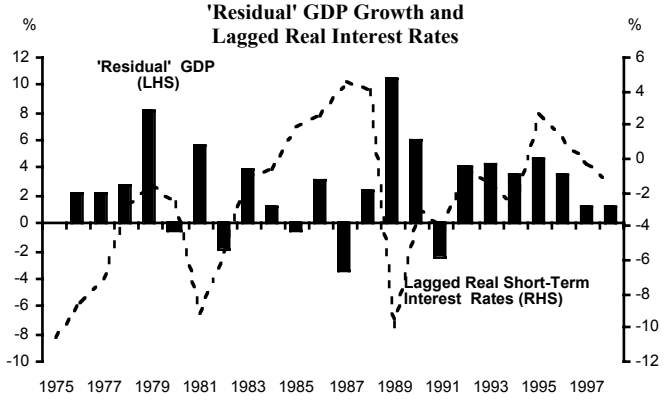
With the agricultural sector shocks clearly playing an important role in income determination, it would also be expected that changes in the world prices of these commodities – reflected in the terms of trade – would also feed through into domestic spending and output. There is some weak evidence that this is the case, although the imprecision of the estimates do not allow us to be more definitive. At the same time, there is no evidence that the real effective exchange rate affects output in the short run. This is not surprising, however, given the limited historical variability in the rate under the pegged exchange rate arrangements. It seems the direct output linkages described earlier are the primary conduits for international influences on the economy.

While supply shocks clearly play a dominant role, the question arises as to the role of monetary and fiscal policies in influencing the path of output in the short-run. The results provide evidence that monetary conditions affect growth although, as expected, the size of the coefficient suggests monetary policy operates at the margin and is not the dominant

[8] If sugar manufacturing was added, the current proportion of output from crops and directly related activities would rise to around 15 percent.

influence on output. Graphically, the relationship is difficult to see, since sharp swings in output associated with other factors, particularly agricultural production, disguise any relationship. However, if these effects are removed, as in Figure 10, the effects of interest rates on the rest of output become more apparent. On average, a one percentage point fall in real short-term interest rates increases the growth rate of the economy in the short-run by around 1/3 of one percentage point.[9] The lag between changes in real short-term interest rates and resultant changes in output is around one year, much the same as in many other countries.

FIGURE 10
'Residual' GDP Growth and Lagged Real Interest Rates



Fiscal policy does not appear to have a stable or predictable relationship with short-term output growth. Despite sizeable swings in the government's fiscal position over the past few decades, there is no evidence of a contemporaneous or lagged correlation between the general

[9] For similar overseas results see D. Gruen and G. Shuetrim (1994), "Internationalisation and the Macroeconomy", Proceedings of a Conference, International Integration of the Australian Economy,

government fiscal balance (as a ratio to GDP) or its broad components (revenues and expenditures) and output growth.[10] This does not mean that fiscal policy is impotent. It does, however, suggest that the effects of any change in policy may be conditional on the response of the private sector. This response may vary depending on the stage of the cycle and the perceived 'appropriateness' of the policy actions.

6.0 Conclusions

Fiji's economy, like most small island economies, is continually buffeted by a range of internal and external disturbances. The economy has rarely moved smoothly along its capacity growth path. This volatility makes it difficult to identify a growth profile that accords with developed economies notion of a business cycle.

Nevertheless, it is still possible to identify the main exogenous influences underpinning short-term fluctuations in output. In the short term, supply-side shocks dominate the pattern of growth. Empirically, shifts in agricultural production account for more than half of the annual change in economy-wide output and income. The external sector also plays an important role with changes in external demand and to a lesser extent, terms of trade, influencing the year-to-year pattern of growth. Other factors, including monetary policies play a role, but only at the margin.

In the medium term, the pattern of growth is closely linked to the growth of Fiji's major trading partners. Empirically, Fiji's economy

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Reserve Bank of Australia, Sydney.

[10] The contemporaneous measure was not included in the estimating equation also because of endogenieity considerations.

moves roughly one-for-one with these foreign economies. Adjustment is relatively quick, with international integration through trade and investment flows, and informational and financial linkages ensuring that developments in trading partner economies are quickly transmitted to the Fiji economy.

From a policy perspective, the results suggest that much of the short-term movement in output is effectively out of macro-policy makers' direct control. In this environment, the best policy makers can do, is to establish broad macroeconomic conditions that provide the necessary cushion for the economy in the event that it is subject to adverse shocks. Low inflation, adequate reserves, and manageable fiscal exposures are an important part of this prescription.

Appendix: Data sources and construction

Series	Construction and sources
Gross domestic product	Gross domestic product at constant factor cost. IMF *International Financial Statistics Yearbook* (1998); Bureau of Statistics, *Current Economic Statistics*, various issues; Reserve Bank of Fiji, *Quarterly Review* (1999).
Trading partner gross domestic product	Calculated as the trade-weighted average constant price gross domestic product of Fiji's five major trading partners: Australia, New Zealand, the UK, the US and Japan. IMF *International Financial Statistics Yearbook* (1998); IMF *International Financial Statistics*, various issues; IMF *Direction of Trade Statistics*, various issues.
Terms of Trade	Calculated as the ratio of an index of export prices to an index of import prices. The export price index was calculated as an index of the world prices of Fiji's major exports (in $US), weighted by their respective export share. Prior to 1990, the export price index published by the IMF was used. The import price index was calculated as an index of export unit values of Fiji's five major trading partners (in $US), weighted by their respective import share. IMF *International Financial Statistics Yearbook* (1998); IMF *International Financial Statistics*, various issues; IMF *Direction of Trade Statistics*, various issues.

Real effective exchange rate	Real effective exchange rate as calculated by the Reserve Bank of Fiji. For the period prior to 1979 an index was constructed using the trade-weighted consumer prices indices and bilateral exchange rates of Fiji's five major trading partners. IMF *International Financial Statistics Yearbook* (1998); IMF *International Financial Statistics*, various issues; Reserve Bank of Fiji, *Quarterly Review* (1999).
Agricultural supply shocks	Proxied by average sugar cane production per hectare in tonnes. *Macro Technical Committee.* Bureau of Statistics, *Current Economic Statistics*, various issues.
Real Interest Rates	Calculated as the Reserve Bank Note yield less the change in the logarithm of the annual average consumer price index. The Treasury bill rate was used for the nominal short-term rate prior to 1989. IMF *International Financial Statistics Yearbook* (1998); IMF *International Financial Statistics*, various issues; Bureau of Statistics, *Current Economic Statistics*, various issues; Reserve Bank of Fiji, *Quarterly Review* (1999).
Government Deficit	Calculated as the ratio of the general government deficit to nominal GDP. IMF *International Financial Statistics Yearbook* (1998); IMF *International Financial Statistics*, various issues; Reserve Bank of Fiji, *Quarterly Review* (1999); 1999 Budget Forecast and Budget Address.

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