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**A Study on Relative Effectiveness of Monetary and Fiscal Policies in
Vanuatu**

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Abstract

Against the background of the global economic downturn, since 2008, Vanuatu emerged as the top performer during 2009-2011 among the Pacific Island countries. With its well-known proneness to shocks of all kinds, including natural disasters and volatility in global prices of fuel and food, Vanuatu with limited resources employed expansionary fiscal and monetary policies for mitigating the adverse effects of the weakening external demand consequent to the ongoing world recession. This paper seeks to evaluate the relative effectiveness of the two policies with an empirical study.

Key Words: *Recession, Monetary policy, Fiscal policy, Exchange rate, Indian Ocean, the Pacific*

I. Introduction

Vanuatu, one of the six Pacific island countries (PICs)¹ with independent currencies and hence with access to all policy tools, including fiscal and monetary policies, has now been recognized as a top regional performer in the South Pacific, successfully weathering the global economic downturn since 2008 (UN ESCAP 2011). Vanuatu's response to the recession was aimed at stepping up domestic demand in the wake of a declining external demand, through fiscal policy measures such as increases in public sector expenditures and through expansionary monetary policy of low interest rates, facilitating greater flows of credit to domestic enterprises.

This paper seeks to evaluate the effectiveness of these two policies pursued over a period of three decades. The paper is organized as follows. The next section reviews economic performance of Vanuatu; the third section outlines the modeling methodology; the fourth section reports the results; and the fifth and final section presents a summary and conclusions with policy implications.

II. Vanuatu: A Brief Economic Review

Table 1 presents a comparative picture of macroeconomic performance of PICs. In terms of growth rates, inflation and fiscal performance, Vanuatu emerged as the best performer. This section briefly reviews its policy responses to the economic crises.

Vanuatu, which is located in the South Pacific at 16.00 degrees south latitude and 167.00 degrees east longitude, has a population of about 245,000. The island nation (Table 2) is heavily subsistence oriented, dominated by root crops; and commercial ranch and fishery activities to a small extent, which provide livelihood to 80 percent of the population. The country's manufacturing base is small, confined to processing coconut based products, including coconut oil, which are mainly intended for exports, besides bread and biscuits, which are for domestic consumption.

Vanuatu has been historically an open economy with no exchange controls of any kind for most of the last 32 years since its independence in 1980². The island nation, known as New Hebrides before independence was famous for its offshore financial centre institutions inherited from the days of the joint Anglo-French condominium rule until 1980. Additionally, absence of all forms of direct taxation on citizens and expatriate residents alike, including personal and corporate income taxes, estate and death duties and gift taxes, have made Vanuatu a pure tax free haven in the South Pacific. Thus, services sector of Vanuatu

¹ It is one of the 14 Pacific island countries (PICs) which are members of the intergovernmental organization, known as Pacific Islands Forum. Out of 14 PICs, six of them have currencies of their own and Vanuatu is one of them and the remaining eight are dollarised economies (Jayaraman 2011).

² For a brief period during 1998-99, with a view to stemming the heavy, unprecedented capital outflows in the wake of the Vanuatu National Provident Fund crisis and the huge payout decision exchange controls were imposed. They were discontinued in late 1999, as the situation improved over a eighteen-month period (van de Walle 2000, Jayaraman 2011).

comprising financial and tourism activities, has been a major support to Vanuatu's economy (Jayaraman and Choong 2009).

Vanuatu has a fixed exchange rate regime, which has served the country well. Since most of the imports have been sourced from Australia and New Zealand, whose monetary policies have been targeting inflation, inflation has been kept low. Export earnings have been far less than imports with the result that trade balance always remained negative. However, tourism earnings, steady aid inflows and in recent years, remittances in particular, have provided substantial support to the country's current account balance, minimising pressures on the fixed exchange rate regime.

Structure of the financial system

Vanuatu's financial sector includes the Reserve Bank of Vanuatu (RBV), five commercial banks, a number of trust and insurance companies, the Vanuatu National Provident Fund (VNPF), and several smaller financial institutions. Banking activities are largely confined to two urban centres in the country, Port Vila and Santo, in which formal sector activities are concentrated. As Vanuatu has no vibrant primary and secondary markets in bond and equity and other financial securities, there are no attractive financial assets other than saving and time deposits for savers to invest in (Jayaraman 2011).

Monetary policy objectives

The objectives of RBV are to promote monetary stability in terms of low inflation and an adequate level of international reserves, while supporting conditions conducive to orderly and balanced economic development. The RBV seeks to keep inflation below 4 percent and maintain international reserves equivalent of four months of imports. As there are no capital controls in Vanuatu, there is not much room for an independent monetary policy under the current fixed exchange rate regime.

In 1988, the RBV imposed for the first time a reserve requirement on all banks under which all commercial banks were required to keep 10 percent of demand, time, and saving deposits of residents in vatu with the RBV³. In fact, until 1998, the statutory reserve deposit (SRD) ratio was the only monetary policy instrument of RBV. In 1998, RBV introduced open market type operations in its own papers, known as RBV Notes of various maturity periods with a view to primarily mopping up excess liquidity in the wake of pension fund payouts crisis and eventually towards influencing the market rate of interest rate.

Macroeconomic performance

Vanuatu's economic performance during 1980-1990 has been uneven (Crane 2006). With bilateral grants falling from 80 percent of public sector expenditure in 1980 to about 50

³ Currently, the ratio stands at 7 percent, which was increased to since March 2012.

percent in 1983 and 21 percent in 1989, government had to tighten expenditures and increase revenue through only one resource open to them, namely indirect taxes, as there is no direct taxation of any kind. Government gave up its conservative stand and began borrowing from international agencies including the Asian Development Bank for funding international telecommunication network and airport runway extension. These helped to augment tourism receipts by allowing larger aircrafts to land.

Despite growth at an average rate of 3.3 percent during the period 1991–1995, there were several unanticipated shocks, which resulted in a deterioration of overall macroeconomic performance⁴. Fresh monetary policy initiatives, including as noted above, the introduction of indirect instruments namely open market type operations in RBV Notes were undertaken in 1998.

Fiscal Consolidation

Reforms funded by Asian Development Bank under the Comprehensive Reforms Programme (CRP) since 1997, which were aimed at fiscal consolidation, and strong recovery in exports and rise in export prices of key crops, including copra and *kava*, helped the economy to recover and perform well in the next seven years. Real GDP grew at an annual average rate of 5.7 percent with the peak at 6.2 percent in 2008. The prolonged period of growth was attributed to rise in private investment, underpinned by policy reforms that included the opening of telecommunication and aviation sector with expansion in airline capacity and greater number of flights (Asian Development Bank 2011). Further, improvements in Vanuatu's governance and economic growth performance since 2001 impressed the United States, which resulted in the sanction of about US \$66 million by the US Millennium Challenge Corporation for funding construction of various infrastructure projects.

Despite higher spending, government fiscal position improved since 2001 with reduced deficits in the next two years and thereafter, producing strings of budget surpluses in the next three years with surplus rising to 2.2 percent of GDP in 2008. The improved fiscal performance was due to significant performance in revenue collection, mainly value added tax (VAT) reflecting both buoyant economic activities and improved tax compliance, and fiscal consolidation efforts since 2001. Measures to control expenditure spending were introduced as part of the ongoing reform in public spending. These include amendment to the Public Finance and Economic Management Act of 1998, which aimed at containing growth in expenditures and contributed to restoring confidence in public finances. Additionally there are ongoing reforms undertaken in the government state owned enterprises which have been found to be a major drain to Government finances.

Global economic downturn since 2008

⁴ In 1998, loss of trust in the state-sponsored Vanuatu National Provident Fund (VNPf) led to a run on the institution, which prompted the government to permit unconditional withdrawals of retirement savings of VNPf members. The payouts of funds by VNPf led to a sharp rise in liquidity in the banking system. There were capital outflows as well as confidence in the domestic currency had already been shaken in the process. Because of the VNPf crisis, the official reserves of the RBV decreased dramatically, from the equivalent of around six months of imports to less than three months of imports.

Global recession originating as a financial sector crisis in the US, which spread across the oceans to Australia and New Zealand, the main sources of tourism revenues as well as foreign direct investment, eventually affected PICs, including Vanuatu. In the second half of 2008, construction activities funded by capital inflows from Australia and New Zealand began to experience a slowdown. There were clear indications that PICs would not be spared. As Vanuatu's major trading partners and the important sources of tourism, namely Australia and New Zealand slowed, there were clear risks. In such an uncertain economic environment, prudent and coordinated monetary and fiscal policies were needed to lessen the impact of global economic downturn.

In December 2008, RBV took preemptive steps, which were aimed at easing the prevailing tight monetary conditions. The rediscount rate was reduced from 6.25 percent to 6.0 percent in December 2008 followed by a reduction in SRD ratio, which was decreased in November 2008 from 10 percent to 8 percent of all vatu deposits and 50 percent of demand deposits in foreign currency. As a more accommodative policy was needed, in January 2009 the SRD ratio was further reduced to 5 percent.

Since government's fiscal position had been sound with budget surpluses accumulated in recent years, supportive expansionary fiscal policy actions were able to meet the recessionary conditions. Budget provisions were increased for capital projects in 2009, 2010 and 2011, which were mostly funded by aid money. The overall budget balance was still positive in 2009 and 2010, and the 2010 budget ran a deficit. As inflationary pressures crept in and the economy experienced a rise in current account imbalances, brakes had to apply. The SRD ratio was increased in two steps: from 5.0 percent to 6.0 percent in August 2010 and to 7.0 percent in August 2011. Table 3 presents the national output and fiscal and monetary statistics.

To sum up, Vanuatu handled its response to global economic crisis with ample support from the fiscal space built up over a period of time prior to the 2008 crisis by prudent fiscal policies in the past. It implemented expansionary fiscal policies to meet the recession, duly supported by easy monetary policy. When the economy showed signs of heating, direct monetary policy instrument was relied upon to a far greater extent, as interest rate transmission mechanism was weak. Increases in SRD ratios were resorted to put out inflationary pressures.

II. Modeling, Methodology and Data

The two major policy tools available to the countries which have independent currencies are monetary policy and fiscal policy, besides exchange rate adjustments. Monetary policy dealing with the quantity of money, interest and exchange rates is believed to have a predominant role in influencing aggregate demand, inflation and output. This owes

much to the emergence of monetarism as a countervailing force against Keynesians who lay greater stress on fiscal policy.

Fiscal policy, as a tool, deals effecting changes in the levels of revenue and expenditures of the government. Government is responsible for providing major public goods and services, which are not feasible for the private sector to supply. An excess expenditure over revenue creates fiscal deficit while excess revenue over expenditure creates fiscal surplus.

St. Louis Equation

The monetarists (Friedman and Meiselman, 1963; Anderson and Jordan, 1968; Carlson, 1978) are of the view that monetary policy is more powerful than fiscal policy in achieving various economic goals. The Keynesians hold the opposite view that fiscal actions are more effective in stabilizing growth. For undertaking a study on the relative effectiveness of two main policy actions, namely monetary and fiscal policy changes, we resort to the time series econometric procedure based on St. Louis equation developed by the US Federal Reserve Bank of St. Louis (Anderson and Jordan 1968).

Critics have pointed out to certain deficiencies of St. Louis equation (Rahman 2005). They were: (i) the St. Louis equation is a reduced form equation and the policy variables (money supply and government expenditure) included in this equation were not statistically exogenous; and (ii) the St. Louis equation suffered from specification error due to omission of relevant variables such as interest rates (Stein, 1980; Ahmed *et al.*, 1984). As Rahman (2005) notes, Sims's (1980) vector autoregression (VAR) approach when applied to St. Louis equation addresses the problem of endogeneity because it assumes all the variables in the system are endogenous.

VAR Model

The VAR approach allows feedback and dynamic interrelationship across all the variables in the system. Since the unrestricted model assumes that each and every variable in the system is endogenous and does not impose any a priori restrictions, it thereby solves the endogeneity problem associated with the St. Louis equation. To address the problem of omitted variables, one can add variables such as interest rate and exchange rate along with the usual three variables in the St. Louis equation, which are real government expenditure as proxy for fiscal policy, real money supply as proxy for monetary policy and real output. The vector of the VAR model, therefore, contains the following variables: (i) real government expenditure (G); (ii) real money (M2); (iii) real GDP (y); and (iv) real exchange rate index⁵ (ER). For estimating the reduced-form VAR model, we enter all the variables in their logs.

The reduced form VAR is written as:

$$Y_t = A_0 + A_1 Y_{t-1} + \dots + A_k Y_{t-k} + u_t$$

where Y_t is a vector of variables, A_0 is a vector of constants, A_{t-i} is a matrix of coefficients on variables lagged j periods, U_t is a vector of serially uncorrelated error terms that have mean

⁵ Exchange rate is defined for the purpose of empirical investigation as units of domestic currency (rupees) per one US dollar (DC/US\$)

zero and variance-covariance matrix \sum_u^2 , and k is the number of lags. Because this is a reduced-form representation of a structural model in which some variables may affect others contemporaneously, the error terms are composites of underlying shocks to variables in the system according to the following specification:

$$\begin{pmatrix} u_{1t} \\ u_{2t} \\ \dots \\ u_{jt} \end{pmatrix} = \begin{pmatrix} 1 & \theta_{12} & \theta_{13} & \dots & \theta_{1j} & \varepsilon_{1t} \\ \theta_{21} & 1 & \theta_{23} & \dots & \theta_{2j} & \varepsilon_{2t} \\ \dots & \dots & \dots & \dots & \dots & \dots \\ \theta_{j1} & \theta_{j2} & \theta_{j3} & \dots & 1 & \varepsilon_{jt} \end{pmatrix}$$

For evaluating the effectiveness of monetary and fiscal policy actions, variance decompositions (VDC) and impulse response function (IRF) derived from vector autoregressions (VARs) are employed. While VDCs would indicate the proportion of the variance in the forecast error for each variable due to innovations to all variables in the system, the IRF would show the response of each variable in the system to shock from system variables. The relative strength of monetary and fiscal policies could then easily be determined. For example, if the response of real output growth due to monetary innovations is relatively higher and dissipates at a relatively slower rate than that of fiscal innovations, we could conclude that monetary policy is more effective than fiscal policy.

The ordering of variables is important in the Cholesky decomposition procedure. Variables placed higher in the ordering have contemporaneous impact on the variables which are lower in the ordering, but the variables lower in the ordering do not have contemporaneous impact on the variables those are higher in the ordering. The policy variables (G and M2) are placed first followed by target variables. Since our study objective is to determine the relative impact of monetary and fiscal policies on output growth, output (RGDP) variable is placed last. The real exchange rate index (ER) takes the third place in the ordering of four variables.

IV. Results

Before estimating the short- and long-run relationship for the variables, which are entered in their logs for regression analysis, it is important to examine the order of integration of each series under concerned. Using both ADF and KPSS unit root tests, it is reported that the series were non-stationary in their levels but were found stationary in their first differences⁶.

Since the sample size of data series is relatively small (1983-2010), it is considered appropriate to use the autoregressive distributed lags (ARDL) model (or bounds testing approach) developed by Pesaran and Shin (1998) and Pesaran *et al.* (2001) to investigate the presence of any long-run relationship between real output and the fiscal and monetary variables and real exchange rate. To implement the bounds testing approach, we start by estimating Equation 1 as an unrestricted error-correction model, or a conditional ARDL-ECM, as follows:

$$RGDP_t = a_0 + a_1G_t + a_2M2_t + a_3RER_t + u_t \quad (1)$$

⁶ For saving space, the results are not reported here. Unit root test results will be made available on request.

The first step in the ARDL bounds-testing approach is to estimate Equation 2 by ordinary least squares.

$$\Delta RGDP_t = \alpha_0 + \alpha_1 RGDP_{t-1} + \alpha_2 G_{t-1} + \alpha_3 M2_{t-1} + \alpha_4 RER_{t-1} + \sum_{i=1}^p \beta_{1i} \Delta RGDP_{t-i} + \sum_{i=0}^p \beta_{2i} \Delta G_{t-i} + \sum_{i=0}^p \beta_{3i} \Delta M2_{t-i} + \sum_{i=0}^p \beta_{4i} \Delta RER_{t-i} + \mu_t \quad (2)$$

Next, we test the null hypothesis that there is a long-run relationship among the variables conduct an F -test on the lagged levels of the variables, that is, $H_0 : a_1 = a_2 = a_3 = a_4 = 0$. As noted by Pesaran et al. (2001), the F -statistic follows a nonstandard distribution irrespective of whether the variables are $I(0)$ or $I(1)$. Pesaran et al (2001) provide two asymptotic critical values for the bounds -testing procedure. However, Narayan (2005) argues that the critical values generated by Pesaran et al. (2001) cannot be used for small samples because they were generated from large sample sizes. In this study we use the critical values generated by Narayan (2005). If the estimated F -statistic is higher than the upper bound of the critical values, the null hypothesis of no long-run relationship is rejected. If the estimated F -statistic is less than the lower bound of critical values, the null hypothesis of no cointegration cannot be rejected.

Table 4 exhibits the F -statistic associated with the null hypothesis of no cointegration, along with the asymptotic critical values of the bounds testing procedure. The results show that only in regard to the equation with RGDP as the dependent variable do we find the computed F -statistic is higher than upper critical bound value at the 1 per cent level of significance. Accordingly, it is concluded that there exists a unique and stable long-run relationship with RGDP as a dependent variable and G, M2, and RER as explanatory variables. Bounds test equations were also estimated for each regressor, as a dependent variable against short-run dynamics of economic growth. However, the computed F -statistics exhibit absence of long-run relationships, when G, M2 and RER are set as the dependent variables (Table 4). Thus, the variables G, M2 and RER can be treated as the long-run explanatory variables for explaining the variations in RGDP. Given the existence of cointegration with RGDP as the dependent variable, the second stage is to estimate the ARDL model to derive the long-run and short-run coefficient estimates. Table 5 presents the short- and long-run coefficients obtained from ARDL model.

All the estimated coefficients have the theoretically expected positive signs and are significant as well. The results of the model suggest that the coefficient of government expenditure (G) is positive and statistically significant, indicating that government expenditure has a strong positive effect on economic growth. The coefficient of monetary aggregate (M2) is also positive and significant. Similarly the coefficient of real exchange index (RER) is positive.

The coefficients suggest that one per cent rise in money supply and government spending would cause to an increase in real output by 0.078 per cent and 0.149 per cent, respectively in the short-run. On the other hand, one per cent rise in money supply and

government spending would cause to an increase in real output by 3.82 per cent and 0.139 per cent, respectively in the long-run. It is interesting to note that fiscal policy exercises a greater influence on output in the short run while monetary policy has dominant effect than fiscal policy in the long-run.

The results confirm the hypothesis advanced here that for a small open economy such as Vanuatu without a fully developed financial sector, in the short run, fiscal policy (defined here as government expenditure) is more important than monetary policy. We also carried out tests on the stability of the model. Both the CUSUM and CUSUMSQ tests suggest that the model is stable over the sample period (Figures 1 and 2).

Variance decomposition analysis

We now proceed to conduct VDC and IRF analyses by entering the variables in their first differences. Table 6 summarizes the forecast error variance decomposition of output growth estimated from the four-variable VAR, including government expenditure, monetary aggregate and exchange rate. The analysis is based on Cholesky factorization with the following ordering of the variables: G, M2, RER and RGDP. We also used different orderings of the variables. The findings obtained from different orderings of variables are robust to changes, as the correlation coefficients of reduced form VAR residuals are found to be low (Table 7).

Table 6 indicates that the effect of government expenditure on RGDP is relatively small within first six years-ahead of the forecast horizon. For example, government expenditure explains only less than 10 percent of variability in output growth in the first six years-ahead of the forecast period. However, the effect accumulates over time. By 10 years ahead, government expenditure accounts for about 34 percent of the variability in output growth, which has achieved its peak (about 63%) in the ninth year.

In contrast, monetary measure explains a large portion in the short-run as compared to the government expenditure. The effect of monetary measure is about 31 percent in the first year and the proportion becomes larger in the next 5 years. After 8 years, it explains lesser of the total variability in the output growth. It is clear between innovations in government expenditure and monetary aggregate, compared to their effect on the output growth, innovations in monetary aggregate have a more significant effect on the output growth over all the time horizons in Vanuatu.

Besides, exchange rate shock has the dominant shock for the output for Vanuatu. The exchange rate shocks accounted for 10% at the 5-year horizon and then fluctuated between 20 and 30 per cent for the remaining horizons. Over time, it seems that the variability of exchange rate shocks on output growth depict a modest fluctuation.

Impulse response functions

We proceed to undertake impulse response function analyses. Figure 3 displays the results of the generalized impulse response functions, which are plotted for a ten year period. Since the variables are in logs and as they are entered into IRF analyses in their first differences, the vertical axis shows the values in percentages. The horizontal axis shows the passage of time: in this case ten years are displayed. In each graph, point estimates of the

function are represented by a solid line while the dotted lines indicate a two standard deviation band around the point estimates. A shock is said to be significant when the lower dotted line is above the zero line.

Overall, the results of impulse response functions are quite consistent with the variance decomposition analysis. A shock to the government expenditure has positive but not significant effect on output growth for the whole horizons. On the other hand, a shock to the monetary measure appears to have a substantial, positive impact on output growth for the first three years. The effect of the shocks on output growth, however, is persistent as reflected by the stable movement of the shocks for the remaining horizons. This suggests that the monetary effects on output growth are modest and transitory. Consistent with the results of variance decomposition analysis, the impulse response functions exhibit positive but no significant impacts of exchange rates on output growth in both countries.

V. Summary and Conclusions

In the context of the ongoing world recession and efforts on the part of the central banks and the governments in the developed and developing countries to mitigate the adverse effects of fall in aggregate demand by expansionary policies, two sets of policy measures were used. They are fiscal and monetary policies. This paper undertook an empirical analysis with a view to determining their relative effectiveness in Vanuatu.

The results of the bounds testing approach indicate that both fiscal and monetary policies were successfully implemented in Vanuatu to enhance and promote its economic achievements during few regional and/or global economic downturns. The results confirm the hypothesis that for a small open economy such as Vanuatu without a fully developed financial sector, fiscal policy is a more important policy tool than monetary policy in stimulating economic growth, especially in the short run. In the long-run, it is clear innovations in monetary aggregate have a more significant effect on the output growth over all the time horizons in Vanuatu. The findings are further confirmed by using both variance decomposition analysis and impulse response function.

This has important policy implications for policy makers. The use of monetary policy, for example, is expected to be not only pro-active but also to be supportive in keeping inflationary potential under check. This would confirm the importance of coordinated action between Ministry of Finance and Economic Development in Vanuatu.

References

- Ahmed, S., Gust, C., Kamin, S. and Huntley, J. (2002). Are depreciations as contractionary as devaluations? A comparison of selected emerging and industrial economies. International finance discussion paper No. 737. Federal Reserve Board, Washington, DC.
- Anderson, L. and Jordan, J. (1968). Monetary and fiscal actions: A test of their relative importance in economic stabilization. Federal Reserve Bank of St. Louis Review, 11-24.
- Asian Development Bank (2011). *Asian Development Outlook 2011*, 241-242, Manila: Asian Development Bank

- Asian Development Bank (2012). *Key Indicators of Asian and Pacific Developing Member Countries*, Manila: Asian Development Bank
- Carlson, K. (1978). Does the St. Louis Equation Believe in Fiscal Policy? *Federal Bank of St. Louis Review*, 13-19.
- Crane, S.(2006). "Vanuatu", in C.Browne (ed.).*Pacific Island Economies*, Washington, D.C.: IMF: 163-170.
- Friedman, M. and Meiselman, D. (1963). The Relative Stability of Monetary Velocity and the Investment Multiplier in the United States, 1897-1958. In *Commission on Money and Credit: Stabilization Policies*. pp. 165-268. Englewood Cliffs, NJ: Prentice-Hall.
- International Monetary Fund (IMF) (2009). Staff Report: Article IV Mission , IMF Country Report, Washington, D.C.: IMF.
- IMF (2010). Staff Report: Article IV Mission, *IMF Country Report*, Washington, D.C.: IMF.
- IMF (2012) *International Financial Statistics*, CD Rom: Feb 201
- Jayaraman, T.K.. (2011).” Macroeconomic Performance in Six Pacific Island Countries” in T.K. Jayaraman and P. Narayan, *Issues in Monetary and Fiscal Policy in Small Developing States*. London: Commonwealth Secretariat: 118-120.
- Narayan, P.K. (2005). The saving and investment nexus for China: Evidence from cointegration tests. *Applied Economics*, 37, 1979-1990.
- Pesaran, M.H. and Shin, Y. (1999). An Autoregressive Distributed Lag Modelling Approach to Cointegration Analysis. In S. Strom (ed.), *Econometrics and Economic Theory in the 20th Century: the Ragnar Frisch Centennial Symposium*. Cambridge: Cambridge University Press.
- Pesaran, M.H., Shin, Y. and Smith, R. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16, 289-326.
- Rahman, M.H. (2005). Relative effectiveness of monetary and fiscal policies on output growth in Bangladesh: A VAR approach. Working Paper Series: WP 0601, Dhaka: Bangladesh Bank.
- Sims, C.A. (1980). Macroeconomics and Reality. *Econometrica*, 48, 1-48.
- Stein, S.H. (1980). Autonomous expenditures, interest stabilization and the St. Louis Equation. *The Review of Economics and Statistics*, 3, 357-363.
- UN ESCAP (2011). *Annual Economic and Social Survey*, 2011, Bangkok: UN ESCAP
- Van de Walle, F. (2000). "Monetary Policy Instruments" in S. Athy and F. van de Walle (Eds). *20 years of Central Banking in Vanuatu*. Port Vila: Reserve Bank of Vanuatu: 88-96.

Table 1. Pacific Region: Island Countries

	Fiji	Papua New Guinea	Samoa	Solomon Islands	Tonga	Vanuatu
Population ('000): 2009	834	6,348	184	539	103	239
Land Area	18,274	462,840	2,831	28,896	747	12,189
Per Capita GDP (US\$)	3,306	943	2,277	684	2,176	1,799
Growth Rate (%)						
2001-2005	2.4	1.7	4.3	1.7	2.0	1.0
2006	1.9	2.3	2.2	6.9	0.5	7.2
2007	-0.5	7.2	2.3	10.3	-1.2	6.8
2008	-0.1	6.6	5.0	7.3	2.0	6.3
2009	-3.0	5.5	-4.9	-1.2	-0.4	3.8
2010	0.1	7.1	0.0	4.0	-1.2	3.0
Inflation (%)						
2001-2005	2.9	7.9	6.2	8.3	10.0	2.2
2006	2.5	2.5	3.2	11.2	7.3	2.6
2007	4.8	0.9	4.5	7.6	5.1	4.1
2008	7.8	10.8	11.5	17.3	9.8	4.8
2009	6.8	7.0	6.6	7.1	5.0	4.5
2010	4.0	6.0	1.0	3.0	2.0	3.4
Budget Balance (% of GDP)						
2001-2005	-5.1	-1.3	-1.1	-5.9	2.3	-0.9
2006	-2.8	3.1	-0.5	1.5	-4.8	0.4
2007	-1.7	2.4	0.6	1.3	1.6	-1.4
2008	-3.2	-2.2	-1.9	-0.3	1.8	2.2
2009	-3.8	-0.2	-3.9	2.2	-1.0	1.0
2010	-3.6	0.0	-8.1	2.4	-0.6	-2.1
Current Account Balance (% of GDP)						
2001-2005	-5.0	4.8	-16.8	0.1	-1.1	-6.4
2006	-18.8	8.0	-11.1	-1.6	-7.8	-5.3
2007	-13.6	2.9	-15.9	-8.2	-8.3	-6.9
2008	-17.9	9.9	-6.2	-16.4	-8.9	-5.9
2009	-8.1	-7.3	-2.0	-21.1	-9.2	-2.2
2010	-2.3	-26.6	-8.0	-20.0	-5.6	-2.4

Sources: Asian Development Bank (2011), IMF (2009, 2010).

Table 2. Vanuatu: Selected Key Indicators

Land Area (Sq.km.'000)	12.2
Population (2010)	245,376
Per Capita GDP (US\$) Current prices : 2010	US\$2,981
Aid as percentage of GDP (2010)	6.8
Annual Average Growth Rate in percent (2001-2005)	1.1
Annual Average Growth percent (2006-2010)	5.1
Annual Overall Budget Balance: (%) of GDP (2001-05)	-1.0
Annual Overall Budget Balance: ((%) of GDP 2006-10)	-0.2
Current Balance as percent of GDP (2001-2005)	-1.7
Current Balance as percent of GDP(2006-2010)	-0.9
Annual Average Inflation in percent (2001-2005)	2.4
Annual Average Inflation in percent (2006-2010)	3.5

Sources: Vanuatu National Statistics Office

Table 3. Vanuatu: Selected Output and Monetary Statistics

	Output Growth (%)	Inflation (%)	Interest Rate (%)	ER (Dom currency/US\$)	M1 (% of GDP)	M2 (% of GDP)	Government Expenditure M2 (% of GDP)
1980-89 (Ave)	1.9	9.4	16.7	107	16.5	84	35
1990-99 (Ave)	4.0	0.6	13.6	117	15.4	101.0	27
2000-04 (Ave)	1.3	2.5	7.9	128	19.8	93.0	22
2005	5.2	1.2	6.25	112	34.8	99.0	18
2006	7.4	2.1	6.25	106	34.4	94.0	20
2007	6.5	3.9	6.5	99.9	39.9	98.0	22
2008	6.2	4.9	6.25	112.6	33.3	100.0	25
2009	3.5	4.3	6.0	97.8	35.6	95.0	26
2010	2.2	2.8	6.0	93.2	33.4	85.0	27
2011	4.3	4.2	6.0	93.6	31.1	53.0	23

Source: Asian Development Bank (2011, 2012), IMF (2012)

Table 4. Vanuatu: Results of Bound Tests

Dependent Variable	Computed F-statistic			
RGDP	17.435***			
G	1.773			
M2	1.328			
ER	2.102			
	Pesaran, et al. (2001) ^a		Narayan (2005) ^b	
Critical Value	Lower bound value	Upper bound value	Lower bound value	Upper bound value
1 per cent	3.41	4.68	4.134	5.761
5 per cent	2.62	3.79	2.910	4.193
10 per cent	2.26	3.35	2.407	3.517

^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. 10. *, ** and *** indicate significance at 10%, 5% and 1% levels, respectively.

Table 5: Short-run and Long-run Elasticities of Real output for Vanuatu

Variable	Short-run	Long-run
LG	0.149**	0.139**
LM2	0.078*	0.382***
LER	0.021*	0.144***
Intercept	-	5.690***

Note: *, ** and *** indicate significance at the 0.1, 0.05 and 0.01 marginal levels, respectively.

Table 6. Results of Variance Decomposition of RGDP

Period	S.E.	RGDP	G	M2	ER
1	0.026	53.755	4.199	31.247	10.799
2	0.062	28.799	3.155	60.268	7.778
3	0.079	20.846	2.012	67.162	9.980
4	0.098	20.174	3.111	64.831	11.884
5	0.105	21.226	9.814	58.312	10.648
6	0.130	25.076	6.481	48.089	20.354
7	0.157	17.634	35.488	32.936	13.942
8	0.202	20.720	22.472	30.572	26.235
9	0.295	9.670	62.769	15.303	12.258
10	0.404	16.632	33.759	18.771	30.839

Cholesky Ordering: M2 G ER RGDP

Table 7: Correlation Matrix reduced form VAR residuals

	RGDP	G	M2	RER
RGDP	1	0.435	0.499	-0.174
G	0.435	1	0.365	-0.077
M2	0.499	0.365	1	0.016
RER	-0.174	-0.077	0.016	1

Figure 1: Plot of CUSUM Test for the RGDP Equation

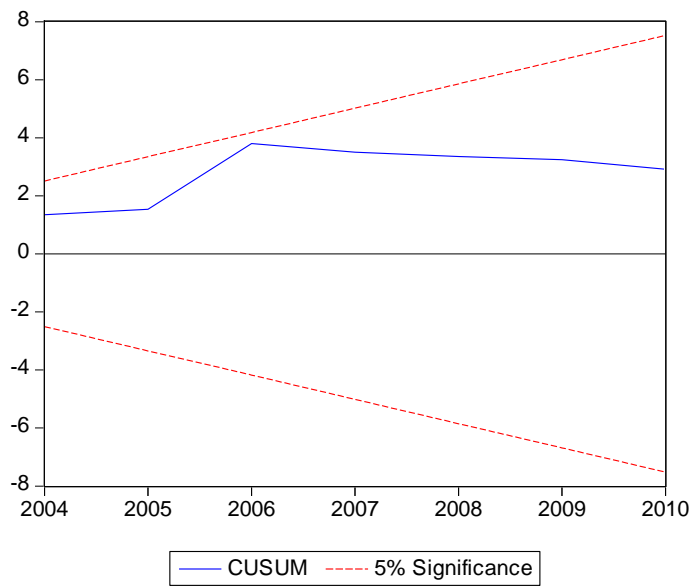


Figure 2: Plot of CUSUM of Squares Test for the RGDP Equation

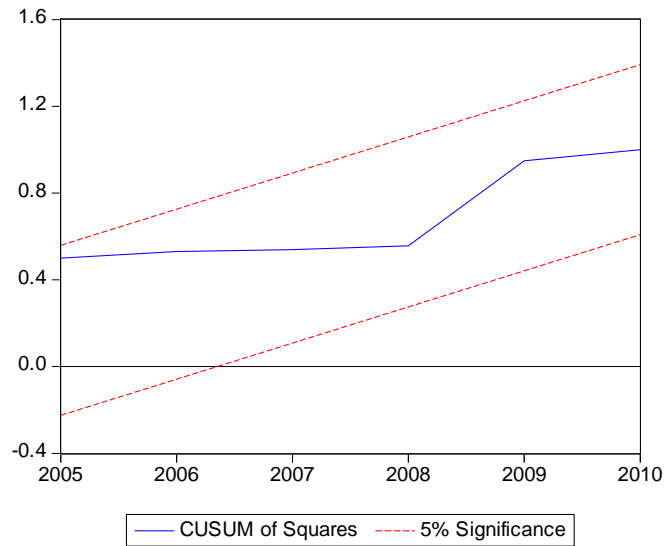


Figure 3: Plot of CUSUM Test for the RGDP Equation

Response to Cholesky One S.D. Innovations ± 2 S.E.

