The Potency Of Monetary and Fiscal Policies In Caribbean Countries: A Cointegrating VAR Approach

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Abstract

The effects of monetary and fiscal polices on the level of economic activity in small open economies have generated much theoretical discussion over the years. However, no formal empirical analysis known to the authors has tested the effectiveness of these policies in Caribbean economies. This paper therefore seeks to address this deficiency by utilising a cointegrating vector- autoregressive model to test the relative effectiveness of monetary and fiscal policy as a stabilization tool in three Caribbean economies, Barbados, Guyana and Trinidad and Tobago.

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Introduction

The relative effects of monetary and fiscal policies on the level of economic activity have been the centre of much debate since the 1960s. Monetarists have advocated the use of monetary policy while Keynesians contended that fiscal policy was more efficacious. The empirical focus has largely been on developed countries. Utilizing the now famous St. Louis single equation model, which involves an equation that contains income, a monetary and a fiscal variable, studies for the United States have concluded that monetary policy is of greater importance to economic activity than fiscal policy (Seaks and Allen, 1980; Anderson and Jordan, 1968), while for other developed countries, the results have been mixed (Chowdhury, 1988).

The few studies conducted on less developed countries have concentrated on the African, Asian and Latin American economies and have also utilised a St. Louis single equation model or its modified version, where exports is included as a measure of the foreign effect given the openness of these countries and their heavy dependence on foreign trade. These results have been mixed (Bynoe, 1994; Orsmond, 1992; Chowdbury, 1986; Darrat, 1984). To date there have not been any formal empirical analysis of the relative effect of monetary and fiscal policies on the level of economic activity in the small open economies of the Caribbean, although the nature of the adjustment policies in the region have generated much theoretical discussion(see Worrell, 1990).

In this paper, rather than to estimate the conventional St. Louis single equation model, a modified St.

Louis cointegrating four-equation vector-autoregressive system is utilised to test the relative effectiveness of monetary and fiscal policy as stabilization tools in three Caribbean economies; Barbados, Guyana and Trinidad and Tobago. This approach has the attractive feature that the estimated long-run relationships embedded in the system are theory consistent and have a clear economic interpretation, yet the short-run dynamics are flexibly estimated within a VAR framework. The dynamic properties of the system is evaluated via the recently developed generalised impulse response function of Koop, Potter and Peasaran (1996) as well as the variance decomposition function.

The next section briefly describes the economic structures and the role which monetary and fiscal policies have played in these economies over the last two decades. The third section describes the estimation procedure and the empirical model. In section four, the results of the model are presented and the paper concludes with a brief summary in section five.

2. Economic Structure and Performance

Guyana, Barbados and Trinidad and Tobago are all considered to be small open economies. Given their small size and high degree of openness, periods of economic contraction and expansion in the international economy translated into fluctuations in the demand for these nations' exports and changes in the price of what they export and consume (Deere, 1990). As a result, monetary and fiscal adjustment policies are employed to achieve a balance between economic growth and foreign exchange reserves.

Guyana

The Guyana economy has been and continues to be supported by the agriculture sector, predominantly sugar cultivation. This industry accounts for almost forty per cent of national income and employs a similar percentage of the labour force. Apart from agriculture, mining and quarrying and the distribution sectors are beginning to gain in importance.

The economic situation in Guyana during the early 1970s was relatively sound as export earnings increased mainly as a result of sugar, the nation's main export commodity, which experienced favourable prices in the international market. Government's monetary policy was aimed at maintaining low interest rates. In addition to issuing credit guidelines to the commercial banks the Bank of Guyana used moral suasion to encourage the shift of resources away from consumption and into productive use (Khan, 1997). Fiscal policies were mainly directed towards the nationalization of strategically important industries and the provision of subsidies and free social services.

With the fall in sugar prices and export earnings during the 1976 to 1979 period, foreign exchange scarcity and large balance of payments deficits emerged. This crisis was compounded when Government borrowed heavily to finance industries suffering from declining market conditions. Monetary policy was used to accommodate the resulting large fiscal deficit. For example in 1978 monetary policy targeted domestic savings and the balance of payments, while fiscal policy was directed at restraining government expenditure and increased taxation. By the end of 1978 these policy measures resulted in improvements in public savings, the balance of payments deficit and the foreign exchange position (Harris, 1989).

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The modest growth in economic activity registered in 1980 due to increase export prices and the anticipation of further growth in the succeeding year led Government to relax stipulations on import licences. This led to a significant growth in imports, an increase in the balance of payment deficit and a large fall in real output at the end of 1982. During the 1983 to 1986 period some growth was realised in the economy, however, no substantial improvements were evident in the balance of payments and government's deficit as monetary policy was aimed at accommodating government's large fiscal deficits.

Government embarked on a medium term Economic Recovery program in 1989, to further correct the imbalances in the economy. Monetary policy focussed on maintaining real positive interest rates and their determination through market forces and sterilizing excess liquidity problems of the banking system with the view of containing credit expansion. These measures began to show positive results by 1991 when the economy expanded following four years of negative growth. This outcome was made possible by government's fiscal policy which was centred on divesting public enterprises. The economy has since experienced continued growth in its major sectors.

Trinidad & Tobago

The twin island state of Trinidad and Tobago had a labour force of 558,700 persons and an unemployment rate of 15% at the end of 1997. The cornerstone of Trinidad and Tobago has been its petroleum industry with an increased reliance in recent years on its manufacturing sector. Hence one would expect that the fortunes of this economy would be highly correlated with that of the petroleum industry.

The beginning of the 1970s witnessed the economy of Trinidad and Tobago being characterised by a sluggish growth in output, foreign exchange shortages and high levels of inflation and unemployment. Monetary policy aimed at stimulating credit was employed initially to counter the poor performance of the economy. However, this policy objective was reversed in 1973, as credit expanded significantly and inflation levels continued to grow.

Economic boom began in 1974 as the oil price revolution characterised by substantial increases in oil prices started to take root within the economy. The Trinidad and Tobago economy was soon characterised with real output averaging 6.3%, high levels of employment, balance of payment surpluses and healthy foreign exchange up to 1980. Government's revenues also benefited substantially, as a revised Petroleum Tax Act was introduced with the purpose of increasing Government's revenue from the earnings of oil companies. The growth in Government's revenue aided in economic diversification and the improvement and expansion of the nation's infrastructure. The reserve requirement, was raise in 1974 in an effort to counteract pressures on domestic prices and credit expansions, resulting from the increased fortunes of the petroleum industry. This monetary policy initiative was met with little success (Farrell, 1989).

The failure to introduce appropriate monetary and fiscal restraint during the period of economic boom soon caught up with the economy. In 1979 signs of downturn emerged as petroleum production fell and the fiscal balance recorded a small deficit. To address this potential problem, government in 1980, instituted its first monetary policy action since 1974 with the intention to slow the growth in credit. Fears of economic slow down were masked as oil prices rosed substantially for the second time.

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Oil revenues peaked in 1981and thereafter fell, plunging the economy into a recession by 1983 as massive fiscal deficits emerged as government's tax revenue from the petroleum industry fell substantially. As a result government expenditure which acted as a stimulus to the growth of the other sectors of the economy, began to contract leading to a similar deterioration in the entire economy. With the further worsening in economic conditions in 1986, monetary policy and fiscal policy aimed at reducing credit growth was introduced, impacting negatively on employment and output. The economy entered a stabilization and structural adjustment programme in 1989 which shaped further monetary and fiscal policies. The reform culminated in 1993 with a shift to a regime of flexible exchange rates.

Barbados

Barbados is principally a service economy led by tourism, but with important contributions from export agriculture and offshore business. The performance of the Barbados economy was relatively poor during the first half of the 1970s. The oil shock of 1973 combined with inflation and economic stagnation of the country's trading partners resulted in high domestic inflation and balance of payments difficulties. In response monetary policy was geared at correcting the external imbalances, while fiscal policy remained tight as government increased its revenue by introducing new tax measures.

By the beginning of the second half of the 1970s, the economy showed signs of stabilization. This was influenced by the expansion in demand for its export from neighbouring Trinidad and Tobago and increased demand for its tourism product as the North American and European economies recovered.

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However, the economy weakened between the 1980 and 1984 period as tourist arrivals stagnated and Government's fiscal position deteriorated as a result of increased expenditure on capital projects and wages and salaries in the lead up to the 1981 general elections. The situation was further aggravated by heavy rains which reduced sugar production. Problems of external liquidity emerged as tight domestic liquidity conditions transferred the burden of government financing to the Central Bank. Despite the tightening of monetary and fiscal policy in 1982 no improvements in reserves were realized, thrusting government into a standby programme up to 1984. The programme sought to address the deterioration in the external accounts and government's fiscal imbalance. Thus in an effort to depress disposable incomes and domestic demand, new payroll taxes were introduced while indirect taxes and charges for public services were raised.

By 1984 inflation was brought under control and the economy registered strong economic growth resulting in an easing of the tight monetary and fiscal policies which were in existence. Economic expansion continued up to 1989, largely the result of government's expansionary fiscal policies. These policies resulted in significant growth of the construction and wholesale and retail sectors, constraining the nation's ability to improve its foreign exchange position. The nation's ability to maintain its official exchange rate became questionable as foreign reserves depleted rapidly during 1989 and 1990 and by 1991 the Central Bank's foreign exchange reserves were exhausted, pressuring Government into an IMF structural adjustment programme.

Fiscal policy was at the heart of the adjustment programme which had as its major aims, the reduction in foreign exchange outflows, the maintenance of the value of the exchange rate and the

restoration of confidence in the economy. To achieve its objectives Government introduced an additional tax, raised the level of existing taxes, reduced the wages of public servants by eight per cent, cut its work force by three thousand persons and scaled back its capital projects. These measures restricted imports by reducing purchasing power thus allowing foreign exchange to accumulate as economic growth resumed in 1995.Over the last six years GDP has grown at an average rate of 3.4%, while inflation has averaged 3.3%. Since 1992 the country's unemployment rate has declined steadily and by the end of 1997 this rate has contracted to 12.2%.

3. Methodology

The VAR, models estimated for Trinidad, Barbados and Guyana were estimated using yearly data. Government expenditure (EP) was used as the fiscal policy variable, net domestic assets (NDA) was used as the monetary policy variable, total exports of goods and services (EX) was used as the foreign trade variable and real GDP (GDP) was used as an aggregate income measure. All of the variables were placed in logarithm form (L) before testing.

As was stated previously, the model used to determine the effectiveness of monetary and fiscal policy measures is the cointegrating VAR model, hence in this section, the attributes of the VAR model are introduced.

Consider the following VAR process

$$y_t = \Phi y_{t-1} + ... + \Phi_p y_{t-p} + \alpha_0 + a_1 + v_t \qquad (1)$$

y_t is a m*1 vector of endogenous variables for t=1,2......T, where α_0 and α_1 are m* 1 vectors of unknown coefficients and u_t is a serially uncorrelated m*1 vector of errors with a zero mean and a constant positive definite variance-covariance matrix $\Omega = (\omega_{ij})$, where ω_{ij} is the (i,j) element of Ω. Assume that the roots of the determinated equation

$$\left| I_m - \Phi_1 \zeta^1 - \Phi_2 \zeta^2 - ..... - \Phi_p \zeta^p \right| = 0 \qquad (2)$$

fall on and or outside the unit circle. Given this stability condition, the model can be reparameterised as a Vector Error Correction (VEC)

$$\Delta y_t = - \Pi\, y_{t-1} + \sum_{i=1}^{p} \Gamma_i \Delta y_{t-i} + a_0 + v_t \qquad (3)$$

where

$$\Pi = I_m - \sum_{i=1}^{p} \Phi_i\, , \Gamma_i = - \sum_{j=i+1}^{p} \Phi_j\, , i = 1,...p = 1 \qquad (4)$$

If the elements of y_t are integrated of order zero, i.e. I (0), Π will be a full rank m*m matrix, and the VAR model in levels is estimated. If they are I(1) and not cointegrated then $\Pi = 0$ and a VAR model in first differences is appropriate. If the elements of y_t are I(1) and cointegrated with rank $(\Pi) = r$, then $\Pi = \alpha\beta'$, where α and β are m*r full column rank matrices and there will be r< m linear combinations of y_t, the cointegrating relations, $\xi t = \beta'y_{t-1}$ which are I(0).

Th argument for VAR models was put forward by Sims in 1980, where he argued that application of the simultaneous equation model to macroeconomic had in fact relied upon artificial constraints unjustified by economic theories in order to achieve the complete identification.

The variables were then tested for Cointegration using the popular software package Microfit 4.0™. First the order of integration was tested by using the Augmented Dickey-Fuller (ADF) tests for unit roots The model selection criteria used were the Schwarz Baysian criteria (SBC) and the Akaike Information criteria (AIC). Once the order of integration was achieved, next the variables were placed in a VAR format and the order of the VAR were estimated using the associated SBC and AIC statistics. Since the aim is to select the optimum order for the VAR, it is important to select an order high enough, to be reasonably confident that the optimum order will not exceed it.

Once the order was obtained the number of cointegrating vectors present in the VAR model were calculated by using the Johansen full information maximum likelihood (FIML) approach. The test was

conducted assuming that there were no trends in the VAR equations for any of the countries

Under cointegration the VECM can be written as

$$\Delta y_t = - \alpha\beta' y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + a_0 + v_t \qquad (5)$$

Where α is the matrix of adjustment or feedback coefficients which measure how strongly the deviations are from equilibrium, the r stationary variables β' yt-1, feedback onto the system. If there are $0< r < m$ cointegrating vectors, then some of the elements of α must be non zero, that is there must be some granger causality involving the levels of the variables in the system to keep the elements of y_t from diverging.

The unrestricted estimate of Π can be obtained using (3) above. In the restricted model, (5), which is subject to $r< m$ cointegrating vectors, estimates of the two m*r coefficient matrices, α and β are needed. It is clear that α and β are not separately identified without additional restrictions, since for any non-singular matrix Q, $\Pi = \alpha$ Q $Q^{-1}\beta'$ and $\alpha* = \alpha$ Q and $\beta*' = Q^{-1}\beta'$ would be equivalent matrices of adjustment coefficients and contegrating vectors. Put differently, any linear combination of the I (0) variables, $\zeta = \beta'$ y_t, are also (I) (0) variables. To avoid this indeterminacy, impose r independent restrictions on each of the r cointegrating relations, a total of r^2 restrictions, r of which are provided by normalisation conditions. Thus in the restricted model 2 mr-r^2 free parameters are

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estimated, and cointegration imposes $(m-r)^2$ restrictions. Johansen (1988, 1991) who provides procedures for testing the rank of Π and estimating α and β, uses the identifying restriction that β are eigenvectors, that is have unit length and are orthogonal. Mathematically, these restriction are useful, but have no economic meaning, since in general there is no reason to expect economic cointegration vectors to be orthogonal: when $r > 1$, economic interpretation of the Johansen estimates of the cointegrating vectors is almost impossible. The alternative is to use economic theory to provide the restrictions, which allows the cointegrating vectors to be interpreted as formula long-run economic restriction. Peasaran and Shin (1997) provide a general treatment of such identifying or over identifying restriction, which can be linear or non-linear (see also Saikkonen (1999)).

Impulse Response Functions and Variance Decompositions

To observe the short-run dynamic properties of the models three separate tests were run; the first examined the effects of system-wide shocks on the cointegrating relations by plotting the 'persistence profiles' of these relations. The second known as the generalised[1] impulse response functions examined the effects of shocks to specific variables on all the variables in the CVs and the third looked at the generalised variance decompositions of the variables. The dynamic tests are computed for a 12-quarter horizon in order to allow for as complete an impact of the disturbances as possible

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[1]The Generalised impulse response was chosen as apposed to the Orthogonalised impulse response because this takes into consideration the effect a shock to one variable in the CV may have on other CVs in the model

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The impulse response functions (IRFs) are another way to explain the dynamics of the system. Fisher has described IRFs as a type of dynamic multiplier that gives the current and subsequent effects on each variable of a shock to one of the variables.

The VDCs show what proportion of the variation in each of the variables in the VAR system is attributable to its own innovations and to shocks to other system variables. The ordering of variables in the VDC is important due to nonzero contemporaneous, cross-equation residual correlation.

4.Results

The stationarity tests showed that all of the series were stationary in the first differences. The order of the VAR (Table 1) was found to be one for all three countries.

Table 1

Order	Schwarz Bayesian Criterion (SBC)		
	Barbados	Trinidad and Tobago	Guyana
4	-45.1	-233.62	-199.27
3	-44.74	-221.27	-191.6
2	-40.05	-207.56	-178.92
1	-25.76	-192.89	-173.39
0	-106.17	-316.52	-289.25

The findings of the FILM approach for estimating the number of cointegrating vectors showed that for Barbados the maximum and trace eigen value statistics rejected the null hypothesis that there was no cointegration among the variables at the 5% level but accepted the null hypothesis that there was one cointegrating vector. However, the FILM test for Trinidad and Tobago showed that there were two cointegrating vectors. With respect to Guyana the maximum and trace eigen value statistic did not reject the null hypothesis that there was no cointegration at the 5% level, hence, each equation within the VAR system was estimated separately by ordinary least squares (OLS). In order to estimate the coefficients of the VAR models, variables had to be chosen on which to normalise; the variables chosen were GDP and exports since these were the variables which were believed to be endogenous to the system. The results of the VAR models are given in Table 2.

Table 2

	Barbados	Trinidad and Tobago		Guyana (OLS)	
Variables	**LGDP**	**LGDP**	**LEP**	**LGDP**	**LEP**
LGDP	1.0000	1.0000	0.0000	1.0538	0.04167
	(none)*	(none)	(none)	(0.03957)	(0.0332)
LEP	-0.2248	0.44679	-0.9721	-0.1503	0.6651
	(0.00968)	(0.1893)	(0.1189)	(0.1674)	(0.1405)
LEX	0.0000	0.000	1.0000	0.2216	0.5175
	(none)	(none)	(none)	(0.2515)	(0.2112)
NDA	-0.0049	0.0007	-0.0004	-0.0008	0.0005
	(0.0027)	(0.0004)	(0.0002)	(0.0006)	(0.0005)
Intercept	-5.9828	-11.1888	0.8997	-0.9265	-1.3766
	(.06265)	(1.1954)	(0.7083)	(0.9079)	(0.7623)

* Values in brackets represent the standard errors associated with the coefficients

In the case of Barbados the preliminary results showed firstly that government expenditure was the only variable which exerted a significant influence on GDP. As expected the coefficient associated with the exports variable was not significant hence it was removed from the model by setting its coefficient to zero. The VAR was then re-estimated and the results showed that government expenditure and NDA have significant influences on GDP (although the coefficient for NDA is only just significant). However the sign for NDA was negative indicating that an expansion in the NDA in the long run causes income to contract.

For Trinidad and Tobago, in the GDP VAR only the coefficient associated with government expenditure is significant, however in the second vector both government expenditure and NDA are significant in explaining the movement of the exports variable, it also shows that a negative relationship exists between exports and both expenditure and NDA. Therefore in the long run the preliminary evidence seems to indicate that only fiscal policy affects output however both fiscal and monetary policy affect export growth.

With respect to Guyana, the OLS equations for both GDP and exports showed that neither expenditure nor NDA were significant in explaining the variation in these variables. Indeed in the GDP equation the only significant variable was GDP itself and in the exports equation both the coefficients for GDP and exports were significant.

These results were in line with a priori expectations, in the small, open economies of the Caribbean which have underdeveloped capital markets and relatively large government sectors, government expenditure as apposed to Central Bank operations would be expected to have a more significant impact on the economy. However, the reasons for the negative signs for the NDA variables for the GDP VAR in Barbados are surprising. In the case of Guyana the lack of significance of either fiscal or monetary policy could perhaps be due to another variable influencing the system.

Persistence Profiles, Impulse Response Functions and Variance Decompositions
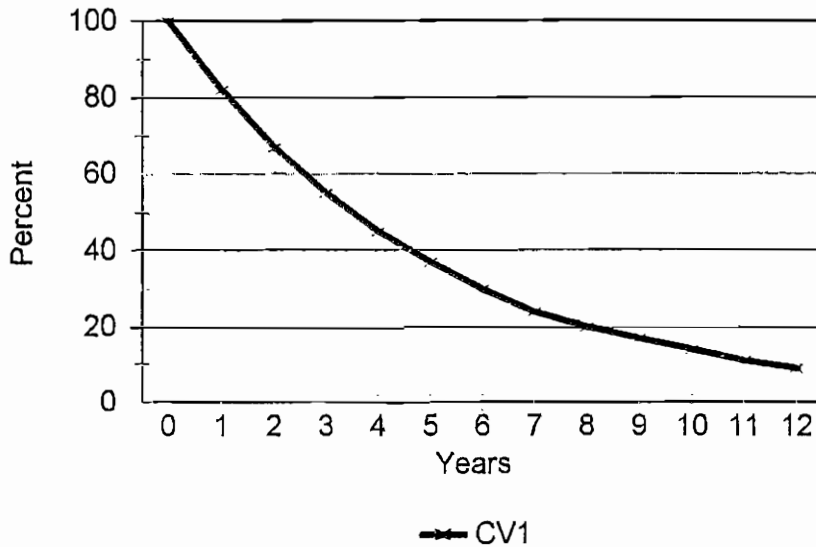For Barbados the persistence profile (Figure 1) showed that the system returns to equilibrium at a fairly rapid rate when shocked, so that by the twelfth period the shock is slightly more than 10% of

it original value.

Figure 1

Persistence Profile of the effect of a system-wide shock to CV1
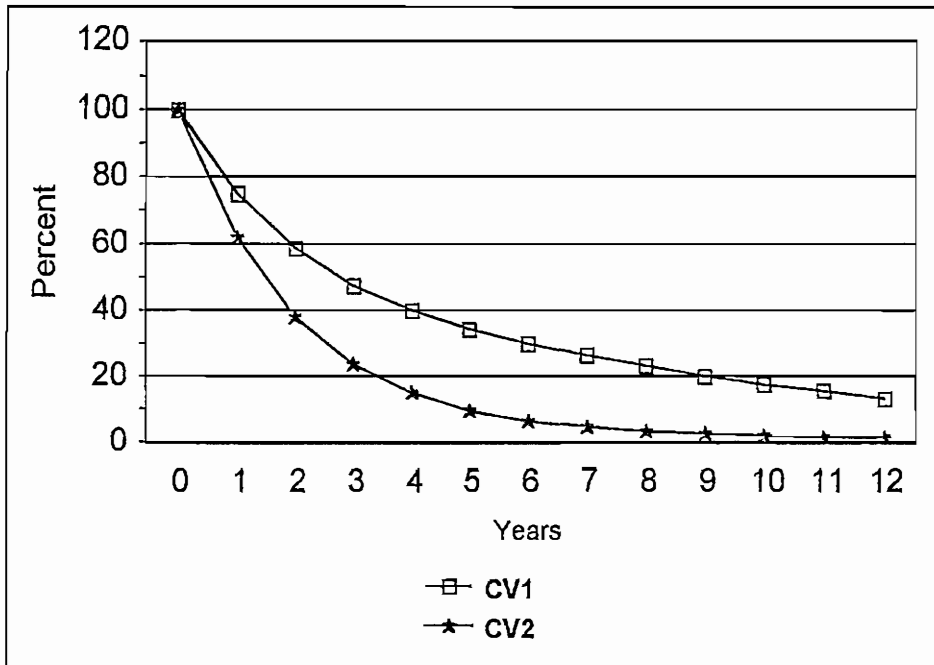
(Barbados)

With reference to Trinidad (Figure 2), the profiles for the two CVs clearly show that the speed with which each variable returns to its respective equilibria is different. The GDP VAR returns to equilibrium smoothly and gradually when shocked so that by the fourth period the effect of the shock has declined to slightly less than half its value, and by the twelfth period the shock is still 10% of its value. However the exports VAR returns to equilibrium at a more rapid rate when shocked, so that by the sixth period the effects of the shock are almost negligible implying perhaps that the exports VAR is more stable that the GDP VAR.

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Figure 2

Persistence Profile of the effect of a system-wide shock to the CVs

(Trinidad and Tobago)

The next series of tests examined the effect of shocks on specific variables on the CVs. The generalised impulse responses to one standard error shock to the equations for each of the variables in the system were obtained. In the case of Barbados, as Table 3 shows, a shock to the expenditure variable produces an initial marginal increase in income growth of approximately 2.2%, however, the effect quickly declines until at the end of the eighth period when it is almost negligible. The long run effects of this shock therefore seem to be insignificant. A shock to the NDA variable appears to have no effect on income in either the short or the long run.

In Trinidad (Table 3) the effect of a shock to government expenditure produces a significant short run effect on income. A one standard deviation shock to government expenditure produces an instantaneous 18.5% increase in GDP . The effect gradually falls to less than half its value by year twelve, however, based on this result, the effect of a shock to expenditure has a significant long run effect on GDP. A one standard deviation shock to NDA causes GDP to instantaneously increase by 18.4%. The effect steadily falls to less than half its value at the end of year four and by the end of year twelve the effects are almost negligible; therefore a shock to NDA appears to have no significant long run effect on GDP. For the export VAR a shock to expenditure produces no significant short or long term effects on exports but a shock to NDA causes an instantaneous 21.7% decrease in exports, this effect declines at a rapid rate to less than half its value by year four and is negligible by the end of year twelve. Therefore the effect on exports of a one unit (one standard deviation) shock in NDA is significant in the short term but insignificant in the long run.

In Guyana, (Table 3) a one unit increase in government expenditure, produces an instantaneous 11% increase in GDP, however the effect rapidly decreases, so that by the end of year four, it is negative. The magnitude of this negative effect then increases rapidly to almost minus 20% by the end of the twelfth year. The results for the impact of a shock to NDA on GDP growth are similar; a positive shock to the NDA increases GDP by approximately 10% however this effect quickly declines to minus 10% by the end of year four. The effect peaks at the end of the eighth year and declines to half its value by the end of year twelve. The results for the impact of expenditure and NDA shocks on exports are very different. Expenditure shocks appear to have no significant impact on exports, however in the short run a shock to NDA results in a 10% decline in exports but this effect falls

rapidly to almost negligible proportions by the end of year twelve.

Table 3

Years	Barbados		Trinidad and Tobago				Guyana			
	CV1		CV1		CV2		LEP		LNDA	
	LEP	NDA	LEP	NDA	LEP	NDA	GDP	LEX	GDP	LEX
0	2.2	-0.6	18.5	-22	2.2	22.4	11.1	3.43	10.3	-10.4
4	0.1	-0.4	6.3	-0.1	2.6	9.4	-0.35	1.61	-10.0	-7.04
8	0.1	-0.2	4.7	0	2.2	3.9	-13.4	1.21	-15.0	-1.56
12	0.1	-0.1	3.4	0	1.7	1.7	-19.8	3.8	-7.54	-2.38

Table 4 gives the results of the Variance decompositions (VDCs) for Barbados, for the GDP system expenditure innovations account for approximately 7% of the variations in GDP, while NDA innovations have almost no effect on GDP. These results serve to emphasize those obtained in the impulse response functions, namely fiscal policy tends to exert an impact on the economy, however monetary policy influences are almost negligible. With regard to exports, innovations to expenditure do not account for any of the variation in this variable and NDA innovations are responsible for only a small percentage of the variation.

Table 4

Country Barbados	Number of Horizons 12 (Explained by)			
System	LGDP	LEP	LEX	NDA
LGDP	91.0	7.00	20.0	1.00
LEP	89.0	12.00	21.0	4.00
LEX	57.0	0.00	62.0	6.00
NDA	12.0	2.00	2.00	84.0

Table 6 shows the results of the VDC for Trinidad and Tobago; for the GDP system innovations to the NDA variable are responsible for approximately 86% of the variation in GDP, however expenditure innovations have only a slight impact on GDP. This result contrasts sharply with that obtained in the impulse response function for Trinidad and Tobago because the effects of NDA are shown to be significantly higher than those for expenditure. In the exports system, exports is responsible for 99% of its variation, while expenditure innovations account for about 32%. Innovations to both NDA and GDP are responsible for 17% and 12% respectively in export variation. Therefore the effects of fiscal policy changes appear to have a more significant impact than monetary policy changes.

Table 5

Country Trinidad and Tobago	Number of Horizons 12 (Explained by)			
System	LGDP	LEP	LEX	NDA
LGDP	23.0	3.00	18.0	86.0
LEP	37.0	28.0	9.00	43.0
LEX	32.0	32.0	99.0	17.0
NDA	13.0	0.00	27.0	97.0

With respect to Guyana, (Table 6) the results for the GDP system are similar to those for Barbados. Expenditure innovations account for 11% of the variation in GDP, however NDA innovations are responsible for only 4% of the variation in GDP. GDP and export variations are responsible for 41% and 18% of the variation in GDP respectively. In the export system, exports itself account for the largest variations (80%). Innovations to the NDA variable account for 18% of the variation in exports, however the impact of expenditure (9%) is much less; GDP innovations account for 17% of the variation in exports.

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Table 6

Country Guyana	Number of Horizons 12 (Explained by)			
System	LGDP	LEP	LEX	NDA
LGDP	41.0	11.0	18.0	4.00
LEP	13.0	74.0	48.0	24.0
LEX	17.0	9.00	81.0	18.0
NDA	48.0	41.0	6.00	19.0

5. Conclusion

This paper has aimed to test the comparative effectiveness of monetary and fiscal policy as policy instruments in the context of the small open economies of the Caribbean. A vector autoregression methodology was used in the empirical analysis and impulse response functions and variance decompositions were used to analyse the dynamic characteristics.

Despite the common characteristics of the economies the results were very different. Barbados' economy appeared to be affected by fiscal policy shocks or changes in both the short and long run but virtually unaffected by monetary policy changes. In Trinidad the findings are ambiguous, the different dynamic tests appear to contradict each other in terms of the relative importance of fiscal and monetary policy. However all the tests highlight the fact that the economy is effected by changes in monetary and fiscal policy in the short run. A similar picture emerges with respect to Guyana, both shocks to fiscal policy and monetary policy appear to exert significant influences in economy in the

short run . However unlike Trinidad the effect of the shock changes over time, hence for example in the long run an expansion of fiscal policy may lead to a decline in growth.

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