CURRENCY SUBSITUTION: EVIDENCE FROM THE CARIBBEAN

DanielBoamah, Kester Guy, Tiffany Grosvenor, AlexisLescott

ABSTRACT

The degree of currency substitution in small open economies has important implications for the purchasing power of the domestic currency and, naturally, the level of consumer confidence in the value of their domestic assets. The benefits and disadvantages of countries adopting a foreign currency to replace the basic functions of their sovereign dollar have been widely debated. The extent of currency substitution in a country provides critical insights into determining an appropriate foreign exchange regime, implementing a stabilization programme and the overall formulation of monetary policy. This study examines the degree of currency substitution within four Caribbean countries and assesses the possible effects of foreign currency demand in these countries. The analysis employs an autoregressive distributive lag (ARDL) model and uses quarterly data from 1996 to 2009.

Keywords:currency substitution, foreign currency demand, ARDL model

JEL Classification:E41; E44; C22

1.Introduction

Currency substitution is by no means a new concept. The idea of currency substitution dates back to the post World War I era when Europe experienced severe hyperinflations. During this period, there was a lack of stable domestic means of payment, which became inconvenient for trade and production. As a result, the use of foreign currencies was desired not only as a store of value, but as a means of payment as well, (Gomis-Porqueras, Serrano, and Somuano, 2000). The definition of currency substitution in the literature has subsequently been linked to the holding of foreign currency by domestic residents, in relation to varying exigencies that derive from the traditional roles that money plays in the economy. At one extreme, Calvo and Végh (1992) limit the concept to the use of foreign currency by domestic residents as a medium of exchange. On the other hand, others such as Clements and Schwartz (1992) and Agenor and Khan (1992) adopt a more general stance; they define currency substitution as a process whereby foreign currency substitutes for domestic money as a unit of account, medium of exchange and as a store of value.

Factors that influence currency substitution either as a medium of exchange or as a store of value depend largely on the level of capital mobility and/or capital restrictions. Since most open economies with fixed exchange rates maintain some form of foreign capital restrictions, domestic residents usually do not have the legal option of holding foreign currency as a store of value. However, foreign currency is often obtained on the parallel market and is primarily used for transactional purposes. Foreign exchange restrictions under floating exchange rate regimes are generally relaxed and residents may hold foreign currency-denominated liquid assets. The magnitude of holdings would normally be influenced by the returns on alternative foreign liquid assets and on the domestic rate of inflation.

Naturally, the phenomenon of currency substitution, as a store of value in particular, is likely to be more pervasive in a country where there is a significant level of financial instability, to the extent that monetary management becomes more difficult when a large proportion of money stock is held in foreign currency-denominated assets. Additionally,

increased currency substitution may have several negative spill-off effects such as weakening the autonomy of monetary policy; increasing vulnerability to economic shocks arising from the host country; the potential for significant deterioration of the balance of payments account and/or exchange rate volatility. Moreover, currency substitution has the potential to negatively impact overall economic growth (Bahmani-Oskooee and Techaratanachai, 2001), especially for small open economies. It is therefore important that policy makers have a realistic notion about the extent of currency substitution and its potential impact on policy decision and the wider economy as a whole. With this view in mind we examine the presence and extent of currency substitution in selected countries of the Caribbean and explore discussion on policy implications.

In the Caribbean countries where unrestricted capital markets exist, residents usually hold foreign currency. Also, it may be used as a hedge against the expected loss in purchasing power when inflation in the domestic economy is high relative to the foreign country, (usually the United States) whose currency is generally held by domestic agents. Three such countries, Guyana, Jamaica and Trinidad and Tobago, are the subject of this study, as well as one fixed exchange rate regime- Barbados. In these territories residents have tended to hold an increasing proportion of foreign currency relative to total deposits. In the case of Jamaica, foreign currency holdings as a ratio of total deposits declined from about 78% in 1996 to about 55% in 1999, a period when the financial sector of that country was being restructured. However the ratio has been on a general upward trend from 1999 to 2008. Although not exhibiting as large fluctuations as in Jamaica, the ratios of the other countries have also followed an upward trend. Such observations therefore lend themselves to investigations that could have useful policy implications and allow for pertinent inferences regarding the general stability of these countries.

The remainder of the paper is structured as follows: section two provides a review of the related literature; section three outlines the methodology; section four describes the data and analyses the results; and section five concludes.

2. Literature Review

An extensive array of literature exists regarding currency substitution in both developed and developing countries. Although there are varying approaches to modeling currency substitution, most studies have utilised M2 in a simple money demand function, as the definition of M2 is deemed to be more relevant for the formulation of monetary policy. Bahmani-Oskooee and Tanku (2006) noted that in 1963, the Nobel Laureate Mundell (1963) was the first to argue that the demand for money could depend on the exchange rate in addition to income and interest rates, but since this was only a conjecture and not supported by any empirical analysis, not much attention was paid to Mundell's idea.

In estimating the demand for money in open economies, Arango and Nadiri (1981) noted that the demand for money had often ignored the influence of foreign money developments, and focused on the impact of adjustments in international reserves on a domestic money supply. The authors estimated the demand for real cash balances on real permanent income, short term domestic interest rates, short term foreign interest rates and the exchange rate, exchange rate expectations, inflationary price expectations. The results verified the hypothesis that foreign financial aid and monetary influences on the demand for real cash balances are transmitted by changes in foreign interest rates and exchange rate expectations and concluded that ignoring the effects of foreign interest rates and exchange rate expectations may lead to misspecification of the demand for money.

A majority of the studies in the literature have utilised the model of Arango and Nadiri (1981) or some variant, as the basis for estimating currency substitution. One of the earliest of such studies is Bordo and Choudhri (1982). The authors posited that if currency substitution is important, the expected change in the exchange rate should be a significant determinant of the demand for home currency. The efficient market hypothesis suggests that the forward rate is a good measure of the expected exchange rate. To account for departure from the simple efficiency hypothesis they used the proportional spread between the 90-day forward and spot exchange rates to measure the expected rate of exchange rate appreciation. They estimated demand for money functions

using both M1 and M2 but found the influence of the expected return on foreign money on the demand for domestic money in Canada to be negligible.

These results were in sharp contrast to the previous analysis of Miles (1978), which suggested a high degree of currency substitution in Canada. However, Bordo and Choudhri (1982) showed that his evidence can be reinterpreted to be consistent with theirs. The authors repeated Miles (1978) regression, and concluded that the model was misspecified, and that currency substitution is indeed insignificant in Canada.

However, Bahmani-Oskooee and Techaratanachai (2001) found that currency depreciation in Thailand has indeed resulted in currency substitution away from the Thailand Baht. Following Arango and Nadiri (1981) and Bahmani-Oskooee (1996), the authors estimated a money demand function with M2 (real money stocks) as a function of real income, the interest rate on alternative assets and the nominal effective exchange rate. Using the Johansen and Juselius (1990) cointegration technique, the results indicated that the nominal exchange rate was positive, suggesting that, as the Thai baht depreciates, public holding of M2 declines.

More recently, Kaplan et al. (2008) investigated whether currency depreciation in Turkey has resulted in currency substitution away from the Turkish dollar. The study also followed Arango and Nadiri (1981) and Bahmani-Oskooee's (1996) models to estimate a money demand function (real money stocks as a function of real income), nominal domestic interest rate and the nominal effective exchange rate. Since all of the variables appeared to be I(1), using the Johansen and Juselius (1990) cointegration method they found one cointegrating relationship, and estimated the long-run model. All variables were found to be significant and the positive sign on the nominal exchange rate variable implied the existence of currency substitution.

Alternatively, Akcay et al. (1997), in examining the extent of currency substitution in Turkey, utilised the portfolio balanced approach, which was first proposed by Cuddington (1983) and emphasizes the allocation of wealth between different types of money and assets simultaneously. The asset demand functions are distributed between the demand for domestic money, the demand for domestic bonds, the demand for foreign

bonds, and the demand for foreign money. The study focused however on the estimation of the demand for domestic money, as a function of domestic interest rate on bonds, interest rate on foreign bonds, the expected rate of depreciation of domestic currency and real income.

Alami (2001) also employed the portfolio balance model of Cuddington (1983) to a developing country where foreign currency deposits earn a competitive rate of return. The author however extended and modified the model to yield demand functions for domestic and foreign money that allows differentiating currency substitution (holding foreign money as a medium of exchange) and dollarization (holding foreign money as a store of value).

Instead of utilising the traditional money demand function, some studies have defined a currency substitution variable, for instance, Elkhafif (2002). Currency substitution was defined as the share of nominal foreign currency in money supply and was modeled as a function of the nominal exchange rate, and the interest rate differential between the interest rate on local currency and that on the dollar. The author used an error-correction model to examine the dynamic of the currency substitution phenomenon (CS) in two of Africa's emerging economies: Egypt and South Africa. The results indicated that currency substitution does exist, but its elasticity with respect to the exchange rate variable is larger in South Africa than in Egypt.

In Bahmani-Oskooee and Tanku (2006), the authors augmented the general model by noting that since there is a black market for foreign exchange in lesser developed countries, the black market exchange rate rather than the official rate should be the determinant for demand for money in LDCs. Using the bounds testing approach to cointegration and estimating the demand for money in 25 LDCs, the results suggested that the exchange, either black market or official, or the black market premium, is country specific, as no general conclusions could be made over the sample.

Additionally, Baharumshah et al. (2009) argued that the theory of asset demand indicates that the demand for money should be a function of the resources available to individuals, including their wealth and the expected return on other assets relative to the expected

returns on money. More specifically, money demand should include stock market prices. The results of the study suggested that real money balances are cointegrated with real income, inflation, real foreign interest rates and stock prices. In other words, stock prices have a significant wealth effect on long and short-run broad money demand.

The economic impact of currency substitution on the financial and economic development of a country is generally well documented in the literature. Many studies have alluded to the potential effects on the effectiveness of macroeconomic policy, the ability to formulate and conduct monetary policy, inflationary pressures and prospects for economic growth.

For instance, Cuddington (1983) made reference to Miles' (1978) argument that even though some degree of monetary independence is attained with a flexible exchange rate regime as opposed to a fixed exchange rate system, this independence may vanish in the presence of currency substitution. Ortiz (1983) also agreed that the argument for floating exchange rates, that is, autonomy of monetary policy, is severely weakened in the presence of currency substitution. The author further noted that a considerable amount of instability may be imported from foreign territories as the demand for domestic currency is significantly influenced by foreign factors. Ho (2003) argued similarly noting that for a fixed amount of money supply, as domestic currency is substituted for foreign currency, the domestic economy becomes susceptible to monetary shocks both at home and abroad, and hinders any attempts of the monetary authorities to pursue policies independent of foreign influences.

Additionally, according to Ramirez-Rojas (1985) currency substitution may redirect the effects of macroeconomic policy, as heavy substitution could lead to deficits in the balance of payments accounts and/or exchange rate depreciation. The author argues that either way deficit financing through money creation will fall, as well as the inflation tax base. Moreover, in analysing the Asian economic crisis, Bahmani-Oskooee and Techaratanachai (2001) suggest that implications of currency substitution for domestic money holdings could impact on economic growth. According to the authors, depreciation of the domestic currency raises the domestic currency value of foreign

assets. Therefore those seeking a safe haven, and expecting further depreciation, substitute more foreign currency for domestic currency, and therefore reduce their domestic money holdings. If these effects are strong enough, the decline in domestic currency could cause an economic slowdown and further exacerbate the economic crisis.

3. Methodology

In this study, currency substitution is measured by investigating the extent to which foreign currency deposits account for the total transactions balance of the money stock (M2)[1], as a result of changes to the exchange rate. An analysis is provided on the presence of currency substitution in Barbados, Guyana, Jamaica and Trinidad and Tobago using quarterly data over the period 1996 to 2009. Within the countries of this study, residents can legally hold foreign currency deposits at domestic banks and, although quoted in US dollars or the local currency, these deposits constitute several foreign currency denominations including the US dollar, the Pound Sterling and the Euro.

In the spirit of Alami (2001), financial markets within the region are quite narrow and thus the range and volume of financial assets are fairly low. As a result, domestic investors' portfolios are predominantly made up of domestic money (M^d), domestic bonds[2] (B^d) and foreign currency deposits (eM^f). The demand for these three categories of assets are:

$$M^d = M^d(\overset{-}{i}, \overset{-}{i^* + x^e}, \overset{+}{PY}, \overset{+}{W}) \quad (1)$$

$$eM^f = M^f(\overset{-}{i}, \overset{+}{i^* + x^e}, \overset{+}{PY}, \overset{+}{W}) \quad (2)$$

$$B^d = B^d(\overset{+}{i}, \overset{-}{i^* + x^e}, \overset{-}{PY}, \overset{+}{W}) \quad (3)$$

[1] M2 consists of all notes and coins in circulation, non-interest bearing deposits and interest-bearing retail deposits. M2 is usually referred to as the transactions balance since this money is readily available for spending.

[2] Domestic bonds include all domestic assets excluding deposits.

where i is the rate of return on domestic bonds, i^*+x^e is the rate of return on foreign money, i^* and x^e represent the interest rate on foreign bonds[3] and the expected percentage change in the exchange rate respectively, e is the nominal exchange rate, PY is domestic income (and represents a transaction variable) and W represents domestic wealth.

To investigate the degree of currency substitution among the selected countries, we adopted a variant of the traditional money demand function used by Bahamni-Oskooee and Techaratanachai (2001), Bahamni-Oskooee and Tanku (2006) and Baharumshah et al. (2009). Specifically, the model is represented by

$$M2_t = \alpha + \beta Y_t + \lambda R_t + \rho I_t^* + \gamma P_t + \xi X_t + \mu_t \quad (4)$$

where, $M2$ is real money balances, Y is real income, R is the nominal domestic interest rates, I^* is the interest rate on foreign currency deposits, P is the price level, X is the nominal effective exchange rate, μ is the error term and α represents a constant.

Uribe (1997) argued that empirical studies showed that the ratio of foreign currency deposits to M2 improves the fit of the money demand function. Thus, the following model was also investigated

$$F_t = \alpha + \varpi Y_t + \sigma R_t + \eta I_t^* + \varphi E_t + \varepsilon_t \quad (5)$$

where, F represents the ratio of foreign currency deposits to real money balances, Y, R and I^* are the same as above, E is the real effective exchange rate, ε is the error term and α represents a constant.

[3]The foreign currency deposits of developing countries would generally earn rates relatively close to those prevailing in the international markets (Alami, 2001).

Due to its greater statistical significance when estimating cointegration in small samples (Ghatak and Siddiki, 2001), an autoregressive distributed lag (ARDL) approach was used to investigate the significance of the long-run relationships that exists among the variables under study. Another justification for the employment of this model was that while other cointegration approaches like Engle and Granger (1987) tests require that all the regressors be integrated of the same order, the ARDL model can be used even when the variables are of different integrated orders. Moreover, endogeneity issues are less of a problem as long as the model is free of residual correlation (Baharumshah et al., 2009). The ARDL model involved estimating the following unrestricted error correction model (UECM):[4]

$$\Delta F_t = \alpha_0 + \sum_{i=1}^{n} b_i \Delta F_{t-i} + \sum_{i=0}^{n} c_i \Delta R_{t-i} + \sum_{i=0}^{n} d_i \Delta I^*_{t-i} + \sum_{i=0}^{n} e_i \Delta Y_{t-i} + \sum_{i=0}^{n} f_i \Delta E_{t-i} + \phi_1 F_{t-1} + \phi_2 R_{t-1} + \phi_3 I^*_{t-1} + \phi_4 Y_{t-1} + \phi_5 E_{t-1} + \mu_{it} \quad (6)$$

where Δ denotes the first difference operator, α_0 is the drift component, μ_t is the white noise residuals. Equation 6 is a standard VAR model in which a linear combination of lagged-level variables are added as a proxy for lagged error terms which measures the departure of the dependent variable from the independent variable in equation 4 (Baharumshah et al., 2009).

The null hypothesis of no cointegration among the variables in Equation 6 is $H_0 : \phi_1 = \phi_2 = \phi_3 = \phi_4 = \phi_5 = 0$ against the alternative hypothesis $H_1 : \phi_1 \neq \phi_2 \neq \phi_3 \neq \phi_4 \neq \phi_5 \neq 0$. Pesaran's et al. (2001) critical value was compared with the calculated F-statistic of the model. Based on his methodology, the null of no cointegration should be rejected if the F-statistic is greater than the upper bound. Conversely, if the F-statistic is smaller than the lower bound then the null is not rejected. An F-statistic that falls between the lower and upper bound is deemed inconclusive.

[4] The UECM representation is for equation 5. The appropriate representation and estimation was also used for equation 4.

One implication from Equation 4 is that a depreciation of domestic currency increases the value of foreign securities held by domestic individuals. Based on the literature, depreciation in the exchange rate causes the expected return on foreign money balances to increase. Consequently, demand for domestic currency decreases as individuals substitute domestic currency for foreign currency Bahamni-Oskooee and Techaratanachai (2001). Thus, a negative coefficient on X is expected. High prices erode the value of domestic currency and would tend to increase currency substitution. Nevertheless, higher prices may also mean higher demand for domestic currency in order to meet normal transaction needs. Thus, the impact of prices on currency substitution is dependent on the net effect of the two influences.

4.0 Data

Quarterly data from 1996 to 2009 was used to investigate the degree of currency substitution among four Caribbean countries Barbados, Guyana, Jamaica and Trinidad and Tobago. The exchange rate variables (both real effective exchange rate and nominal effective exchange rate) and the real GDP data were obtained from the IMF's online International Financial Statistics. All other data were obtained from the statistical digests of the various central banks. Real GDP was not available quarterly; therefore a frequency filter was used to obtain the quarterly data from the annual series.

Foreign currency deposits are the deposits in foreign currency held by residents in commercial banks.[5] Thus, our currency substitution proxy is the ratio of foreign currency deposits to M2. The domestic interest rate variable is the weighted average deposit rate and the foreign interest rate variable is the average rate on foreign currency deposits.[6] All variables were transformed by the natural logarithmic function.

[5] For Jamaica, foreign currency deposits included foreign currency deposits at commercial banks, building societies and merchant banks.

[6] For Barbados and Guyana, foreign deposit interest rates were not available. The 3-month US Treasury bill rate was used as an alternative proxy for the opportunity cost of holding foreign currency deposits.

5.0 Results

In order to ensure that all variables are either I(0) or I(1), we computed three widely used unit root tests, namely the Augmented Dickey-Fuller (ADF), Phillips-Perron (PP) and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS). The results from this test are particularly important because, while the bounds test for cointegration does not require that all variables be integrated of order 1, the assumption in computing the critical values of the F-test (Pesaran et al., 2001) is that all variables are either I(0) or I(1). Thus, including I(2) variables would undoubtedly lead to spurious results.

Tables 1 and 2 in the appendix provide the results of the unit root tests, which show that all the variables are at most I(1). Although the traditional unit root tests yielded conflicting results for the real GDP series for Guyana, Jamaica and Trinidad and Tobago, further examination using unit roots testing with structural breaks suggested that these variables were in fact I(1) variables (see table 2). A long run relationship between the currency substitution variable and other variable(s) is established if the coefficient on lagged dependent variable in its level form is statistically significant as confirmed by the ARDL F-statistic, and falls between -1 and 0.

The general to specific modeling approach for Barbados (see table 3 in appendix), showed a co-integrating relationship between currency substitution, domestic interest rates and real GDP when using foreign currency to M2 as a measure for currency substitution. We found a positive long run relationship between real GDP and foreign currency deposits to M2 ratio and a negative relationship between domestic interest rates and the currency substitution ratio. The finding with respect to the domestic interest rate is expected as high domestic rates would invariably imply holding more domestic assets. In relation to the positive impact on income, higher demand for foreign currency for transactional purposes may be a natural result. Further, causality analysis and a more detailed analysis of the policy shifts and the impact of financial liberation may help to explain this finding, but such is beyond the scope of this investigation. We, however, cannot conclude that there is evidence of currency substitution given that the real effective exchange rate has no significant impact (either in the short run or long run) on

the currency substitution variable. No long-run relationship exists for Barbados using the traditional money demand function (see table 4 in appendix).

In the case of Guyana, only the traditional money demand function provided any useful results for analysis. The results suggested a significant long run relationship between all the variables except domestic interest rates. The signs on the long run variables of interest were also consistent with our *a priori* expectations, where real GDP positively impacts real money balances, higher prices lead to higher money demand and most importantly, the nominal effective exchange rate negatively impacts real money balances in the long-run. The substitution effect of a shock to the exchange rate, which implies depreciation in the nominal effective exchange rate, translates into a 0.44 per cent switch from domestic currency holdings to foreign currency holdings. Positive impacts on real money balances due to price shocks and real GDP are consistent with the general literature. Short-run impacts were also significant for domestic interest rates, foreign currency interest rates, prices and the nominal exchange rates. The positive coefficient on the nominal effective exchange rate in the short run indicates that higher cost for foreign currency immediately leads to short-term increases in domestic currency, partly through wealth effects from repatriations. The changes in sign on the exchange rate variable between the short-run and long-run is logical and reflects that people would substitute foreign currency for domestic currency to protect themselves against future depreciation. The diagnostics for the model were relatively robust, with the exception of slight ARCH effects at the 10% level.

Like Barbados, the analysis for Jamaica is based on the foreign currency to M2 model. While the coefficient on the domestic interest rate was consistent with our expectation, the negative relationship between real GDP and foreign currency deposit ratio is an interesting finding. This may reflect the growing level of confidence and expectations of improvement for the economy over the long term to the extent that the desire to hold assets in a foreign currency is diminished. Similar to Barbados, higher domestic interest rates provide an incentive for holding domestic assets provided that all other conditions are constant. Short run changes in the real effective exchange rate will positively impact changes in currency substitution. This finding suggests that short term volatilities in the

exchange rate would encourage individuals to seek foreign assets to protect themselves; however, as conditions stabilize, there is less incentive for currency switching. This idea may be supported by the non-significance of the exchange rate variable and the negative sign on real GDP in the long run.

The elasticity of substitution due to a real exchange rate shock is estimated to be 0.63 per cent for Trinidad and Tobago based on the foreign currency deposits ratio model. However no short-run real exchange rate impact is observed in this model. Using the traditional money demand function model, the nominal effective exchange rate appeared to have no significance on real money balances. We therefore cannot argue currency substitution using this framework.

6.0 Conclusion

Overall, the results for currency substitution were slightly different depending on the variables constructed and the methodology employed. Notwithstanding the associated risks that may increase with currency substitution, such as the limitation of the lender-of-last-resort function of central banks or liquidity management, this phenomenon has grown in many developing and transition economies. Weighing all the risks and perceived benefits, currency substitution is extremely relevant with regards to financial stability (See Gulde et al., 2004) and the formulation of monetary policy. While foreign currency deposits as a percentage of total M2 has been generally trending upward for the countries under investigation, it is increasingly important to evaluate the factors that may affect the growth of currency substitution, since the level of foreign currency demand may allow for significant inferences about financial stability within the Caribbean economies.

This paper provides a definition of currency substitution and provides evidence that currency substitution due to exchange rate shocks occurs in three of the four countries investigated to some extent. Long-run impacts are present for Guyana and Trinidad and Tobago, but only short-run effects are observed for Jamaica. As highlighted by previous research, those countries which currently have floating exchange rates such as Guyana,

Jamaica and Trinidad and Tobago may be at greater risk of losing independence in their monetary policy interventions if the occurrence and degree of currency substitution increases. Further, if substitution effects are significant enough it could result in an overall slowdown of the domestic economy.

While we acknowledge the extent of financial liberalisation and effective foreign currency control policies (including the rules for holding foreign currency deposit accounts) among countries were not considered in this study, we believe that our findings set the platform for further research and analysis on the subject. In particular, future work should consider the quantifying impact of currency substitution on macroeconomic variables like credit, inflation and growth.

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APPENDIX

Table 1 – Traditional Unit Roots Tests

	Barbados			Guyana			Jamaica			Trinidad & Tobago		
	ADF	**PP**	**KPSS**	**ADF**	**PP**	**KPSS**	**ADF**	**PP**	**KPSS**	**ADF**	**PP**	**KPSS**
F	-0.967	-1.154	0.883+++	-2.127	-2.221	0.144	-0.992	-0.809	0.858+++	-3.90***	-3.796***	0.488++
ΔF	-11.4***	-11.95***	0.074	-8.51***	-8.49***	0.073	-3.476**	-9.02***	0.135	n.a.	n.a.	0.325
R	-1.672	-1.533	0.283	-0.827	-0.499	0.94+++	-2.593	-2.859*	1.011+++	-0.515	-0.390	0.724+++
ΔR	-4.832***	-4.752***	0.099	-4.61***	-4.58***	0.126	-4.45***	-3.94***	0.231	-1.145	-3.802***	0.122
I*	-1.281	0.742	0.527++	-1.281	0.742	0.527**	-0.848	-0.731	0.828+++	-0.705	-0.374	0.691++
ΔI*	-2.472	-7.211***	0.3467	-2.472	-7.21***	0.3467	-5.28***	-5.14***	0.060	-2.418	-6.928***	0.126
E	-2.522	-2.150	0.109	-2.812**	-2.942**	0.105	-3.568**	-3.484**	0.190	-0.742	0.211	0.819+++
ΔE	-6.266***	-6.150***	0.088	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-4.26***	-4.298***	0.163
Y	-1.879	-1.675	0.921+++	0.370	-1.558	0.902+++	-1.740	-0.890	0.789+++	-1.756	-1.793	0.890+++
ΔY	-3.082**	-16.21***	0.082	-2.108	-4.04***	0.193	-1.430	-1.343	0.218	-1.750	-1.679	0.360

Notes: *, **,*** are the MacKinnon critical values for the rejection of the null hypothesis of a unit root at the 10%, 5% and 1% levels respectively, for both the ADF and PP tests, while +,++,+++ are the critical values for the LM statistic of the KPSS test and denote rejection of the null hypothesis of stationarity at the 10%, 5% and 1%, respectively.

Table 2 – Unit Root Test with Structural Break

	Guyana	Jamaica	Trinidad & Tobago
Break Date	1998 Q1	2006 Q2	2006 Q2
ΔY	-3.3054**	-3.1408**	-3.2687**

Notes: ** are the MacKinnon critical values for the rejection of the null hypothesis of a unit root at the 5% level.

Table 3 - Static Long Run Equation: Foreign Currency to M2 is the dependent variable

Variables	Barbados	Guyana	Jamaica	Trinidad & Tobago
ΔF (Endogenous)				
ΔR				
ΔI^*				0.262** (0.089)
ΔE			0.0224** (0.0035)	
ΔY	2.529** (0.335)			
F_{t-1}	-0.482** (0.031)		-0.241** (0.0272)	-0.232** (0.0736)
R_{t-1}	-0.298** (0.126)		-0.307** (-0.0251)	
I^*_{t-1}				0.146** (0.113)
E_{t-1}				
Y_{t-1}	2.615** (0.728)		-0.795** (0.118)	
C		-0.003	9.104**	0.181
Adj R^2	0.492	0.41	0.7315	0.9028
F Stats.	6.20**		69.79**	5.753**
AR Test	1.169	0.4603	0.477	1.363
ARCH	1.257	1.4503	0.012	1.169
Normality	0.028	2.2158	0.489	0.077
Reset Test	0.371	0.1097	1.088	0.581

Notes: *, and ** represents significance at the 10% and 5% levels respectively; Standard errors are in parentheses.

Table 4 – Static Long Run Equation: Real M2 is the dependent variable

Variables	Barbados	Guyana	Jamaica	Trinidad & Tobago
ΔM2 (Endogenous)				
ΔR		-0.044** (0.021)		
ΔI*		0.011** (0.004)		
ΔP	0.062** (0.224)	-0.713** (0.121)	0.758** (0.313)	
ΔX		0.105** (0.046)	-0.436** (0.1763)	
ΔY				
$M2_{t-1}$		-0.188** (0.051)		-0.429** (0.0983)
R_{t-1}				-0.221** (0.045)
I^*_{t-1}		0.008** (0.002)		0.160** (0.0346)
P_{t-1}	-0.04* (0.022)	0.236** (0.089)		1.319** (0.242)
X_{t-1}		-0.083** (0.039)		
Y_{t-1}		0.213** (0.671)	0.051** (0.084)	-0.332** (0.0345)
C		-0.324		
F Stat.		16.32**		6.534**
Adj R^2	0.632	0.896	0.731	0.458
AR Test	0.613	0.646	0.324	1.336
ARCH	1.603	2.339*	0.138	0.952
Normality	0.389	1.518	4.422	2.7215
Reset Test	1.671	0.923	0.668	0.2409

Notes: *, and ** represents significance at the 10% and 5% levels respectively; Standard errors are in parentheses.