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Financial Dedollarization of the Jamaican Economy: A Portfolio Approach

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Abstract

This paper employs a minimum variance portfolio (MVP) approach in order to explore the financial dollarization decision on both sides of the balance sheet of the Jamaican commercial banking sector. First, cointegration analysis, along with an error correction model, is used to derive the relationship between dollar deposits and dollar credit. Then, similar to Castro and Moron (2003), the asset portfolio model is calibrated to replicate the Jamaican economy. Two policy options, aimed at de-dollarizing the Jamaican economy, are explored. These include: (1) decreasing the level of deposit insurance on 'dollar' deposits relative to local currency deposits and (2) decreasing the volatility of inflation vis-à-vis the volatility of the real effective exchange rate. The key result of the study is that a reduction in financial dollarization could be achieved by the central bank using the latter option.

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[1] The views expressed are those of the author and do not necessarily reflect those of the Bank of Jamaica.

1. Introduction

Dollarization, in the general context, is the means by which a country replaces its domestic currency with the currency of another country, where the currency of choice is typically the US dollar. Dollarization can be either official or unofficial. Official dollarization or *currency substitution* is a complete conversion from local currency to US dollars. Currency substitution is normally a direct decision of the government. However, studies have revealed that even in the absence of a conscious policy move toward currency dollarization, there is an automatic channel through which the process could occur. Alternatively, unofficial dollarization or *asset substitution* refers to the situation where residents hold a significant portion of their wealth in foreign currency, as a store of value. Unofficial or financial dollarization has become increasingly pervasive in developing economies. These economies are typically characterized by high levels of inflation, which erodes the purchasing power of the local currency and thereby induce asset substitution for foreign currency by depositors. Widespread dollarization has been a significant factor in many recent banking crises of developing economies due to increased levels of credit risk from local currency on-lending of foreign currency by banks to producers of non-tradables.[2]

According to Calvo and Reinhart (2000) and Yeyati (2003), real exchange rate shocks may significantly reduce the 'capacity to pay' for the producers of non-tradables if the exchange rate is relatively flexible. However, in instances where the exchange rate is tightly managed, as is the case when the monetary authorities are unwilling to use the real exchange rate as a shock absorber, the adverse 'balance sheet effects' will spillover to the tradables sector. This policy action will tend to promote financial dollarization. Similarly, Ize and Levy Yeyati (1998) argue that these 'balance sheet effects' tend to occur in countries where a stable real exchange rate is targeted to preserve external competitiveness.

Ize and Levy Yeyati (1998) relied on the Capital Asset Pricing Model (CAPM) to explain the depositor's asset substitution process. They argue that the portfolio choice between

[2] See, for example, Yeyati (2003).

local versus foreign dollar deposits, which are determined by the minimum variance portfolio (MVP) approach, influences the level of dollarization within the economy. Ize and Levy Yeyati (1998) follows work done by Thomas (1985) in which the choice of holding local currency versus the US dollar is reflected in deposits, as well as credit accounts. In particular, asset substitution occurs on both the asset and liability sides of the bank's balance sheet depending on the risks or volatilities of inflation and the exchange rate. Banks and depositors will hedge against these risks in order to achieve minimum variance portfolio equilibria in the loanable funds market. Ize and Levy Yeyati (1998) suggest that dollarization could be limited by targeting a steady inflation rate in the context of a freely floating exchange rate. That is, increasing the volatility of the real exchange rate vis-à-vis the volatility of inflation can motivate investors to reduce the volume of dollar deposits.

This paper will explore the degree of financial dollarization within the Jamaican economy and make policy recommendations to assist policymakers in their decision-making process. Specifically, the aim of this paper is to use an asset substitution model to assess the underlying causes of dollarization. As discussed above, the portfolio approach focuses on the volatility of inflation relative to the volatility of real exchange rate depreciation as the key sources of financial dollarization. Similar to Castro and Moron (2003), the portfolio model will be calibrated to replicate the Jamaican economy. Two policy options aimed at de-dollarizing the Jamaican economy will be explored. These include: (1) decreasing the level of deposit insurance on foreign dollar deposits relative to Jamaica Dollar deposits and (2) decreasing the volatility of inflation relative to the volatility of real exchange rate depreciation.

In Jamaica, the proportion of foreign currency deposits relative to total deposits is currently around 40 per cent, which is 10 percentage points higher than the international minimum benchmark for dollarization. The process of financial dollarization in Jamaica can be traced back to the financial liberalization process in the late 1980s and early 1990s. During liberalization, the government liberalized control of key economic prices, including the rate of interest and the exchange rate. Residents now had the option to

choose how much local currency deposits, against US dollar deposits, they were willing to hold. The increase in US dollar deposits[3] led to an increase in dollar credit and a further expansion in the level of financial dollarization within the Jamaican economy. The use of dollar deposits and credit are very important to Jamaica, as well as many other developing countries, primarily because of their dependence on international trade.

Since the start of the liberalization process, the volume of dollar deposits and loans have exhibited a sharp increase in their rate of growth relative to Jamaica Dollar deposits and loans. As such, the Central Bank has become progressively more concerned, especially given their awareness that a high level of financial dollarization is associated with a less effective monetary transmission process. In particular, the decline in the use of Jamaica Dollars and its increased volatility of demand undermines the ability of the monetary authorities to moderate credit and output cycles. The 'balance sheet effects' of high financial dollarization also poses a significant threat to the stability of the financial system. The widespread holding of dollarized liabilities by Jamaica Dollar earners results in a significant exposure of the financial sector to default risk from exchange rate movements.

In the recent Financial Sector Assessment Programme (FSAP) report on Costa Rica,[4] the monetary and exchange rate policy of the country was criticized on the basis that it promoted dollarization. This policy pursued the preservation of external competitiveness through the adjustment of the exchange rate crawl to compensate for inflation rate differentials between Costa Rica and the United States, as well as through the adjustment of real interest rates. According to the Report: 'by *trading short-term real certainty against long-term nominal uncertainty* (through the systematic targeting of the real exchange rate, rather than inflation), the current regime promotes dollarization.' As a result, economic agents viewed the exchange rate as the 'best predictor' of inflation.

[3] Hereafter, 'US dollar deposits' will be referred to as 'dollar deposits'.
[4] See *Costa Rica: Financial System Stability Assessment*, IMF Country Report No. 03/103 (April 2003)

In contrast to Costa Rica, market forces largely determine the exchange rate in Jamaica. However, a high exchange rate-inflation pass-through[5] in Jamaica encourages tight exchange rate management by the monetary authorities, particularly during periods of significant foreign exchange market pressure. In essence, this approach may effectively lead to restricting the relative volatility of the exchange rate compared to the inflation rate, during certain periods, thereby encouraging dollarization.

The rest of the paper is organized as follows. Section 2 presents the model and explores the causes of financial dollarization. In section 3, the methodology of the study is briefly discussed. Section 4 reports the results. Section 5 discusses the policy recommendation and concludes.

2 The Portfolio Approach

2.1 Cointegration and the error correction mechanism

The aim of this section is to explore the existence of a stable relationship between bank deposit and credit dollarization. It adopts the approach of Castro and Moron (2003), by examining the cointegrating relationship, as well as the direction of causality between foreign currency deposits and foreign currency loans for the Jamaican economy.

The original model by Ize and Levy Yeyati (1998) critically examined the composition of the depositors' portfolio, as well as the creditors' portfolio, in order to explore the de-dollarization process. However, as will be discussed below, the cointegration and causality tests negates the simultaneous analysis of both portfolios, thereby allowing the analysis to focus only on the deposit side of the bank's balance sheet.

Cointegration represents a long-term statistical relationship between time series variables. The relationship allows for short-term deviations from the long run trends in the variables. A cointegration test using monthly balance sheet data on Jamaican commercial banks ranging from June 1996 to March 2004 was conducted. The Johansen cointegration

[5] Current estimates reveal around a 50 per cent pass-through coefficient.

test indicated that there exists a single cointegrating equation at the 5 per cent level of significance for the period. However, the vector error correction estimates could not find a significant error correction formulation over the same period. The data was subsequently adjusted to end at March 2003 because, as illustrated in Figure 2.1, the long run relationship between the two non-stationary variables appears to break down around that period. This structural break occurred against the background of sustained foreign exchange market pressure resulting in 9.4 per cent depreciation in the weighted average selling rate for the March 2003 quarter. This gave rise to a 12.2 per cent increase in foreign currency deposits over the quarter. The truncation of the data series is further supported by results of the vector error correction estimates reported in Table 1. The cointegrating equation for the adjusted period of June 1996-March 2003 is given by the following equation:

$$FC_t = -0.082 + 1.4FD_t + e_t \qquad (1)$$

where FC is ratio of foreign currency credit to total credit and FD is the ratio of foreign currency deposits to total deposits.

Equation (1) has an associated error correction model of the following form:

$$DFC = b_{10} + b_{11}e_{t-1} + b_{12}DFC_{t-1} + b_{13}DFC_{t-2} + b_{14}DFD_{t-1} + b_{15}DFD_{t-2} + b_{16}DRV_t + b_{17}DRV_{t-1} + b_{18}DLS + e_{1t} \qquad (2)$$

$$DFD = b_{20} + b_{21}e_{t-1} + b_{22}DFC_{t-1} + b_{23}DFC_{t-2} + b_{24}DFD_{t-1} + b_{25}DFD_{t-2} + b_{26}DRV_t + b_{27}DRV_{t-1} + b_{28}DLS + e_{2t}$$

where RV is the relative volatility of inflation to real effective exchange rate depreciation, LS is the Jamaican Dollar loan spread, Δ is the difference operator and e_{1t} and e_{2t} are 'white noise' error terms.

A cointegrating relationship with an associated error correction mechanism was found for the period June 1996 to March 2003. The significant acceleration in FC compared to its

long run trend is noticeable, which occurred against the background of the drastic depreciation of the exchange rate around this period.

Figure 2.1

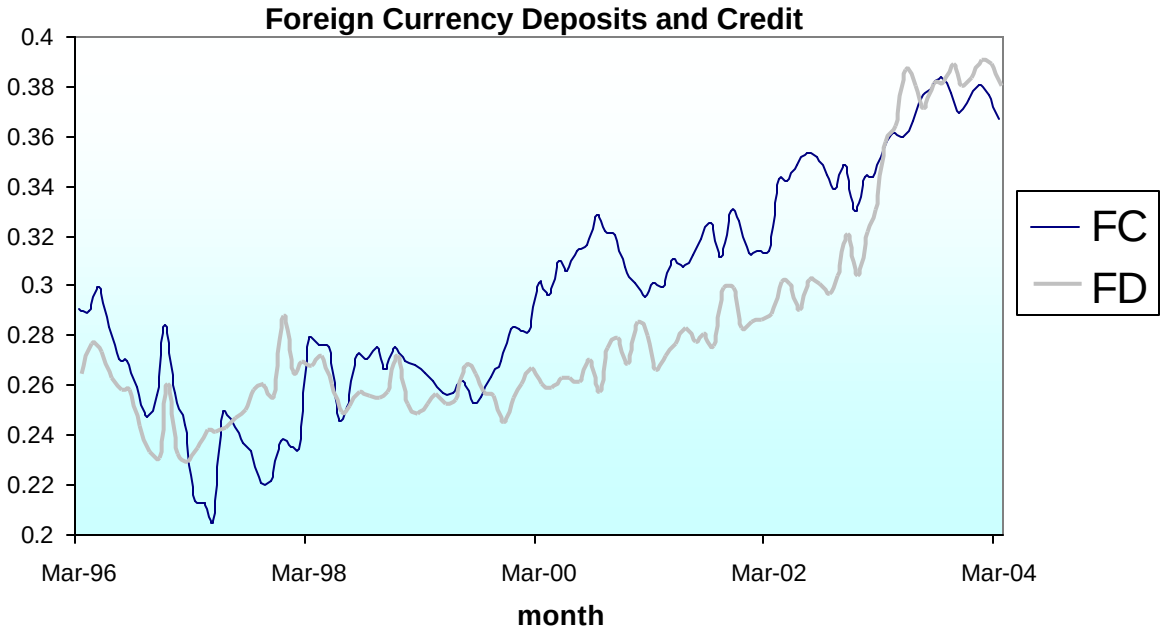


Table 1 shows that not all the exogenous variables are significant for the error correction estimates in the foreign currency credit equation. However, the important result is that the lagged error term for the cointegration vector, e_{t-1}, is only significant, and of the correct sign, in the equation for credit dollarization. As pointed out by Castro and Moron (2003), this result indicates that there exists unidirectional causality from deposit dollarization to loan dollarization. That is, any deviation of either variable from their long run equilibrium will only adjust to its equilibrium value in the case of the credit dollarization equation. This implies that any change in the deposit dollarization trend will cause an equi-directional change in the credit dollarization trend.

Table 1: Vector Error Correction Estimates
(June1996- March 2003)

Variables	*DFC*	*DFD*
Constant	0.001	0.001
	(0.002)	0.001
e_{t-1}	-0.147	0.0683
	(0.0720)**	(0.056)
DFC_{t-1}	-0.016	-0.100
	(0.130)	(0.100)
DFC_{t-2}	0.015	-0.100
	0.127	(0.100)
DFD_{t-1}	-0.176	-0.311
	(0.200)	(0.151)**
DFD_{t-2}	-0.386	-0.234
	(0.173)**	0.135
DRV_t	0.001	0.000
	(0.000)	(0.000)
DRV_{t-1}	0.000	0.000
	(0.000)	(0.000)
DLS	0.004	0.002
	(0.002)**	(0.002)

Note:
(1) The critical regions are 1. 96 and 1.645 for 5% and 10% level of significance, respectively,
(2) ** indicates a rejection of the null hypothesis at the 5% level of significance.

2.2 Depositors Portfolio Choice:

In this section the analysis conducted by Castro and Moron (2003) is replicated to suit the Jamaican experience. Cointegration tests have established that there exists a long run relationship between the depositors' and creditors' portfolios, while the ECM has displayed that there exists uni-directional causality from depositors' asset choices to

creditors' asset choices. This means that any adjustments in credit dollarization can be explained to a large extent by changes in deposit dollarization.

The model is designed such that the role of deposit insurance and the relative volatility of inflation to real depreciation in the portfolio decision-making process of the investor can be critically examined. Fundamentally, exchange rate and country risks have reduced the substitutability of the different components of the depositors' portfolio. Potential variations in the exchange rate over the duration of the portfolio limit the ability of the depositor to freely substitute between dollar deposits and Jamaica Dollar deposits. Similarly, given the presence of country risk, investors' cannot freely substitute between deposits held in local banks and deposits held abroad.

The Jamaican depositors' portfolios are made up of three assets: locally held home currency deposits (HCD), foreign currency deposits held locally (FCD), and cross-border foreign currency deposits (CBD). The real return expressed in terms of domestic prices are given as r_D^H, r_D^F and r^C for HCD, FCD and CBD, respectively. The risk that a domestic bank will fail, coupled with exchange rate risk, are important factors to consider when making the decision to hold deposits locally or deposit funds abroad.

The realized returns associated with each asset is expressed as follows:

$$r_D^H = E(r_D^H) - m_p + m_{CH}$$

$$r_D^F = E(r_D^F) + m_E + m_{CF}$$

$$r^C = E(r^C) + m_E \qquad (3)$$

where m_Π, m_C and m_E represent inflation, country and real exchange rate disturbances, respectively, and the additional risk components associated with holding domestic and

foreign currency deposits in the home economy are given by: $m_{CH} = m_C - d_H m_E$ and $m_{CF} = m_C - d_F m_E$, respectively.

The specification of the m_{CH} and m_{CF} reflect the fact that country risk is positively related to confiscation risk, m_C and negatively related to depositors insurance, d, and exchange rate risk, m_E. The use of the deposit insurance parameter is important to the analysis because it directly influences the impact of changes in the level of deposit insurance for a given level of exchange rate risk, on depositors' returns. The analysis in this paper will examine how changes and differences in deposit insurance on both local currency, d_H, and dollar deposits, d_F, affect the level of dollarization within the economy.

The financial system is also subject to systemic risk due to sudden movements in the real exchange rate. According to the CAPM framework, the market compensates the depositor for taking this systemic risk.[6] Systemic risk affects investor's choices and, as a consequence, the degree of dollarization within the economy.

The model also assumes that m_Π, m_C and m_E are distributed with mean zero and variance-covariance matrix $[S_{ij}]$:

$$m_\Pi,\ m_C \text{ and } m_E \sim \left(0, [S_{ij}]\right)$$

Country risk is independent of inflation and exchange rate volatility such that their covariance is equal to zero:

$$S_{EC} = S_{\Pi C} = 0$$

The aim of the depositor is to choose a combination of assets, given his preferences, in order to maximize his utility. The depositors' utility maximization function is expressed as:

$$U = E(r) - h\, s_r^2 / 2 \qquad (4)$$

[6] See Lintner (1965).

where r represents the real average return of the portfolio, $h > 0$ is the depositors risk aversion parameter and x^F, x^C and $x^H = 1 - x^F + x^C$ are the shares of HCD, FCD and CBD, respectively. The mean and variance of r are given as follows:

$$E(r) = x'w + r^H$$
$$s_r^2 = x'Bx + 2Cx + \text{var}\, r^H \tag{5}$$

where:

$$x = \begin{bmatrix} x^F \\ x^C \end{bmatrix}, \qquad w = E\begin{bmatrix} r^F - r^H \\ r^C - r^H \end{bmatrix}$$

$$B = \begin{bmatrix} \text{var}\ (r^F - r^H) & \text{cov}\ (r^F - r^H, r^C - r^H) \\ \text{cov}\,(r^F - r^H, r^C - r^H) & \text{var}\,(r^C - r^H) \end{bmatrix}$$

$$C = \begin{bmatrix} \text{cov}\ (r^F - r^H, r^H) \\ \text{cov}\ (r^C - r^H, r^H) \end{bmatrix}$$

Substituting (5) into equation (4) yields:

$$U = x'w + r^H - h\ (x'B\ x + 2C\,x + \text{var}\, r^H)/2 \tag{6}$$

Differentiating with respect to x gives the first-order condition for utility maximization:

$$w - h\ x\,B - h\ C = 0$$

By making x the subject of the formula, the optimal shares of dollar deposits held locally, x_F, and abroad, x_C, are expressed as:

$$x = \begin{bmatrix} x_F \\ x_C \end{bmatrix} = -B^{-1}C + (1/h)\,B^{-1}w \tag{7}$$

Let Ω^* represent the first term in the equation, such that:

$$\Omega^* = -B^{-1}C$$

This term is very important to the analysis because it represents the degree of underlying dollarization within the minimum variance portfolio (MVP). Explicitly:

$$\Omega^* = \begin{bmatrix} \Omega_F^* \\ \Omega_C^* \end{bmatrix} = -\frac{1}{|B|}\begin{bmatrix} \text{var}(r^C - r^H) & -\text{cov}(r^C - r^H, r^F - r^H) \\ -\text{cov}(r^C - r^H, r^F - r^H) & \text{var}(r^F - r^H) \end{bmatrix}\begin{bmatrix} \text{cov}(r^F - r^H, r^H) \\ \text{cov}(r^C - r^H, r^H) \end{bmatrix} \quad (8)$$

Here Ω_F^* *and* Ω_C^* represent FCD and CBD shares of the minimum variance portfolio, respectively. The differential volatilities of the different rates of returns are expressed using (3) as:

$$\begin{aligned} \text{var}(r^F - r^H) &= V = (1 + 2(d_H - d_F) + (d_F - d_H)^2 S_{EE} \\ &\quad + 2(1 + d_H - d_F)S_{\Pi E} + S_{\Pi\Pi} \\ \text{var}(r^C - r^H) &= V + S_{CC} - (d_F^2 - 2d_F - 2d_F d_H)S_{EE} + 2d_H S_{\Pi E} \\ \text{cov}(r^F - r^H, r^C - r^H) &= V + (d_F + d_F d_H - d_F^2)\, S_{EE} + d_F S_{\Pi E} \\ |B| &= \text{var}(r^F - r^H)\text{var}(r^C - r^H) - (\text{cov}(r^F - r^H, r^C - r^H))^2 \end{aligned} \quad (9)$$

and

$$\begin{aligned} \text{cov}\,(r^F - r^H, r^H) &= C_1 = (d_F - 1 - 2d_H)S_{\Pi E} + (d_H(d_F - 1) - d_H^2)S_{SS} - S_{\Pi\Pi} \\ \text{cov}\,(r^C - r^H, r^H) &= C_2 = -(1 + 2d_H)S_{\Pi E} - (d_H + d_H^2)S_{EE} - S_{\Pi\Pi} - S_{CC} \end{aligned} \quad (10)$$

The structural forms of the variables are as follows:

$$\Omega_F^* = \frac{\text{var}\,(r^C - r^H) * \text{cov}(r^F - r^H, r^H) - \text{cov}\,(r^F - r^H, r^C - r^H) * \text{cov}(r^C - r^H, r^H)}{\text{var}\,(r^F - r^H) * \text{var}(r^C - r^H) - \left[\text{cov}\,(r^F - r^H, r^C - r^H)\right]^2}$$

$$\Omega_C^* = \frac{-\text{cov}\,(r^F - r^H, r^C - r^H) * \text{cov}(r^F - r^H, r^H) + \text{var}\,(r^F - r^H) * \text{cov}(r^C - r^H, r^H)}{\text{var}\,(r^F - r^H) * \text{var}(r^C - r^H) - \left[\text{cov}\,(r^F - r^H, r^C - r^H)\right]^2} \quad (11)$$

It is also important to note that the variance and covariance of the respective returns are given as:

$$\begin{aligned}
&\text{var}\, r^H = S_{\Pi\Pi} + S_{CC} + d_H^2 S_{CC} + 2S_{\Pi E} \\
&\text{var}\, r^F = (1 - d_F)^2 S_{EE} + S_{CC} \\
&\text{var}\, r^C = S_{EE} \\
&\text{cov}(r^C, r^H) = -S_{\Pi E} - d_H S_{EE} \\
&\text{cov}(r^F, r^H) = -(1 - d_F) S_{\Pi E} - d_H (1 - d_F) S_{EE} + S_{CC} \\
&\text{cov}(r^F, r^C) = (1 - d_F) S_{EE}
\end{aligned} \quad (12)$$

3. Methodology

Monthly data ranging from June 1996 to March 2004 on the real effective exchange rate (reer) and inflation was split into four two-year sub periods: JUN:96 – MAR:98, JUN:98 –MAR:00, JUN:00 – MAR:02 and JUN:02 – MAR:04. This was done in an effort to facilitate the estimation of the evolution of dollarization over time. The data was used to compute the variance of real depreciation (S_{EE}), the variance of inflation ($S_{\Pi\Pi}$) and their respective covariance ($S_{E\Pi}$) for each associating sub period. Two policy options are simulated using the CAPM framework previously outlined:

(1) Deposit insurance on domestic currency (d_H) was kept fixed and the deposit insurance on dollar deposits (d_F) was made flexible so as to see what effect simulated changes in the level of foreign currency insurance would have on dollarization.

(2) The relative volatility of inflation vis-à-vis real effective exchange rate depreciation, $S_{\Pi\Pi}/S_{EE}$, was multiplied by a factor in order to lower it by 10 per cent for each simulation.

4 Results and Analysis

4.1 Deposit Insurance

Deposit insurance was introduced in Jamaica on 31 August 1998 after the financial crisis of the mid-1990s.[7] It was as a consequence of government intervention in an effort to ensure that depositors' investments were insured against any unforeseen crisis in the financial sector.[8] The actual level of deposit insurance is in Jamaica is currently approximately 45 per cent of total deposits, i.e. $d_H = d_F = 0.45$.[9] This value was employed initially with an estimated confiscation risk of $S_{CC} = 10.95$.[10] The model produced an underlying dollarization ratio for the overall period of $\Omega^* = 0.51$. This value is greater than the current actual dollarization value of about 40 per cent within the economy. This is consistent with the purpose of the Ize and Levy Yeyati (1998) model, which is to produce an estimate of the *optimal level* of dollarization within the economy given the macro-economic indicators. As such, the empirical result normally exceeds actual dollarization by a large margin.

The series of graphs below illustrate a systematic analysis of how changes in the degree of deposit insurance on dollar deposits can influence the dollarization ratio within the

[7] A major financial crisis occurred in Jamaica, which led to the failure of some commercial banks and conglomerate groups. This failure warranted government invention via the Financial Sector Adjustment Company (FINSAC).
[8] See: http://www.jdic.org for a background to the establishment of deposit insurance in Jamaica.
[9] There is a limitation of insurance coverage of the deposit of any depositor to an amount of $300,000 in Jamaica currency.
[10] The simulation results are not very sensitive to changes in country risk.

economy at different points. As was mentioned earlier, d_H is kept fixed at 0.45, while d_F is varied between the range of 0.15 to 0.45.

Figures 4.1 and 4.4 below indicate the existence of a positive relationship between deposit insurance on dollar deposits, d_F, and the share of dollarization within the economy, Ω^*, for the sub periods JUN:96 – MAR:1998 and JUN:02 – MAR:04, respectively. However, Figures 4.2 and 4.3 indicate that there exists a negative relationship between d_F and Ω^* in sub-periods of JUN:98 – MAR:00 and JUN:00 – MAR:02.

Figure 4.1

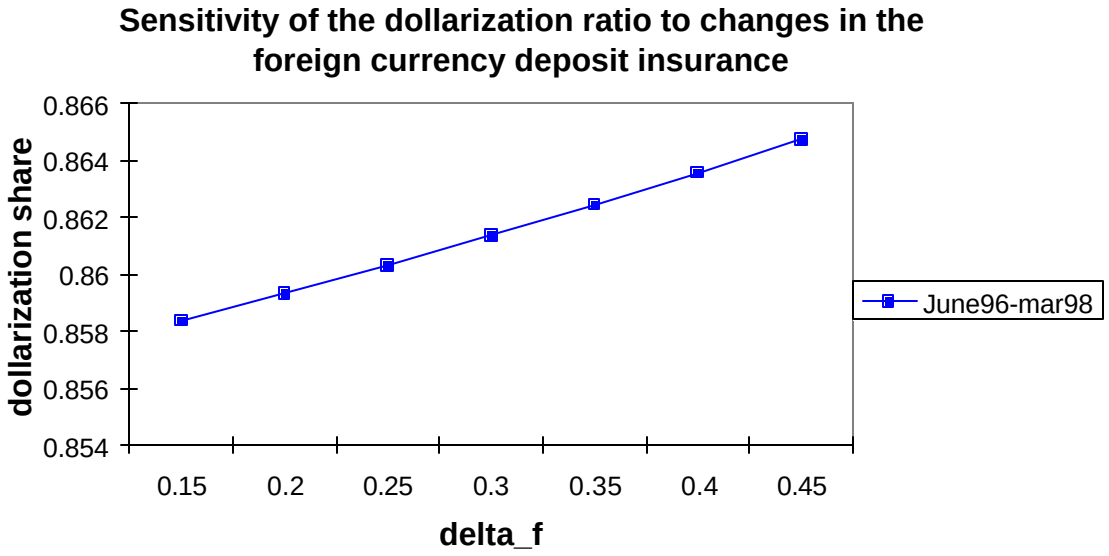


Figure 4.2

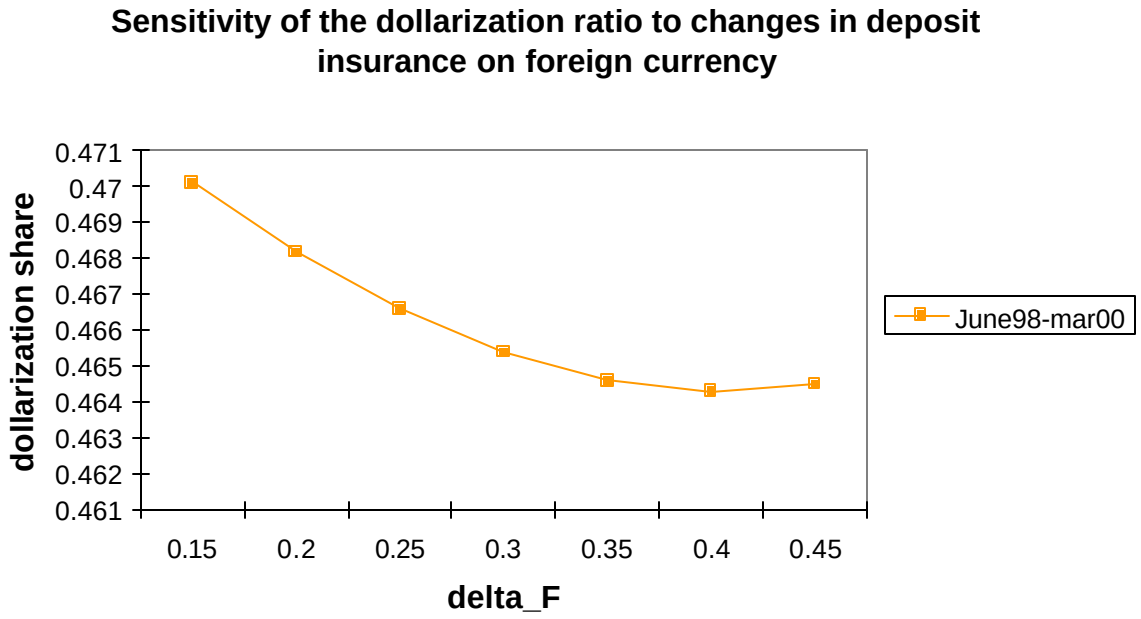


Figure 4.3

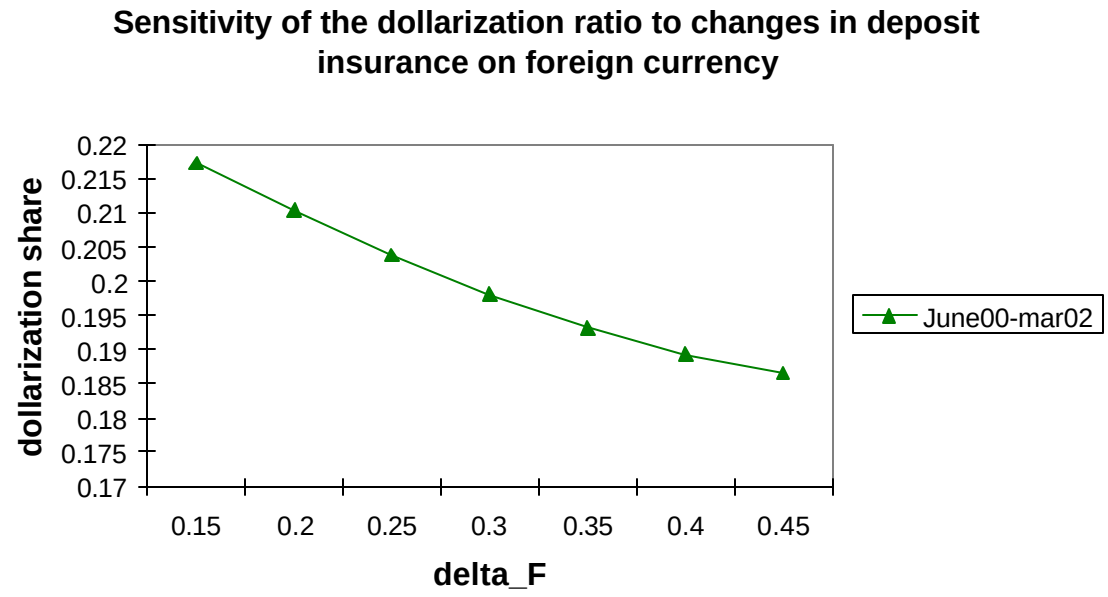


Figure 4.4

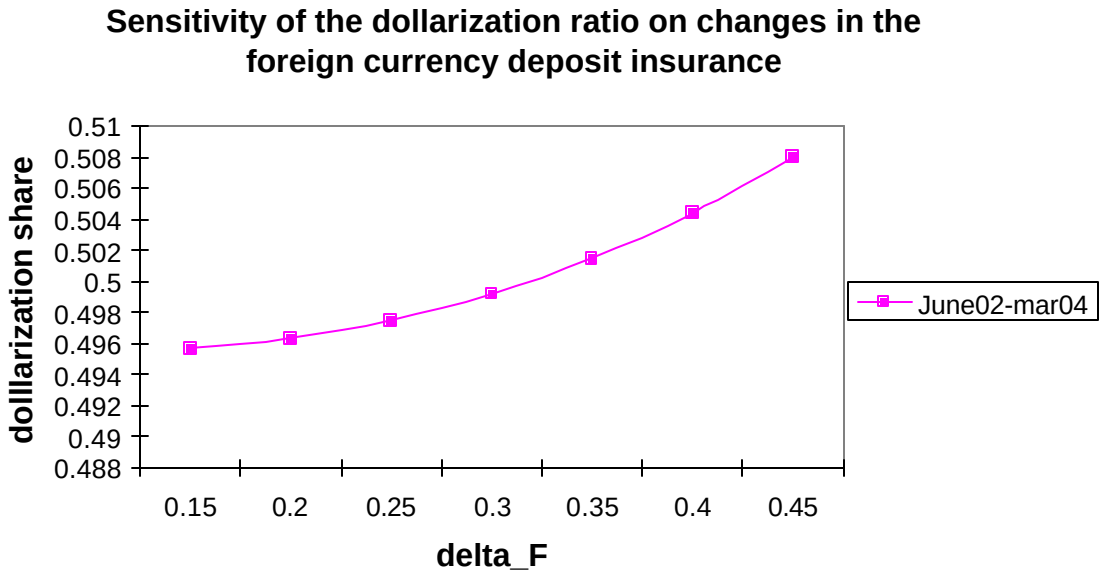
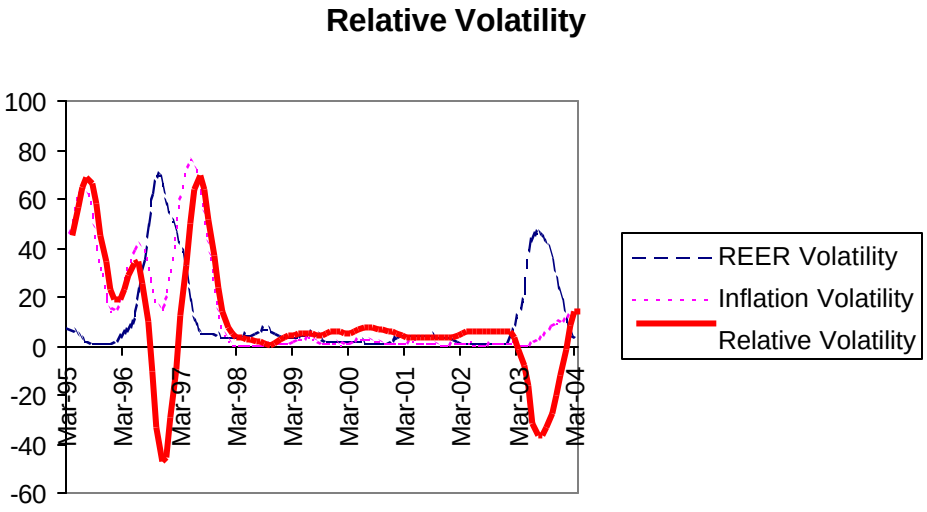


Figure 4.5



The different trajectories shown in Figures 4.1 and 4.4 relative to Figures 4.2 and 4.3 reflect the consequences of the actions of the utility maximizing representative agent during volatile periods in the macroeconomic environment (see Figure 4.5). Foreign currency is the most attractive store of value during volatile periods. In the first sub-period of JUN:94 - MAR:96, inflation was at very high levels and expectations of a exchange rate depreciation was mainly due to the financial crisis occurring at that time. As a result, an increase in deposit insurance on dollar deposits would be necessary to provide greater protection, given the increasing rate of substitution of the Jamaica Dollar deposits for dollar deposits. This increase in dollar deposit protection induces the utility optimizing representative agent to increase the share of dollar deposits, relative to Jamaica Dollar deposits held in local banks, in order to attain the minimum variance portfolio (MVP).

In the two subsequent sub-periods, JUN:98 – MAR:00 and JUN:00 – MAR:02, the foreign exchange market stabilized and inflation was reduced to single digits, consistent with the resolution of the financial crisis. Speculation and uncertainty were no longer an imminent problem and the depositor had little need to rearrange the structure of his portfolio during this period. The simulation results, illustrated by Figures 4.2 and 4.3, are as a consequence of the relative stability of the economy. An increase in deposit insurance on foreign currency deposits in this environment will serve to contribute to positive depositor confidence and thus lead to a reduction in their desired share of foreign currency deposits. Thus, the utility maximizing representative agent will reduce the volume of foreign currency deposits relative to deposits denominated in local currency in the MVP.

In the final sub-period, JUN:02 - MAR:04, the foreign exchange market volatility increased and inflation returned to double digits due to the emergence of significant uncertainty surrounding the economy. Given the substitution to dollar deposits, the simulated increase in deposit insurance on foreign currency deposits would, once again, provide the extra protection desired to hold locally foreign currency deposits relative to deposits denominated in domestic currency. The increase in foreign currency deposit

insurance would lead the representative agent to increase the share of dollar deposits in his MVP.

Figure 4.6

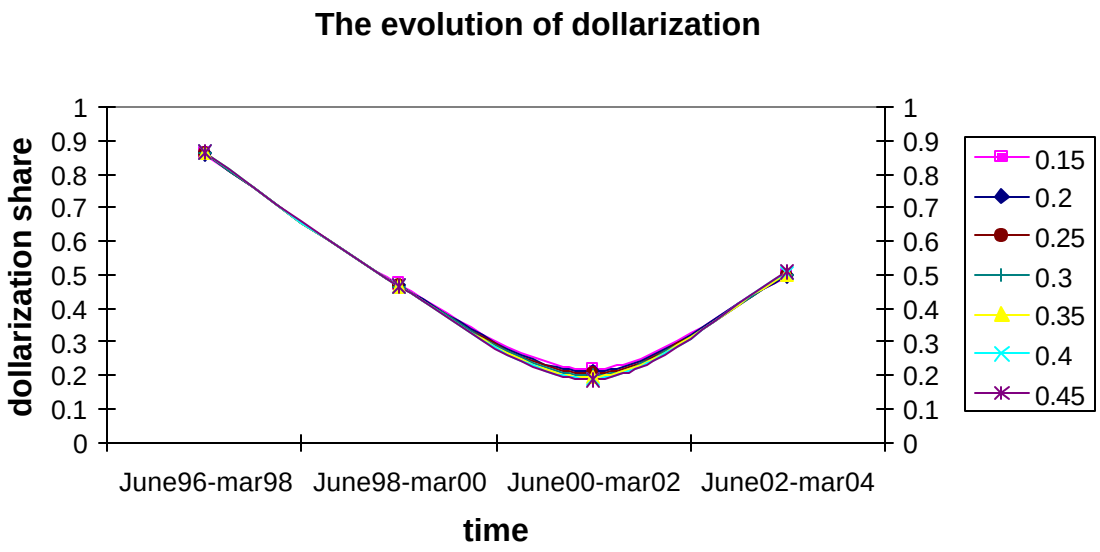


Figure 4.6 illustrates the evolution of dollarization over the entire 10-year period. The key located to the right of the diagram shows the different levels of foreign currency deposit coverage. It is noticeable that even if the level of insurance on foreign deposits is changed for a particular period, dollarization will not change by much As a result, the total share of dollar deposits in the MVP will follow the same pattern overtime. This degree of inelasticity has major implications for government policy decisions.

4.2 Relative Volatilities

The relative volatility can be defined as the change in the variance of inflation relative to the change in the variance of the real effective exchange rate (REER) depreciation. It is given by the function ($S_{\Pi\Pi}/S_{EE}$). Due to the functional form of the expression and from the results of the original Ize and Levy Yeyati (1998) model, a positive relationship is expected to exist between this relative volatility and the dollar share of deposits. An increase in the volatility of inflation or a decrease in the volatility of the REER should result in a corresponding increase in the level of dollarization in the economy.

The results in Table 4.1 illustrate how actual dollarization in the economy has evolved in comparison to the relative variation of inflation to the variation of the depreciation of the REER. A 91 per cent decrease in the relative volatility to 2.45 from 28.70 is associated with a 28 per cent decrease in Ω^* to 0.64 from 0.89. A further decrease of 53 per cent in the relative volatility to 1.15 is associated with an 18.75 per cent decrease to 0.52 for Ω^*. When the relative volatility increases again to 2.88, Ω^* again increases to 0.69. This supports the conclusion of the original model that there exists a positive relationship between Ω^* and $S_{\Pi\Pi}/S_{EE}$.

Table 4.1

PERIOD	Ω^*	$S_{\Pi\Pi}/S_{EE}$
JUN96 - MAR 98	0.89	28.70
JUN98 - MAR 00	0.64	2.45
JUN00 - MAR 02	0.52	1.15
JUN02 - MAR 04	0.69	2.88

The simulation of a series of 10 percentage point reductions in the relative volatility is conducted for the final sub period of JUN:02 to MAR:04.[11] Additionally, deposit insurance was completely removed from this simulation (i.e. $d_H = d_F = 0$) so that the effect of the relative volatility on the dollar share could be isolated.

Starting from the base scenario where $S_{\Pi\Pi}/S_{EE}$ = 2.88 and Ω^* = 0.69, the results from the MVP model reported in Table 4.2 also support the claim posited by the original model that there exists a positive relationship between Ω^* and $S_{\Pi\Pi}/S_{EE}$. Initially, $S_{\Pi\Pi}/S_{EE}$ was reduced by 10 per cent, which produced a 5.22 per cent reduction in Ω^*. Consistent with expectations, the more the relative volatility declined, the greater the relative decline in $S_{\Pi\Pi}/S_{EE}$. Generally, for each 10 per cent reduction in the relative

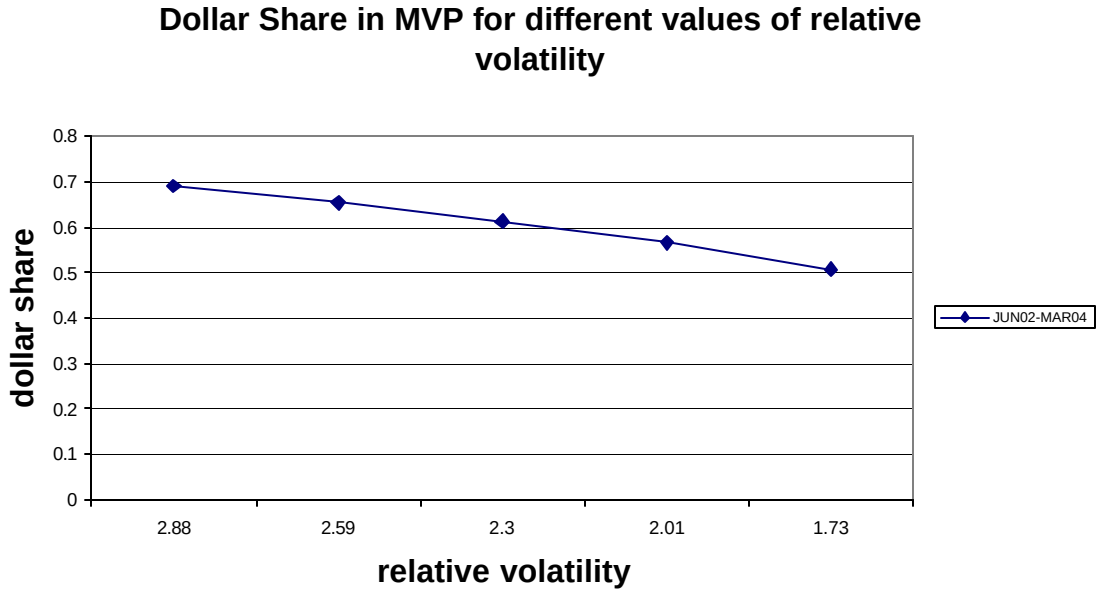
[11] The simulation results are similar for the other sub-periods. They are available from the author upon request.

volatility, the rate of reduction in Ω^* increased (See Figure 4.7). Fundamentally, the economy needs, at most, a 30 per cent less volatile inflation rate relative to exchange rate volatility to achieve a 10 per cent reduction in dollarization.

Table 4.2

Simulated percentage change in $S_{\Pi\Pi}/S_{EE}$	Simulated percentage change in Ω^*	Simulated values of $S_{\Pi\Pi}/S_{EE}$	Simulated values of Ω^*
0	0	2.8	0.69
-10	-5.22	2.6	0.65
-20	-11.14	2.3	0.61
-30	-18.19	2	0.56
-40	-26.56	1.7	0.51

Figure 4.7



4.3 Exchange Rate Pass-Through

By assuming a constant external inflation rate, the log-linear version of the real effective exchange rate, E, and the inflation rate, Π, can be defined as:

$$E = e - \Pi \tag{13}$$

$$\Pi = b\,e + (1 - b\,)e \tag{14}$$

where e is defined as real effective exchange rate depreciation, b is the pass through coefficient from the nominal exchange rate to the domestic price level and e measures the impact of real and monetary shocks over the domestic currency component of the consumption bundle of the representative agent.

By employing equations (13) and (14) and assuming that the cov (e, e**)** = 0, it can be shown that:

$$\begin{aligned} \text{var}(\Pi) &= b^2\,\text{var}(e) + (1 - b^2)\text{var}(e) \\ \text{var}(E) &= \text{var}(e) + \text{var}\,\Pi - 2\text{cov}(e, \Pi) \\ &= (b - 1)^2\,\text{var}(e) + (1 - b)^2\,\text{var}(e) \end{aligned} \tag{15}$$

Table 4.3 reports the pass through coefficients of Jamaica for the five sub periods under study.

Table 4.3 The Pass-Through Coefficients from JUN:94 toMAR:04

JUN96-MAR98	JUN98-MAR00	JUN00-MAR02	JUN02-MAR04
3.149	0.734	0.234	0.554

It is known that higher inflation is the chief by-product of real effective exchange rate depreciation. When the pass through coefficient is high i.e., a high b, increases in the variances of the nominal exchange rate will result in large increases in the inflation variance. This increase in the relative volatility will induce an increase in the dollar share of the MVP. The converse will hold if the pass through coefficient is low.

5. Policy Recommendations and Conclusion

Financial dollarization is becoming an increasing concern given the rising share of dollar deposits within the portfolios of banks and depositors. In order to protect the effectiveness of monetary policy, the Central Bank will need to use policy measures to dissuade the practice of financial dollarization. Methods to achieve this were explored and consistent simulation results upon which policy decisions can be made were found in this study.

The analysis of the impact of foreign currency deposit insurance on the share of foreign currency deposits held yielded mixed results, which reflected the different states of the economy. The result of a positive relationship between insurance on foreign currency deposits and financial dollarization was supported in situations where the foreign currency market was relatively volatile and inflation was high. However, in times when the economy is stable, the policy decision to decrease insurance on foreign currency deposits led to an increase on dollar deposits. In essence, the state of the economy is critical to the success of deposit insurance as a policy tool.

Further, it was shown that changes in the level of deposit insurance on dollar deposits had an insignificant effect on the level of financial dollarization in Jamaica. This means that investors' portfolio choices are insensitive to the level of deposit insurance coverage within the economy. Thus, a policy decision to decrease the level of financial dollarization by changing the level of dollar deposit insurance relative to deposits denominated in local currency would have little effect in the Jamaican economy.

The key result of the study is that a reduction in financial dollarization could be achieved by the Central Bank with a reduction of the relative volatility of inflation vis-à-vis the volatility of the real effective exchange rate. This policy would have a relatively significant impact because depositors are more sensitive to volatilities within these variables compared to changes in the deposit insurance coverage. Therefore, the Central Bank should facilitate the trade-off of long-term certainty against short-term real uncertainty (through the systematic targeting of inflation, rather than the real exchange

rate), in order to limit the depositor's incentives to dollarize his portfolio. As a result, the exchange rate will not be viewed as the 'best predictor' of inflation. Obviously, however, a critical caveat to this policy option is that, at times when the pass-through coefficient is very high, an increase in $S_{\Pi\Pi}/S_{EE}$ will *increase* underlying dollarization.

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