

# THE MONETARY CONTROL FRAMEWORK OF GUYANA: EXPERIENCES, LESSONS AND CONSEQUENCES

Tarron Khemraj  
St. Francis College, NY

---

## 1. Introduction

Guyana's banking system is characterized by persistently high levels of excess reserves or liquidity<sup>1</sup>. Excess liquidity (or reserves) is defined here as actual bank reserves minus required bank reserves. Guyana's monetary framework is guided by the IMF's financial programming model. In addition to examining this framework, the paper makes a first attempt at studying the reasons for the persistence of the high levels of reserves. The paper then goes on to argue that the incessant sterilization of the excess reserves needs to be re-examined, as it might not be as destabilizing as the model predicts; besides there is a domestic debt component that is associated with this policy. A contention of this paper is that inflation is not a natural outcome of excess reserves. The best way to deal with the high levels of liquidity is to stimulate the demand for bank credit, but this will require more direct measures that the Fund-Supported programme might be unwilling to accept.

The remainder of the paper takes the following format. Section 2 looks at the monetary policy framework of Guyana. Section 3 proposes several factors that might be accounting for the persistently high levels of excess liquidity. Section 4 argues that it is not automatic that the excess liquidity is driving the rate of inflation. In section 5 an econometric investigation is conducted into the factors which account for variations in excess reserves. Section 6 concludes.

## 2. Guyana's Monetary Framework

### 2.1 Background Information

The Guyanese economy is one in transition from a Socialist oriented state to one that is trying to embrace the market as the giver of all good things. A country sandwiched between the two superpowers in the cold war era, and with a

---

<sup>1</sup> Excess reserves are a subset of banks' total liquidity (or liquid assets). Excess reserves do not earn any interest, while Treasury bills, a significant component of liquid assets, have a rate of return depending on the maturity structure. For the remainder of this paper excess liquidity is defined as total commercial bank liquid assets minus required liquid assets. Treasury bills are issued to "mop up" or sterilize excess reserves. There is therefore a rearrangement of the portfolio of liquid assets when banks buy Treasury bills.

---

---

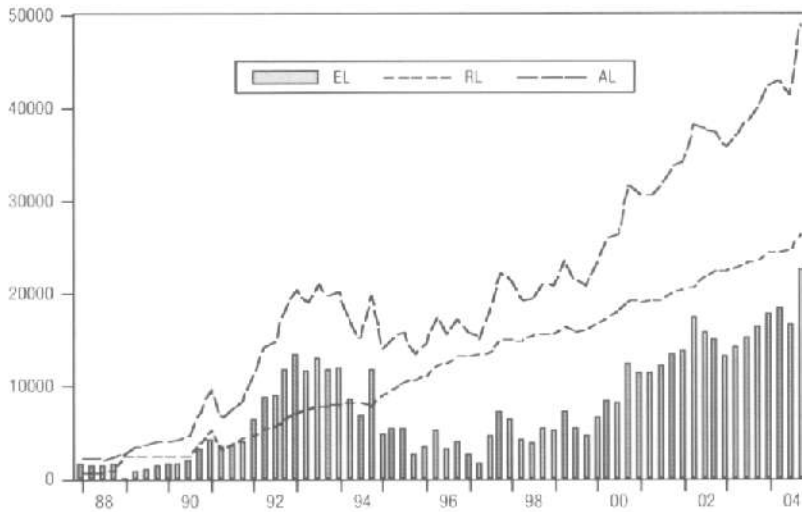
bankrupt economy by 1988, Guyana launched the Economic Recovery Programme (ERP) in 1989. The Programme comprised of radical changes in all aspects of economic life such as elimination of price controls and subsidies, the adoption of a floating exchange rate, privatization, fiscal reform, and monetary reform, to name just a few. The IMF and World Bank eventually sanctioned the new economic initiatives and got on board providing crucial funding to enable the switch from state control to market mechanism. These events are well documented elsewhere (see Das and Ganga, 1997; Ganga, 1998); therefore, I will specifically deal with the shift in monetary policy in keeping with the theme of the paper. Selected macroeconomic indicators are presented in Appendix, Table A.

Monetary policy prior to 1991 focused on direct instruments such as interest rate control, credit ceiling, and direct lending to government and selected private sector entities. The central bank, Bank of Guyana (BoG), also made use of reserve and liquid asset requirements to control liquidity levels. A major turning point in monetary policy operations took place in June 1991 with the adoption of indirect instruments. A competitive bidding system for short-term Treasury Bills was instituted, first on a monthly basis, then biweekly in June 1994, and finally weekly in February 1996 (Das and Ganga, 1997; Egoume-Bossogo *et al*, 2003). Buyers, mainly institutional investors, bid for the instruments, which are usually sold to the lowest bidders, thereby determining the rate of interest through the market. Specifically the rate of interest on 91-day Treasury bills is the anchor rate of the banking system determining both the bank rate and the prime-lending rate.

## 2.2 Excess Liquidity

Banks usually hold a fraction of deposits as required reserves. At certain times banks may find that the amount of reserves they actually hold is greater than the amount they must hold. However, this is likely to be transitory as banks will try to rid themselves of the excess funds by buying financial instruments or making loans in the interbank market or to the non-bank public. If a bank holds on to unusually high levels of excess reserves, then it is not making as high a profit as it can, as there is the usual trade-off between liquidity and profitability. But this is not the situation in Guyana since high levels of excess liquidity are a permanent feature of Guyana's banking system (see Fig. 1).

---

**Figure 1: Actual (AL), Required (RL), and Excess Liquid (EL) Assets (G\$Mill)**

The authorities fear that the heavy liquidity overhang, if not constantly sterilized, can result in macroeconomic instability. Therefore, the central bank issues on a weekly basis 91-day, 182-day, and 364-day Treasury Bills. By issuing these short-term papers the BoG hopes to influence liquidity levels consistent with the targeted growth of broad money (M2) and reserve money (or base money). One interesting aspect of open market operations is the BoG never needs repurchase assets from the markets since there is always the liquidity overhang.

Commercial banks have been very sensitive to risks, and as a result, they hold a significant portion of their portfolios as risk-free government securities. With the existence of such a low-risk channel in which to invest, banks can afford to become complacent since they do not need to compete intensely to make loans to the private sector. This, of course, culminates into excess reserves, where investable funds continue to exist idly in the vaults of banks and the central bank. That this phenomenon continues to exist after more than a decade of market reforms is a clear sign that the market is not doing its job effectively in intermediating in the best possible manner between savers and investors.

### 2.3 Interest Cost on Domestic Debt

Associated with perpetual sterilization are the high levels of interest cost that must be paid to the buyers of the securities. This is shown in Appendix, Table B. Despite a slight decline in interest cost since 2001, it still remains a substantial figure that must be paid for a process that is clearly not working well. This simply means the authorities are paying a price to lock away in a sterilization account a large percentage of funds that could otherwise be invested elsewhere. The authorities do so, of course, because they have been advised within the context of financial programming that the excess funds can encourage inflationary bank lending and reckless consumer spending.

### 2.4 Financial Programming Model

IMF economic stabilization in developing countries is usually motivated by the financial programming model. The model consists of a set of macro accounting identities linking the government fiscal balance and monetary aggregates to outcomes on the balance of payment, which has implications for the targeted level of net international reserves. A set of behavioural relationships, necessary to make proper economic analysis and policy, is added to the accounting identities. To present the model, it is good to start with the central bank balance sheet and the consolidated balance sheet of the entire banking system. The balance sheet constraint of the central bank is given in identity 1, while that of the entire banking system – central bank plus commercial banks – is represented by identity 3. Identities 2 and 4, respectively, show the weighted growth rates of the monetary base (MB) and broad money (M2).

$$(1) \quad MB^* = NFA^3 + NCG + CB$$

$$(2) \quad \frac{\Delta MB_t}{MB_{t-1}} = \frac{\Delta NFA_t}{NFA_{t-1}} \cdot \frac{NFA_{t-1}}{MB_{t-1}} + \frac{\Delta NCG_t}{CNG_{t-1}} \cdot \frac{NCG_{t-1}}{MB_{t-1}} + \frac{\Delta CB_t}{CB_{t-1}} \cdot \frac{CB_{t-1}}{MB_{t-1}}$$

$$(3) \quad M2^4 = NFA + NCG + CPS$$

$$(4) \quad \frac{\Delta M2_t}{M2_{t-1}} = \frac{\Delta NFA_t}{NFA_{t-1}} \cdot \frac{NFA_{t-1}}{M2_{t-1}} + \frac{\Delta NCG_t}{CNG_{t-1}} \cdot \frac{NCG_{t-1}}{M2_{t-1}} + \frac{\Delta CPS_t}{CPS_{t-1}} \cdot \frac{CPS_{t-1}}{M2_{t-1}}$$

<sup>2</sup> MB = currency in circulation outside banks (CC) + demand deposits (DD)

<sup>3</sup> Included in the net foreign assets is the net international reserve.

<sup>4</sup> M2 is made up of CC + DD + Time deposits (TD)

Where NFA stands for net foreign assets; NCG means net credit to government; CB represents claims on commercial banks by central bank (mainly discount window lending); while CPS means claims on the private sector.

The overall balance of payments is financed by the change in international reserves (IR). Therefore,

$$(5) \quad \Delta NFA = \Delta M2 - (\Delta NCG + \Delta CPS) = X - M + K = -\Delta IR^5$$

Where K = net capital inflows of the non-banking sector. Identity 5 is an important one as it assumes an increase in credit to government and to the private sector over the increase in money stock, which when the money market is in equilibrium must equal to money demand, is reflected in a decline in net international reserves. This forms the core of the monetary approach to the balance of payments. It is for this reason that typical financial programmes seek to control money growth by placing ceilings on credit to government and private sector, with the former usually being most restricted. Another important ingredient of the programme is a stable money demand function, which can vary in sophistication.

$$(6) \quad MD(Y, i, v, e) = M2$$

As is evident from equation 6 the commonly assumed money market equilibrium holds; and Y = real income, i = interest rate, v = income velocity, e = other variables. The domestic credit components are derived residually from the forecast of the change in NFA and the projected value for money supply. Thus the policy variable, domestic credit (NCG and CPS), is determined. The target for M2 comes from the ubiquitous quantity equation –  $Mv = PY$ . Assuming that velocity, v, is stable, the Fund goes for the monetarist interpretation that changes in money supply are translated into changes in price level. Therefore, once inflation and growth targets are obtained, a projected M2 level is found; domestic credit, then, must fall in line.

In financial programmes the money multiplier concept, called the Base-Multiplier approach to the money supply by Bain and Howells (2003), is important. The money multiplier (mm) is the ratio of M2 to MB, which is given below.

<sup>5</sup> In balance of payment compilation methodology an increase in IR has a negative sign, while a decrease has a positive sign (see IMF, 2000).



$$(7) \quad mm = \frac{M2}{MB} = \frac{CC + DD + TD}{CC + r_d DD + r_t TD + r_e DD} = \frac{c + 1 + b}{c + r_d + b r_t + r_e}$$

By dividing both the numerator and denominator of (7) by DD gives the money multiplier in ratios, which are represented by the lower case letters. Required reserve ratios against DD and TD are given by  $r_d$  and  $r_t$ , respectively; while  $r_e$  represents the ratio of excess reserves to DD. According to the typical base-multiplier approach, if  $mm$  is constant, then changes in the monetary base (also known as reserve money) are reflected in changes in M2. Equation 8 implies, once the target level of M2 is obtained, and  $mm$  is at least predictable, the possible strategy of the central bank is to set MB in line with the target.

$$(8) \quad \Delta M2 = mm \Delta MB^e$$

Couched within the financial programming framework is the Reserve Money Programme (RMP). The RMP takes into consideration the fact that it is reserves of the banks that provide a link between the balance sheet of the central bank and of the commercial banks. Reserves that are on the liability side of the BoG's balance sheet show up on the asset side of the consolidated balance sheet of the commercial banking sector (see Appendix 1, Table C, for a hypothetical weekly programme). Therefore, it is assumed that the central bank can influence total bank reserves by controlling its assets (namely government Treasury bills) when it conducts open market operations. Unlike direct monetary policy that seeks to directly influence the intermediate target, the programme seeks to operate on the reserve position of the banking system by influencing the supply of and demand for reserve money. The programme espouses three important assumptions of the financial programming framework (see Singh, 1997; BOG, 2001, p.37). First, it is the reserve position of banks that determines their ability to extend credit to the economy. Second, the money multiplier is assumed to be stable or at least predictable; therefore, it is possible to influence money supply by hitting targets for reserve money. Third, inflation is a monetary phenomenon, being determined by an excess of money supply over money demand *a la* the quantity theory of money.

\* Equation 8 reflects the conventional view that the monetary base is exogenous or can be controlled by the central bank in order to control the broad money supply via a stable multiplier. However, there have always been economists – neo Classical and post Keynesian alike – who have rebuffed this view. For instance, Lavoie (1984), Goodhart (2002; 1995), Lombra and Torio (1973) and Guttentag (1966).

### 3. Determinants of Excess Liquidity

The persistent excess liquidity is a reflection of several factors working in tandem to keep liquidity levels high. First, one has to look at the most obvious factor, government finance of the deficit by simply borrowing from the central bank. Finance for the deficit comes from different sources. First, there is the international component mainly in the form of grants and foreign loans. Second, domestically the deficit is financed when the government issues securities, borrows from the central bank or from commercial banks. While government borrowing from the BoG has declined, its borrowing from commercial banks has increased in recent years (*BoG Annual Reports*). This trend is worrying since it has implications for private sector credit. Commercial banks have scaled back their lending to the private sector or they have kept the lending rate high, possibly crowding out private sector investment<sup>7</sup>. Private sector credit, in turn, is known to be the best sterilizer of excess liquid assets, including excess reserves.

When government borrows from the central bank both the asset and liability side of the central bank balance sheet are affected initially with no effect on net claims on the government. However, as government draws down on its account at the central bank to make payments to the private sector, its deposits fall while reserve money rises along with commercial bank deposits of agents who sell goods and services to government. This is the basis for the fear that inflation can rise if the central bank is not independent enough to curtail such lending.

A second factor is foreign exchange intervention. At times the central bank intervenes by selling foreign currency to ease demand pressures in the domestic currency market (otherwise known as the *cambio* market). Typically, though, financial programming requires that the central bank must maintain a target level of international reserve. This involves buying foreign exchange in the local *Cambio* market. Such intervention directly affects private sector agents' bank deposits and also reserve money. For example, when the BoG purchases foreign currency by writing a check against itself its balance sheet shows an increase in foreign assets and a corresponding rise in reserve money. The converse occurs when it sells foreign currency to ease demand pressure on the exchange rate. Within the context of financial programming, however, the former scenario is more binding as international reserve targets must be met. The central bank

---

<sup>7</sup> The crowding out of private investment owing to Guyana's monetary policy framework will depend on whether the liquidity accumulation process is voluntary or involuntary. This issue will have to be taken up in another paper.

through its liquidity management framework will try to mop up the injected liquidity. This means that Guyana indirectly incurs domestic debt to meet international reserve targets.

Third, remittances, which originate from the large expatriate Guyanese population living abroad. Such inflows are conservatively estimated by the BoG to be around US\$ 45 million annually (*Annual Report*, 2002), but private sources estimate an annual inflow of about US\$ 150 million. A figure of this magnitude – even say the mid-point between US\$45 million and US\$ 150 million – is likely to have tremendous influence on money supply and bank reserves in an economy with an official GDP estimate of about US\$ 820 million. To the extent that households exchange their foreign currency gifts for domestic currency, currency in circulation and bank deposits will automatically adjust. Remittances therefore create demand for domestic money (both cash and bank deposits), which banks exchange for the hard currency. The BoG must therefore supply reserves if required<sup>3</sup>, since not accommodating currency as households exchange foreign currency for local dollars will be disastrous for the banking system as the currency dealers (and later people in the villages who seek to withdraw deposits) start to panic. Another way of looking at it is through equation 4 above, which expresses the growth of money stock ( $M_2$ ) as a function of the growth in NFA. Remittances increase the NFA of the banking sector, which must then be balanced by a similar increase on the liability side in order to maintain the balance sheet constraint.

Fourth, the underground economy also drives the money supply and also bank reserves. In Guyana there are two aspects of the underground economy: the illegal economy driven by the narcotics trade, money laundering and cross-border smuggling; and the legal one that comprise mainly of the self-employed pursuing legitimate activities who chose to stay hidden for purposes of tax evasion. Recent attempts to estimate the magnitude of the underground economy suggest the size has declined over the 1990s, but overall it still averages close to 33 percent of recorded GDP (Faal, 2003, p.16). Such significant unrecorded production will be reflected in the monetary aggregates, which becomes difficult to predict.

<sup>3</sup> Note the Bank of Guyana does not directly supply the reserves through the discount window. As explained earlier there is no need for this to occur given that banks always have a surplus of liquidity. The reserves enter the economy indirectly when the central bank supply reserves to government who then injects liquidity into the economy. However, should this channel evaporate, given the circumstances described, the central bank will be forced to directly lend through the discount window or through expansionary open market operations to ensure the stability of the banking system.



---

To the extent that those operating in the underground economy earn foreign currency, the effect is the same as the remittance case above. Overall, such activities increase the demand for local currency, which subsequently elicits the increase in currency supply from the central bank. Refusal by the BoG to supply the requisite currency can result in panic and loss of confidence in the domestic banking system.

Individuals operating in the hidden economy must do business with the official economy. For instance, a self-employed person not documented who earns cash purchases goods from a legal supermarket. The supermarket then deposits the purchase proceeds in its bank account. The currency now finds its way into the banking system augmenting deposits and reserves in the process. Note there is nothing that precludes anyone operating in the hidden economy from owning a bank account<sup>8</sup>. Therefore, income generated in the underground economy will ultimately find its way into the local banking sector either directly by cash earners having their own accounts or indirectly by cash earners interacting with documented businesses. As this process occurs it is possible that deposits and bank reserves can increase without the corresponding expansion of credit.

Fifth, high levels of reserves, according to the financial programming model, ought to stimulate bank lending. But this is not the case as banks have shown stronger preference for low risk government papers instead, gradually reducing their lending to the private sector since 1998 (*BoG Annual Reports*). Clearly, then, bank lending is not a function of free reserves. Credit expansion is dependent on a complex mix of variables. On the supply side banks in Guyana are not able to anticipate risk adequately by picking good from bad borrowers. It may also be that banks are not as yet compelled to do so because they have a safe and easy form of investment in government Treasury Bills. In general, the credit market is very different because supplying credit to different agents is not the same as selling a commodity to these same agents (Stiglitz and Greenwald, 2003). Information problems reign supreme in credit markets. Failure of banks to adequately assess the peculiar characteristics of each potential borrower will stymie the flow of credit. Banks become more sensitive to risk as problems of information – adverse selection and moral hazard – become entrenched.

The supply of credit is also constrained by the extent of liquidity preference of banks (Dow, 1996; Fontana, 2003). Liquidity preference, in turn, is determined by

---

<sup>8</sup> However, it will become difficult for money launderers to have accounts in Guyanese banks with the recent passage of the Anti-Money Laundering Act in Parliament.

---

banks' perception of the business environment. Uncertainty – whether political or economic in nature – is a major factor determining banks' preference for liquidity. Political instability, which Guyana has experienced for the last five years, means confidence of banks is low as the lending environment is weak. With political instability the probability of business failures increases, therefore banks prefer to hold a portfolio that is very liquid and low in risk. This portfolio typically includes foreign currencies, vault cash and Treasury Bills. Under such circumstances loans are extended only to the most established businesses with the best credit history. As uncertainty ebbs so too will banks' preference for liquidity while credit extension is likely to be reinvigorated.

On the demand side liquidity preference with concomitant uncertainty also impedes the process of credit expansion. Political turmoil engenders a situation where businesses adopt a wait and see attitude towards investment. Essentially animal spirits are low and the business class prefers to hold on to whatever liquid assets they can find – cash, bank deposits, foreign currency, etc. Households also have similar predilections preferring liquid assets in times of uncertainty. The demand for home mortgages and consumer loans tend to wane in such periods. Therefore, the connection between excess reserves (or the monetary base) and credit is a very weak one.

In concluding this section, there are several factors generating bank deposits on the liability side of the aggregate commercial bank balance sheet. However, there is not sufficient lending to the private sector to dampen the excess reserves. It follows, then, that sterilization is not likely to be an adequate policy measure in such circumstances. More direct measures might have to be adopted in order to address the situation. This section also serves to highlight the problematic task of meeting reserve money targets under the typical financial programme. Money is endogenous to different factors ranging from credit to private agents (both businesses and households), foreign exchange inflows, and the underground economy. While it is true that the money supply can be controlled by curtailing the extent to which government deficit is monetized, it is not so certain whether money accommodation owing to the other factors is controllable.

#### **4. Excess Liquidity and Inflation**

Within the context of the financial programming model, inflation results from an increase in money supply over that which is demanded, assuming the income

---

---

velocity is at least predictable. However, it is not as mechanical as the quantity theory of money predicts. It is important to look at how money enters the economy. Money can enter the economy primarily through three sources. First, it enters endogenously through the demand for bank credit. Second, it enters the economy exogenously when the government borrows from the central bank to make payments. Third, when there is an exogenous inflow of foreign currency through remittances, foreign aid, or foreign loans. To the extent that foreign currency is converted into the local currency, it can have implications for demand and prices.

With respect to the first one can argue that the conventional causality ascribed to the quantity theory is reversed. Money becomes endogenous to business activities (production) and prices. This is the basic proposition of Post Keynesian theory of endogenous money and also that of the theory of monetary circuits (Deleplace and Nell, 1996). Money enters the economy because businesses want to undertake production. Wages must be financed in advance and also payments on intermediate goods must be made up front. Therefore, these must be financed by credit from banks or large corporations can issue corporate bonds<sup>10</sup>. Nell (2003) demonstrates how intertwined is money with production. He derives theoretically the quantity of money that is required to monetize all transactions in a hypothetical two-sector economy. The velocity of money is given a specific formula in which the aggregate wage bill and technical production coefficients are arguments. This quantity of money grows with the wage bill and production. What this means is if the private sector wage bill grows, or the cost of production rises, businesses must demand more credit to finance working capital, which in turn, increases deposits and broad money. Therefore, when money is created owing to demand for loans, it cannot possibly be a cause of inflation, but rather is caused by inflation. If prices increase exogenously perhaps because of exchange rate depreciation or higher import prices or agricultural supply bottlenecks, the cost of production and the wage bill must also rise; hence the demand for credit must also increase. Here money is endogenous in the Post Keynesian and neo-Structuralist sense (Ghatak, 1995).

However, it is fair to believe that there might be some upper bound above which credit creation will begin to exert price pressures. This is possible mainly through pressures on the balance of payments, which then can precipitate depreciation in

---

<sup>10</sup> However, in many developing countries, including Guyana, there is very little reliance on direct finance. The banking sector is therefore the main source of credit.

the currency. However, this further depends on whether credit is expanding to finance a consumption-led or an investment-led expansion. A consumption-led expansion is problematic in small open economies such as Guyana. Such economies typically export what they produce and import what they consume<sup>11</sup>. Therefore, if consumption is readily augmented by bank credit one can expect trouble. The constraint, however, may not be so binding if credit is used to finance an investment-led expansion. The economy's capacity to produce is growing while money and credit grow, so there is no natural tendency for prices to increase.

The second source of money supply is where the problem usually lies. If government finances its spending by resorting to its seigniorage privileges, it tends to be most inflationary (Fry, 1997). But this must also be placed in context. If central bank finance is used to pay for government worker wages or for other current expenditures, it is no surprise that the stock of money – and with it the private sector's ability to spend – will grow faster than the economy's capacity to produce. But if government uses that finance option to expand the economy's productive capacity it is not automatic that inflation will result.

It would seem as though excess liquidity, despite being ubiquitous, cannot explain inflation phenomenon in our case study economy. Fig. 1 shows the level of excess reserves widening, while the rate of inflation has been declining since the early 1990s (Appendix, Table A). Therefore, the policy of incessant sterilization – which has implications for the domestic debt – will have to be re-examined. Inflation must be explained within broader structural and institutional frameworks. This paper utilizes Davidson's 1994 (Chapters 9 and 12) inflation model. Identity 9 below is the talismanic quantity theory, while 10 shows Weintraub's mark-up pricing model.

$$(9) \quad MV = P_D Y$$

$$(10) \quad P_D = k W/A$$

Where  $P_D$  is the domestic price level,  $W$  is the average nominal wage,  $A$  is average labour productivity and  $k$  the mark-up or profit share. The endogeneity of money in the inflationary process can actually be shown by combining 9 and 10 and noting that  $Y = AN$  ( $N$  being the level of employment). If both velocity and the mark-up are held constant we obtain  $m = w + n$ , where  $w + n$  = growth rate of nominal wage bill.

<sup>11</sup> I borrowed this crisp sentence from Prof. Clive Thomas.



Here we see that a change in the wage bill will lead to an accommodation in the money supply captured by money growth ( $m$ ).

To reflect the highly open nature of our sample economy the above analysis must be extended. Below  $\Phi$  (which denotes the openness of the economy) is imported goods denominated in local currency ( $e P_D Q_M$ ) divided by the value of aggregate expenditure on final goods by domestic residents ( $E_D$ ). The exchange rate ( $e$ ) is the Guyana dollar/US dollar rate.  $Q_M$  and  $Q_D$  are the quantity of imported and domestic goods, respectively; while  $P_M$  and  $P_D$  are the imported prices (mainly an index) and domestic prices, respectively.  $Q$  is the quantity of final goods bought by domestic residents, while  $P$  is the weighted average of  $P_M$  and  $P_D$ .

$$(11) \quad \Phi = (e P_M Q_M) / E_D$$

$$(12) \quad E_D = P_D Q_D + e P_M Q_M = P Q$$

$$(13) \quad P = k (W/A) (1 - \Phi) + e P_M (\Phi)$$

Equation 13 is derived from 12 and 10 above. Here we see the price level of goods and services that make up domestic aggregate expenditure is a positive function of  $e$ ,  $\Phi$ ,  $P_M$ ,  $W$  and  $k$ .  $P$  is inversely related to labour productivity ( $A$ ) as is expected.

## 5. Empirical Methodology and Analysis

This section uses innovation accounting – variance decomposition and impulse response functions – to study the dynamic interaction among four endogenous variables. The forecast error variance decompositions allow inference over the proportion of movement in one variable that is due to its own shocks versus shocks in the other endogenous variables in the VAR system. The analysis of impulse response functions, on the other hand, traces out the time path of various shocks on the variables. In particular, we want to know what percentage of variation in excess reserves (ER) can be explained by itself, central bank credit to government (CBCG), foreign assets (FA)<sup>12</sup> of the banking system, and commercial bank loans to government and private sector (LON).

<sup>12</sup> The specific hypothesis that remittances determine excess liquidity could not be tested, as there is not a long enough time-series. However, remittances will show up as part of the foreign assets of the banking system. Hence, the reason for studying the extent to which FA accounts for variations in ER. However, I do accept that other factors such as export earnings, foreign aid, etc., will also determine foreign assets.

Three issues emerge during the empirical estimation of the VARs. First, variables must be stationary to ensure the stability of the VAR. In this regard, each variable is examined for unit roots by inspecting plots of the autocorrelation functions and also by using the ADF test. Results, which are not reported here because of space limitation, indicate that each variable is I (1). The second issue regards whether the model should be specified in levels or first differences. This issue is addressed by performing Johansen's cointegration test, which indicates the presence of one cointegration vector. This information was then used to restrict the VAR, in which case we get a VECM. The third refers to the order or the optimal lag length of the VAR. Utilizing the AIC and SC information criteria, a lag order of four quarters seems best<sup>13</sup>. Overall, the results seems invariant to different lag lengths.

Let  $x_t$  be a vector containing the four endogenous variables in our VAR. That is,  $x_t = (ER, LON, CBCG, FA)'$ . The basic VAR model is presented by equation 14.

$$(14) \quad x_t = A_0 + \sum_{k=1}^n \Phi_k x_{t-k} + \varepsilon_t$$

Where  $\Phi_k$  is a  $4 \times 4$  matrix of coefficients of  $x_{t-k}$  for the  $k^{th}$  lag ( $k = 1, 2, \dots, p$ );  $p$  = the number of lags;  $A_0$  is a  $4 \times 1$  vector of constant terms; and is a white noise  $4 \times 1$  vector, such that:  $E(\varepsilon_t) = 0$  for all  $t$  and  $E(\varepsilon_t \varepsilon_s') = \Sigma$  for all  $t = s$  and 0 for all  $t \neq s$ . The VECM format is expressed below in equation 15.

$$(15) \quad \Delta x_t = \mu + \Pi x_{t-1} + \Gamma_1 \Delta x_{t-1} + \dots + \Gamma_{p-1} \Delta x_{t-p+1} + \varepsilon_t$$

Where  $\Pi = -I + \Phi_1 + \dots + \Phi_p$  and  $\Gamma_k = -\Phi_{k+1} - \dots - \Phi_p$ , and  $k = 1, \dots, p-1$  are  $p \times p$  matrices. The restricted model 15 is the preferred model to estimate in the presence of cointegration. Estimating the model in only differences will omit  $\Pi x_{t-1}$ .

The impulse response coefficient matrices can be computed recursively from the following equation (16).

$$(16) \quad C_i = C_{i-1} \Phi_1 + \dots + C_{i-p} \Phi_p$$

Where  $i = 1, 2, \dots$ , with  $C_0 = I$  and  $C_i = 0$  for  $i < 0$ . Now we get the impulse response coefficients from equation 17.

<sup>13</sup> The econometric results not reported here are fully represented in a second paper: "An Analytical Framework of Persistent Excess Bank Liquidity."

$$(17) \quad IR(n, ij) = e_i' C_n T e_j$$

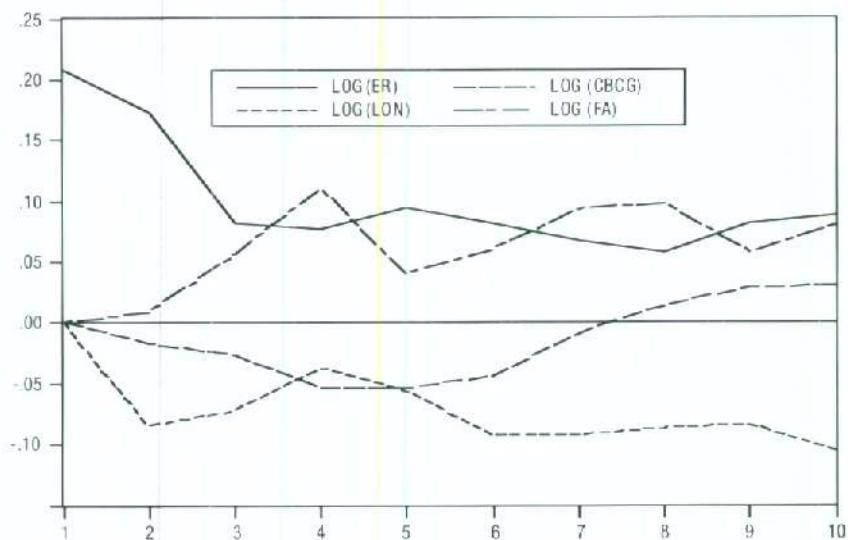
Where  $e = (0, 0, \dots, 0, 1, 0, \dots, 0)'$  is an  $m$ -vector with 1 on the  $i^{\text{th}}$  position and zeros elsewhere.  $T$  is the  $m \times m$  Cholesky decomposition matrix of the residual covariance matrix,  $\Sigma$ . Equation 17 gives the response in variable  $i$  to a shock in variable  $j$  in the  $n^{\text{th}}$  time horizon.

The analysis spans the period 1991:1 to 2003:4. Data were obtained from the *International Financial Statistics* and from *Bank of Guyana Annual Reports*. The first result of interest is presented in Table 1 below.

**Table 1: Variance Decomposition of LOG(ER)**

Period	S.E.	LOG(ER)	LOG(LON)	LOG(CBCG)	LOG(FA)
1	0.21	100	0	0	0
2	0.28	90.68	8.83	0.38	0.11
3	0.31	82.74	12.79	1.05	3.42
4	0.35	71.96	11.55	3.33	13.16
5	0.37	69.75	12.46	5.07	12.73
6	0.4	64.7	16.33	5.67	13.31
7	0.42	59.37	19.07	5.01	16.55
8	0.45	54.9	20.89	4.59	19.62
9	0.47	53.49	22.39	4.6	19.52
10	0.49	50.94	24.5	4.48	20.08

The results are interesting and to a large extent confirm expectations. FA and LON explain most of the variations in ER. Central bank credit to government accounts least for variations in ER, a result that might be due to the tightening of this source of government finance under the Fund-programme. It is possible that the effect of FA might be capturing remittances, foreign aid and the fact that the BoG must meet its international reserve targets by buying foreign exchange – injecting reserves in the process – from the local currency market. Variations in ER are also explained by LON. These effects tend to persist. But most important is the negative effects LON exerts on ER (Fig. 2 below).

**Figure 2:** *Response of LOG (ER) to Cholesky One S.D. Innovations*



---

## 6. Conclusion

Monetary policy in Guyana is focused towards the control of excess bank liquidity, which according to conventional belief must be sterilized so as to circumvent inflationary pressures. But sterilization is not likely to be successful. As a matter of fact, after ten years of incessant sterilization, excess reserves continue to expand, while at the same time inflation had decelerated drastically. Therefore, the inflationary process cannot be driven by the surfeit of reserves. The government is incurring debt to lock away funds that could be used elsewhere in a productive manner. Such debt does not add to the economy's capacity to produce.

Open market operations are mainly intended to be reserve injecting or reserve clearing mechanisms, which is part of a greater purpose to defend the targeted overnight rate. The overnight rate and the bank rate are clearly powerless in an environment of recurring excess reserves. The time for indirect monetary policy will emerge once the economy performs in such manner as to make the banking system dependent on the central bank or the interbank market for reserves. Such time, however, has not yet occurred. From the econometric findings we also see that a major factor determining shocks in excess reserves is the foreign assets of the banking system. This then suggests that the Treasury bill sales have been unsuccessful in sterilizing that inflow of foreign assets. The role of open market sales of government papers must be seen for what it really is: nothing more than a short-term stabilizing mechanism. Since the reserve position of banks does not determine their willingness to lend, one can further question the current mechanism of liquidity sterilization.

The paper argues that the excess reserves emanate from structural features of the economy, which range from monetizing the government deficit, reliance on foreign private and official grants, the underground economy, and importantly the economy's limited absorptive capacity. Policies must therefore be geared towards augmenting the demand for bank credit from primarily the private sector, as the only sure way to reduce excess liquidity is for financial institutions to hold a greater percentage of loans in their asset portfolios. Indeed, the econometric exercise also confirms that loan expansion is likely to diminish the excess liquidity. This, of course, will require the use of direct instruments. For example, the central bank can rechannel sterilized funds into the long end of the market; especially into such activities as mortgage lending and agricultural development financing. Also, government must use other strategies to get commercial banks and near-banks to make loans.

---

---

## References

- Bain, Keith and Peter Howells (2003). *Monetary Economics: Policy and its Theoretical Basis*. Hampshire: Palgrave Macmillan.
- BoG (various years). *Annual Report*. Bank of Guyana: Georgetown.
- Deleplace, Ghislain and Edward Nell, eds., (1996). *Money in Motion: The Post Keynesian and Circulation Approaches*. London: Macmillan Press, Ltd.
- Das, Udaibir and Gobind Gobind (1997). "A Retrospect and Prospect on the Reform of the Financial Sector in Guyana." *Social and Economic Studies*, Vol. 46 Nos.2&3: 93-129.
- Davidson, Paul (1994). *Post Keynesian Macroeconomic Theory: A Foundation for Successful Economic Policies for the Twenty-first Century*. Northampton: Edward Elgar.
- Dow, Sheila (1996). "Horizontalism: A Critique." *Cambridge Journal of Economics*, Vol. 20: 497-508.
- Egourme-Bossogo, Philippe., Ebrima Faal, Raj Nallari, and Ethan Weisman (2003). *Guyana: Experience with Macroeconomic Stabilization, Structural Adjustment, and Poverty Reduction*. Washington, DC: International Monetary Fund.
- Enders, Walter (1995). *Applied Econometric Time Series*. New York: John Wiley and Sons, Inc.
- Faal, Ebrima (2003). "Currency Demand, the Underground Economy, and Tax Evasion: the Case of Guyana." *Working Paper /03/7*, International Monetary Fund.
- Fontana, Giuseppe (2003). "Post Keynesian Approaches to Endogenous Money: A Time Framework Analysis." *Review of Political Economy*, Vol. 15, No. 3: 291-314.
- Fry, Maxwell (1997). *Emancipating the Banking System and Developing Markets for Government Debts*. London: Routledge.
- Ganga, Gobind (2000). "Credit, Excess Liquidity and Monetary Policy Issues in Guyana." *Social and Economic Studies*, Vol. 49, Nos. 2&3: 199-224.
- Ganga, Gobind (1998). "Stabilization and Financial Adjustment in Guyana." *Money Affairs*, Vol. 11, No. 2: 147-168.
- Ghatak, Subrata (1995). *Monetary Economics in Developing Countries*, 2<sup>nd</sup> edition. London: Macmillan.
- Goodhart, Charles (2002). "The Endogeneity of Money." In P. Aristis, M. Desai and S. Dow (eds.), *Money, Macroeconomics and Keynes: Essays in the Honour of Victoria Chick*. London: Routledge.
- Goodhart, Charles (1995). *The Central Bank and the Financial System*. Cambridge: MIT Press.
- Guttentag, Jack (1966). "The Strategy of Open Market Operations." *Quarterly Journal of Economics*, Vol. 80, No. 1: 1-30.
-

---

IMF (2000). *Financial Programming and Policy: The Case of Turkey*. Washington, DC: IMF Institute, International Monetary Fund.

IMF (1995). "The Adoption of Indirect Instruments of Monetary Policy." *Occasional Paper No. 126*, International Monetary Fund.

IMF (1987). "Theoretical Aspects of the Design of Fund-Supported Adjustment Programs." *Occasional Paper No. 55*, International Monetary Fund.

Lavoie, Marc (1984). "The Endogenous Flow of Credit and the Post Keynesian Theory of Money." *Journal of Economic Issues*, Vol. XVIII, No. 3: 771-797.

Lombra, Raymond and Raymond Torto (1973). "Federal Reserve Defensive Behaviour and the Reverse Causation Argument." *Southern Economic Journal*, Vol. 40, No. 1: 47-55.

Moore, Basil (1983). "Unpacking the Post Keynesian Black box: Bank Lending and the Money Supply." *Journal of Post Keynesian Economics*, Vol. 5, No. 4: 537-556.

Moore, Basil (1979). "The Endogenous Money Stock." *Journal of Post Keynesian Economics*, Vol.2, No.1: 49-70

Nell, Edward (2003). "Monetizing the Classical Equations: A Theory of Circulation." *Cambridge Journal of Economics*, Vol. 28: 173-203.

Polak, Jacques (1997). "The IMF Model at Forty." *Working Paper 97/49*, International Monetary Fund.

Singh, S. (1997). *Bank of Guyana: Reserve Money Programming Manual*. Georgetown: Bank of Guyana.

Stiglitz, Joseph and Bruce Greenwald (2003). *Towards a New Paradigm in Monetary Economics*. Cambridge: Cambridge University Press.

Stock, James and Mark Watson (2001). "Vector Autoregressions." *Journal of Economic Perspectives*. Vol. 14, No.4: 101-115.

Tarp, Finn (1993). *Stabilization and Structural Adjustment: Macroeconomic Frameworks for Analyzing the Crisis in Sub-Saharan Africa*. London: Routledge.

---

## APPENDIX

Table A: Macroeconomic Indicators

	GDP Growth	Inflation Rate	Exchange Rate G\$/US\$	Interest Rates			Interest Spreads	
				T/Bill Rate (I)	Prime Lending Rate (II)	Average Deposit Rate (III)	(II) - (I)	(II) - (III)
1992	7.8	26.2	125	25.75	28.69	22.51	2.94	6.18
1993	8.2	13.8	126.7	16.83	19.36	12.26	2.54	7.11
1994	8.5	9.1	138.3	17.66	18.36	11.42	0.7	6.94
1995	5	12.2	142	17.51	19.22	12.9	1.71	6.32
1996	7.9	7.1	140.4	11.35	17.79	10.49	6.44	7.31
1997	6.2	3.6	142.4	8.91	17.04	8.56	8.14	8.48
1998	-1.7	4.6	150.5	8.33	16.77	8.1	8.44	8.67
1999	3	7.5	178	11.31	17.11	9.08	5.8	8.03
2000	-0.7	6.1	182.4	9.88	17.3	8.71	7.42	8.59
2001	1	2.6	187.3	7.78	17.01	7.63	9.23	9.38
2002	0.5	5.3	190.7	4.94	16.33	4.53	11.39	11.8
2003	0.4	5.6	195.5	3.4	15.58	3.46	12.18	12.12

Source: BOG Annual Reports

Table B: Treasury Bills Issued and Interest Cost (G\$ Million)

	Total	Treasury Bills Issued			Interest Cost			
		91-Day	182-Day	364-Day	Total	91-Day	182-Day	364-Day
1993	22173	13673	4000	4500	NA	NA	NA	NA
1994	23939	19088	2640	2211	4057	2599	765	693
1995	22788	17745	2250	2794	4423	3626	449	348
1996	27535	6763	3156	17616	3168	2336	350	482
1997	25678	4569	4406	16703	2651	348	350	1954
1998	25930	2700	4700	18530	2186	322	410	1453
1999	35207	4303	4952	25952	2787	450	632	1705
2000	44013	4947	8453	30613	4625	432	789	3404
2001	48090	3640	7600	36850	4568	373	882	3313
2002	49892	2973	10189	36730	4147	207	520	3420
2003	75121	5251	16617	53253	2521	100	202	2219

Source: BoG Annual Report



**Table C: Hypothetical Weekly Reserve Money Programme: Open Market Operations (G\$ Millions)**

	Target	Projection	Deviation
<b>Net Foreign Assets</b>	5031	5031	0
Gross Reserves	42141	42141	0
Foreign Liabilities	-37110	-37110	0
<b>Net Domestic Assets</b>	18046	19414	-1368
Credit to Public Sector	-34458	-33090	-1368
Other Deposits	-788	-788	0
Valuation Adjustment	41003	41003	0
Other	12289	12289	0
<b>Reserve Money</b>	35221	36589	-1368
Currency in Circulation	10931	12299	-1368
Liab. Comm. Banks	12145	12145	0
Required Reserves	9716	9716	0
Free Reserves	1609	1609	0
Vault Cash	820	820	0

Open Market Operation: Withdrawal of liquidity G\$ 1368M.

The above shows the typical central bank balance sheet. Here it is assumed government expenditure was higher than projected, which means cash have been injected into the banking system. The reserve money growth of G\$ 1368 million must then be sterilized by issuing T/Bills by an equal amount.

---

**Abstract**

*This paper examines the monetary policy framework of Guyana. Monetary Policy is motivated by the IMF's financial programming model. One aspect of the model assumes that the reserve position of the banking system determines the system's ability to extend credit. Excess liquidity, therefore, can encourage reckless bank lending, augmenting the monetary aggregates in the process, and hence creating inflationary pressures. Therefore, any excess must be sterilized at all times. Associated with the sterilization is the growing domestic debt. This paper argues against such a mechanical view of how monetary aggregates can affect the economy. Innovation accounting within the VAR framework is conducted to gauge what factors might account for variations in excess bank liquidity. Findings suggest that variations in excess liquidity are best explained by its own shocks, shocks in foreign assets of the banking system, and shocks in commercial bank loans to the private sector.*

**KEY WORDS:** *excess liquidity, financial programming, monetary policy, Guyana.*



---

While not implying acceptance, payment of fees, responsibility for loss or return, the Editor encourages the submission of manuscripts concerning money, financial intermediaries, financial techniques, and experiments in savings mobilization in developing countries. The Editor will confirm the reception of articles promptly. Articles are then refereed by a panel of experts. Only after this process a decision will be made and communicated to the Authors. Manuscripts submitted for publication should be in English, 4,000 - 10,000 words in length with a 200 - 400 word summary, and double-spaced. Footnotes should be indicated by consecutive numbers throughout the paper. References in the text should be quoted by the author's last name and year of publication, e.g. Shaw (1973) or (Shaw, 1973). The title should be as compact as possible. Submission of the paper implies that it is an unpublished work, not yet submitted for publication elsewhere. Sections and subsections of the paper should be indicated in cardinal numbers (e.g. 1.; 1.1; 1.2; etc.). Mathematical formulas should be numbered consecutively as [1], [2] etc. Figures should be limited in number and submitted in a form ready for the printer. References at the end should be listed alphabetically and quoted as follows:

- for articles: Galbis Vicente, "Monetary and Related Policies in Ministates", *Savings and Development* Vol. VIII, No. 4, 1984, pp.291-350;
- for books: McKinnon Ronald, *Money and Capital in Economic Development*, The Brookings Institution, Washington D.C., 1973. All communications should be sent to the Editor:

**"GIORDANO DELL'AMORE" FOUNDATION**

Via L. Manara, 15/17 - 20122 MILANO (Italy) - Tel. 02 5418441 - Fax 02 55193005  
e-mail: publications@fgda.org - <http://www.fgda.org>

Signed articles do not necessarily reflect the opinion of *Savings and Development* or of its Editor and no responsibility is accepted for them.

---

Bien que cela ne signifie pas l'acceptation ou le paiement de frais, et que toute responsabilité soit déclinée pour la perte ou la restitution, la Rédaction souhaite l'envoi de manuscrits concernant la monnaie, l'intermédiation et les techniques financières, et les essais pour la mobilisation de l'épargne dans les pays en voie de développement. Les articles (deux copies) devraient être rédigés en Anglais, d'une longueur de 4.000 à 10.000 mots avec un résumé de 200 - 400 mots. Toute communication devra être adressée à la Rédaction:

**FONDATION "GIORDANO DELL'AMORE"**

Via L. Manara, 15/17 - 20122 MILANO (Italie) - Tel. 02 5418441 - Fax 02 55193005  
e-mail: publications@fgda.org - <http://www.fgda.org>

Les articles portant signature ne reflètent pas nécessairement l'opinion de *Savings and Development* ou bien de la Rédaction et toute responsabilité est déclinée par ceux-ci.

---

**RASSEGNA TRIMESTRALE**

REGISTRATA PRESSO IL TRIBUNALE DI MILANO AL N. 102 DEL 27.3.1974  
DIREZIONE, REDAZIONE, AMMINISTRAZIONE  
FONDAZIONE "GIORDANO DELL'AMORE" - Via L. Manara, 15/17 - 20122 MILANO  
TEL. 02 5418441 - FAX 02 55193005

Direttore Responsabile  
**FELICE TAMBUSI**

Grafica e videoimpaginazione  
Indigo Srl - Milano

Stampa  
Geca - Cesano Boscone (Mi)

---







ISSN 0393 - 4551