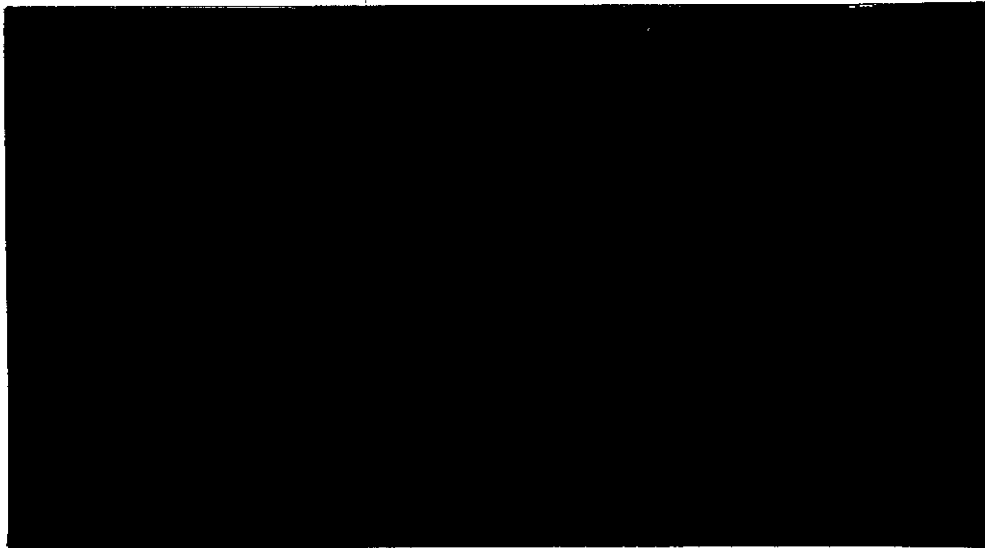




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**MANAGEMENT OF
INTERNATIONAL RESERVES:
THE CASE OF BANK OF
GUYANA**

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Over the last decade, financial innovations and globalisation enabled by advances in information technology have significantly increased cross-border flow of capital as economies of the world became more integrated and transaction costs lowered. This caused the currency and stock markets to become more volatile and easily influenced by events and conditions in other countries. As a consequence, financial risks and vulnerabilities have become integral parts of the international financial system. Accordingly, this has led to significant changes in central banks' policies on the management of official reserves portfolios.

In view of the increasing volatile nature of financial markets and, hence, the inherited financial risks, there have been dramatic changes in reserve management practices grounded in the portfolio approach, where the optimum quantity and composition of international reserves are based on profit maximisation at any given level of risk. There are many manifestations within this framework of reserve management. For example, in one case of portfolio management practice, liquidity and return considerations are not mutually exclusive. Rather, the emphasis is on diversification into multiple portfolios with differing objectives such as having one or more portfolios maintaining a desired degree of liquidity; another current income; and others for long term capital appreciation. By holding a wider variety of instruments, there are improvements in the risk adjusted returns in investment portfolios (by taking advantage of the correlation between return in different markets¹) and in liquidity. This approach suggests that the optimum currency composition will be determined using the optimisation procedure.

In another reserve management practice, the demand for reserves is indirectly related to the net opportunity cost of holding reserves. Miller (1995) pointed out that since government can use its international reserves to import capital goods to foster economic growth, there is a gross opportunity cost of these reserves which is defined as the domestic marginal product of capital or

¹ Here diversification takes into account correlations between interest rates, between exchange rates and between interest rates and exchange rates.

the additional output produced as the capital input is increased by one unit. This can be proxied by the domestic rate of interest or the rate at which a country can borrow internationally. This will have to be netted off against the rate of return on the reserves (proxied by US Treasury bill rate or the Euro) to give the net opportunity cost of holding reserves. If the net opportunity cost is high, fewer reserves should be held for portfolio investment.

In the economic literature, the transaction approach explains traditional central bank reserve management practices, which are consistent with conservative, risk averse management practices, and where the potential rate of return of the reserves is not an important objective. In this approach, assets are held for foreign exchange market intervention and will, therefore, depend on the volume of foreign exchange market transactions. Specifically, it is argued that for any given volume of international transactions, the demand for international reserves is indirectly related to government's willingness to allow balance of payments adjustment mechanism to take place and is directly related to policies directed at controlling domestic interest rates, output and prices (Heller and Knight, 1978). Clarke (1970) argued that the demand for international reserves is indirectly related to the speed of adjustments in the balance of payments, while Cooper (1968) argued that the demand for international reserves is positively related to the openness of the economy because of the attended external disturbances, and hence, the potential volatility of the country's balance of payments.

Heller (1974) argued that the benefits from holding international reserves are related to the role the reserves play in allowing the country to avoid, or at least, postpone balance of payment adjustment measures. This is dependent on how much home output would have to fall if no reserves were available, and if balance of payments adjustments were carried out by expenditure switching policies. Specifically, a high marginal propensity to import will require a small reduction in income to achieve any given improvement in the balance of payment. The benefit from holding international reserves in this case is low. On the other hand, if the marginal propensity to import is low, income will have to be reduced significantly for any desired improvement in the balance of payments. The benefits from holding international reserves here will be high.

Currency speculation plays a much reduced role in the activities of central banks according to the transaction model. The optimum currency composition, it is argued, is associated with the gross volume of trade denominated in a particular currency, the currency denomination of a country's existing and anticipated long-term debts or liabilities; and the exchange rate arrangements (i.e. the official intervening currency).

In view of the increasingly volatile nature of financial markets and the changes in international reserve management, this paper assesses the approach to the management of international reserves in Guyana. Section II of the paper presents an overview of the economy and the holdings of international reserves since 1976. Section III provides an assessment on the level and management of international reserves from the perspective of the various approaches. Section IV provides some recommendations and Section V provides some concluding remarks.

2.0 International Reserves Holdings and Composition

During the 1976-1990 period, Guyana experienced unfavourable macroeconomic conditions that included a major foreign exchange crisis of unprecedented intensity. The underlying imbalances came to the fore in the mid-1980s as flows of financial foreign assistance declined substantially. The authorities responded to these developments by resorting to external and domestic commercial bank borrowings to finance increasingly large budget deficits. The easing of credit stance, large fiscal deficit and a number of large devaluations, resulted in a rise in inflation that reached 120 per cent in 1989. Moreover, negative economic growth, with real GDP declining by an average of 3 per cent per year, and high interest rates in World markets, caused the debt burden to reach unsustainable proportions and Guyana's external vulnerability to exacerbate.

Table I illustrates the crisis situation at the end of the 1980s. The external debt exceeded annual GDP by nearly fivefold, external payment arrears had accumulated to over US\$1 billion and official international reserves declined below one month of imports. After declining in 1988, the external current account deficit further widened as a per cent of GDP in 1989 and 1990. Similarly, the central governments' fiscal deficit declined as a per cent of GDP to 36.7 per cent then increased to 47 per cent during the 1989-1990 period.

Table I
Selected Economic Indicators

	1980-85	1986	1987	1988	1989	1990
GDP Growth	-2.9	0.0	0.6	-3.0	-4.8	-6.0
Inflation	18.7	7.9	28.7	40.0	120.0	85.0
External Payment Arrears (US\$M)	-	874.3	1,008.5	1,122.0	531.8	-
External Debt/GDP	1.7	2.5	3.9	3.4	5.1	5.2
BOP Curr. Acc. Deficit/GDP	-	-25.2	-42.9	-16.5	-65.0	-65.9
Exchange Rate (G\$ per US\$)	3.2	4.3	9.8	10.0	27.2	39.5
External Debt Stock (US\$M)	700.0	1,035.6	1,117.4	1,233.5	1,391.9	1,820.1
Domestic Debt Stock (G\$M)	2,828.0	6,100.0	6,810.0	7,078.0	9,267.0	9,782.0
Central Govt. Bal./GDP	-	-51.3	-50.2	-36.7	-46.6	-47.0
Gross Int'l Reserves (US\$M)	7.9	8.6	8.9	4.0	14.1	26.6
Import Cover	2 wks	2 wks	2 wks	1 wk	3 wks	4 wks

Source: Bank of Guyana Annual Reports (various years)
Recent Economic Developments (IMF, 1991)

Inadequate level of reserves forced the authorities into various undesirable actions between 1976 and 1988. These had a debilitating impact on the growth potential of the economy. Specifically, as a consequence of the adverse conditions, international payments were in default; restrictions were imposed on trade and exchange outflows, which resulted in a parallel exchange rate system and an underground economy; and restrictive macroeconomic policies were implemented. In 1988, the authorities implemented the IMF/World Bank supported Economic Recovery Program. This was subsequently followed by the Fund one-year standby arrangement, followed by an arrangement under the enhanced structural adjustment facility (ESAF) during the 1990-1993 period and two ESAF successor arrangements that covered the 1994-1997 and 1998-2000 periods respectively. The structural adjustment programmes/arrangements covered trade and payment policies; industrial, agricultural and fiscal policies; and monetary and financial sector reforms.

The adjustment programmes and political democracy through free and fair elections enhanced confidence in the economy and resulted in significant improvements in the macroeconomic situation. Economic growth averaged 5.7 percent annually between 1991 and

1999, except for 1998 when GDP declined by 1.5 percent. Inflation declined from over 100 percent in 1991 to 3.6 percent in 1997 and then increased to 8.6 percent in 1999. The exchange rate was relatively stable during the 1994-1997 period before it depreciated in both 1998 and 1999. In addition, the balance of payments strengthened with the current account deficit as a percent of GDP narrowing from 43 percent in 1991 to 14.0 percent during the 1997-1999 period. With this improvement, the international reserve holdings increased significantly. This was facilitated by increased capital inflows in the form of concessional resources from the multilateral institutions with the implementation of the IMF/World Bank adjustment programs.

Table II
Total International Reserves
US\$Million

Year	Total	of which SDRs
1976	27.28	4.11
1977	22.98	3.32
1978	58.27	3.60
1979	17.53	3.73
1980	12.20	-
1981	6.91	1.21
1982	10.56	2.86
1983	6.49	-
1984	5.85	-
1985	6.47	-
1986	9.00	-
1987	8.43	-
1988	4.04	-
1989	13.35	-
1990	28.68	2.12
1991	124.42	1.42
1992	191.43	0.33
1993	246.30	-
1994	247.13	0.08
1995	269.34	0.14
1996	331.60	0.11
1997	315.30	0.20
1998	276.40	0.24
1999	267.00	1.30

Source: IMF: International Financial Statistics Yearbook

Table II indicates that the international reserve held by the central bank increased substantially during the 1991-1999 period. Between 1976 and 1990, average annual holding in international reserves amounted to US\$15.9 million, reflecting the unprecedented foreign exchange crisis experienced by the country during that period. As the foreign exchange situation improved after 1990, there was a modest build-up in international reserves. Foreign exchange reserves increased from US\$123 million in 1991 to a maximum of US\$331.6 million in 1996, and to an annual average of US\$286 million during the 1997-1999 period. In absolute terms, the value of the international reserves increased modestly from 4 months of imports in 1992 to an average of 4.8 months during the 1993-1999 period.²

The sharp rise in the reserves and the economic cost of holding reserves raise the question of what determines the adequacy of the level of international reserves? It is important to note that what is adequate for one country may not be so for another of similar size, and what is adequate for a country at a particular time may not be so in the future. Adequate levels of international reserves should be based on a country's objectives which include contributing to a balance in international payments, maintaining sustained economic growth and conducting prudent monetary policy. According to international practices, aggregate reserves should be at least equal to a four to five-month import volume in currency - inconvertible currency and a three-month import volume in countries with convertible currencies. When Guyana's foreign exchange reserves are juxtaposed with those of the flexible rates prevailing in Caribbean countries, it does appear that Guyana's foreign exchange reserves are fairly modest. However, in view of the fact that non-economic actions and reactions (political, civil unrest, etc) influence the balance of payments, international reserves to finance imports may not be adequate. This also follows from the fact that net capital outflows may not be controlled by normal financial forces such as interest rates, exchange rates and inflation differentials. In this regard, the level of reserves must be considered with the overall vagaries of the balance of payments and not just the current account. In addition, cost considerations arising from the continuously depressed domestic economy and loss of potential economic growth are important in determining the optimal international reserves.

² The rise in the reserves to five months of imports, it is argued in some quarters, is unnecessary and should be used to developing the infrastructure of the country.

An alternative measure to assess the adequacy of reserves would be the level of international reserves in terms of the current foreign liabilities of the central bank. A rising ratio provides assurance that when there are currency constraints because of the operation of the foreign trade multiplier and/or less confidence in a reversal capital flow, the foreign currency assets will be large enough to sustain a currency contraction to the pre-inflow period. Table III shows that the ratio of Guyana's gross foreign exchange reserves to the Bank of Guyana current liabilities has been increasing between the 1991-1999 period. The ratio increased from 0.64 in 1996 to 0.90 in 1997 and to 1.21 in 1999. This indicate that assets are more than sufficient to offset the current liabilities which have been decreasing on account of debt relief and the removal of certain debt from the Bank of Guyana books to the Ministry of Finance.

Table III
International Reserves to Bank of Guyana Liabilities
G\$Million

Year	Gross Official Reserves (1)	Bank of Guyana Foreign Liab. (2)	Percent (1)/(2)
1990	2,789.0	34,574.3	0.08
1991	15,125.2	100,919.6	0.15
1992	24,081.3	112,942.5	0.21
1993	32,178.0	104,777.0	0.31
1994	38,309.0	114,927.0	0.33
1995	37,484.0	113,365.0	0.33
1996	46,590.0	72,947.0	0.64
1997	45,719.0	50,591.0	0.90
1998	45,675.0	44,436.0	1.03
1999	48,305.0	39,821.0	1.21

Source: Bank of Guyana

3.0 Assessment of Demand for and Management of International Reserves

Bank of Guyana's holdings of international reserves are largely in line with the foreign exchange reserve requirement under the IMF/World Bank structural adjustment programmes. Consequently, the reserves are held primarily for facilitating the country's international financial

obligations in servicing its external debt and other financial transactions such as imports and exports in goods and services as well as repatriation of profits and dividends to enhance international creditworthiness. It is also a means to manage the value of the local currency through periodic intervention in the foreign exchange market to smooth out short-term fluctuations in the exchange rate arising from internal and external shocks.

Table IV
Indicators of International Transactions
US\$Millions

Year	Imports (M)	Exports (X)	GDP	Gross Reserves	Imports/GDP	Reserves/M+X
1991	239	244	330	123	0.73	25.6
1992	443	382	366	191	1.21	23.2
1993	484	414	440	246	1.10	27.3
1994	504	463	525	247	0.96	25.5
1995	537	496	629	269	0.85	25.7
1996	595	575	718	332	0.83	28.3
1997	642	593	742	315	0.87	25.5
1998	601	547	660	276	0.91	24.0
1999	550	525	669	267	0.82	24.8

Sources: Bank of Guyana Annual Reports (Various Years), Author's Calculation

The data in Table IV shows that during the 1991-1999 period, the holding of international reserves was positively related with the volume of the country's imports and the sum of its imports and exports which serve as the proxies for the volume of international transactions. Specifically, the ratio of international reserves to the sum of imports and exports averaged 25.5 and varied marginally between 1991 and 1999, except for 1996 when reserves growth was relatively higher than both the sum of imports and exports growth. The holding of international reserves is also related to the degree of openness of the economy. Table IV shows that the ratio of imports to GDP, a proxy of the degree of openness of the economy, increased between the 1991 and 1993 period which were the first few years of the adjustment programmes that required substantial level of imports for growth. Consequently, there was an increase in the holding of

international reserve. After 1993, however, the ratio of imports to GDP declined while the holding of international reserves increased. This latter relationship is explained by the fact that the capacity for a build-up in foreign reserves has been lacking prior to 1994. It also explains the fact that the level of reserves has been associated with the allowance for unrestricted balance of payments adjustment mechanism to take place as required under IMF/World Bank structural adjustment programs. The removal of quantitative restrictions and increased liberalisation of domestic interest rates, output, prices and foreign exchange rates also evidence this.

The volatility of the country's balance of payments also explains the central bank's holding of international reserves. Table V shows that the volatility of the balance of payments, measured by the stock of short-term foreign exchange liabilities of the government and the banking sector, has been generally higher between 1991 and 1993 and this served to increase the central bank holding of international reserves during the period. While the volatility remained relatively low during the 1994-1999 period, the build up of foreign reserves has been slower.

Table V
Selected Indicators

Year	Real GDP Growth	Interest rates 91-days t-bill	Exchange Rate US\$ to G\$	Inflation Rate (Average)	Short term liabilities US\$M	Current A/c. Bal. To GDP	Gross Int'l Reserves in Mths. Of Imports
1991	6.0	30.9	111.8	101.5	158.3	-49.3	6.1
1992	7.8	23.0	126.0	28.2	190.1	-26.3	8.1
1993	8.2	15.4	130.8	11.7	190.0	-29.4	4.9
1994	8.6	18.6	142.5	13.6	190.0	-18.9	5.1
1995	5.0	15.5	140.5	12.3	182.0	-17.9	4.6
1996	7.9	9.9	141.3	7.1	178.0	-9.3	5.2
1997	6.2	8.2	144.0	3.6	165.0	-14.2	4.7
1998	-1.5	8.8	165.3	4.6	148.0	-13.5	4.3
1999	3.0	11.1	180.5	8.6	140	-	-

Source: Bank of Guyana Annual Report (Various Years)

The holding of foreign reserves is also related to a number of macroeconomic policy reasons independent of profitability. The central bank has at times, changed its foreign currency

holdings to intervene in the foreign currency market to prevent the domestic currency from depreciating. The central bank continuously sterilises any deposit expansion through domestic security sales during the 1992-2000 period. As such, it is long in foreign currency position and short in domestic currency position. The long foreign currency position was used for intervention purposes to smooth out short-term fluctuations in the exchange rate.³ This is evidenced by the depreciation of the Guyana dollar from G\$142.25 to US\$1 in 1997 to G\$174 to US\$1 in January 1999 and the consequent periodic intervention by the Bank during the period. During the 1997-1999 period Bank of Guyana intervened fourteen (14) times with US\$90 million. These interventions achieved their purpose in stabilising the exchange rate. In 1997, there were eight (8) interventions amounting to US\$32 million. This stabilised the exchange rate from G\$142.25 to US\$1 in March 1997 to G\$144 to US\$1 at end December 1997. The interventions in 1998 occurred through the January to May period when the exchange rate depreciated to G\$152.25 to US\$1 in March and then appreciated to G\$147.25 to US\$1 at end June 1998.

The net opportunity cost of holding reserves does not seem to be a possible reason for the increased holding of international reserves since 1991. Using the rate of interest of 12.5 percent at which the country can borrow internationally as the domestic marginal product of capital and the interest rate of 5 percent on very liquid asset denominated in the reserve currency, the net opportunity cost of reserves is approximately 7 percent. According to this, the amount standing in international reserves should have been lowered. In view of the fact that the Government, under the IMF/World Bank adjustment programmes had access to concessional financing, the net cost of holding reserves may be marginal at most.

Another cost is the co-ordination between foreign reserves policy and domestic monetary policy. An increase in the central bank's exchange reserves has given rise to a corresponding increase in the supply of base money. If adjustments were not made in time as exchange reserves increased, liquidity and credit supply would add further pressures on a highly liquid

³ Specifically, the move from a fixed to a flexible exchange rate in 1991 exerted a positive effect on the holding of reserves for stabilising foreign exchange market intervention. It is expected that when exchange rates are flexible, the foreign exchange markets are likely to be unstable, especially in the short run according to the J-curve phenomenon as net exports deteriorate initially following a depreciation of the home currency.

financial system. The withdrawal of liquidity from the system through the auctioning of t-bills has been costly. During the 1992-1999 period, the cost of sterilising excess liquidity amounted to more than G\$30 billion, of which a part can be accrued to the accumulation of reserves.

After 1991, the sharp growth in foreign exchange reserves which meant excess reserves for the Bank's investment portfolio did not force the Bank into active reserve management as reflected in its investment portfolios. Table VI shows that the distribution of the country's total foreign assets has been between United States 3-month Treasury bills and term deposits. In 1999, United States Treasury bills accounted for 81 percent of total foreign investment and 86 percent of overall earnings while term deposits taken as a group represents 19 percent of investments and 14 percent of earnings. When compared to 1998, the distribution and earnings of the money market instrument of investment suggest that term deposits have provided a relatively higher rate of return. Further, with the choice of the 3-month US Treasury bill as the benchmark, the Bank received a lower annualised return than if it had held a longer-term security of similar risk. For example, during the first 6 months of 1999, the average annual yield on 3-month US Treasury bills was 5 percent per annum as against 5.1561 percent for the 6-month US Treasury bills. This means that an additional 16 basis points would amount to an additional annualised return of US\$400,000 on the reserve size of US\$250 million with no more than the practically insignificant risk. In view of this, maximisation of returns does not seem to be the main goal of Bank of Guyana's investment strategy.

Table VI
Total Foreign Assets

Holdings and Investment	Percent	
	1998	1999
Term deposits	24	19
US T-bills	76	81
Earnings		
Term deposits	12	14
US T-bills	88	86

Source: Bank of Guyana

Bank of Guyana has been holding varying percentage of its reserves in gold. In 1993, US\$175,223 in reserves was held in gold and this increased to US\$4.3 million in 1996 and US\$27.2 million in 1998. The gold is usually lent to bullion dealers who then on-lend it to producers to hedge future sales. A modest return from this activity (less than 0.5 percent) is received. This, however, is far below the yield the Bank has received in its other securities such as Treasury bills and Bank deposits. Further, after the huge accumulation of more than US\$20 million worth of gold between 1997 and 1998 when world gold prices have been declining, the gold was sold in January 1999 at the price of US\$287 per ounce which was lower than the end 1998 price of US\$292 per ounce (see Table I in Appendix II).

Table VII
Gold Reserves

Date	Fine Ounces	US\$ Balances
December 31, 1993	453.176	175,223.87
December 31, 1994	4,331.337	1,677,118.15
December 31, 1995	3,285.354	1,171,957.42
December 31, 1996	11,168.979	4,290,337.99
December 31, 1997	80,000.00	25,042,600.00
December 31, 1998	82,331.43	27,158,500.00
December 31, 1999	-	0.00

Source: Bank of Guyana

The currency composition of the reserves is explained largely by the expected volume of central bank foreign exchange transactions in each reserve currency and not the currency denomination of external debt payments. The volume of trade payments denominated in United States dollars is estimated to be about 75 percent and this partly explains the heavy concentration of United States dollar (97 percent) in Guyana's international reserves. The large holding of United States dollar is also associated with the fact that it is the principal intervention currency with unqualified convertibility, high liquidity and low transaction costs in the large dollar market.

Table VIII
Currency Composition of International Resources

Year	US\$	Pound Sterling	SDR	DM	Canada	Total	US\$/Total
1991	-	-	-	-	-	-	-
1992	182,708,646	5,855,729	244,293	108,261	45,551	188,962,480	96.69
1993	244,372,492	4,255,311	448	115,609	76,531	248,820,391	98.21
1994	252,995,742	11,216,128	52,470	55,981	38,414	264,358,735	95.70
1995	252,201,698	11,080,055	93,406	57,549	10,442	263,443,150	95.73
1996	321,920,162	5,121,708	74,261	59,012	42,688	327,217,831	98.38

Source: Bank of Guyana

The currency composition of reserves is not systematic in terms of the currency composition of the country's external debt to cover the country from the vagaries of exchange risk, which can be costly. The major currencies constituting the total external debt outstanding in 1999 were the United States dollar and the Euro with approximately 75 percent and 12.5 percent respectively. The share composition of the other major currencies of the total debt outstanding were the Pound Sterling with 8.0 percent and the Japanese Yen with 4.5 percent. In view of the almost 100 percent United States based reserves portfolio structure, it is evident that there is an associated currency risk. During the first six months of 1999, there was a windfall gain of US\$5.7⁴ million in having the reserve portfolio of US\$250 million in US dollars. But it could equally be the same loss with the same probability.

4.0 Recommendations

The foregoing analysis pointed out that the level of foreign reserves held by the Bank of Guyana depends largely on the need for financing balance of payments transactions. In view of this, reserves cover amounting to between four and five months of import volume is being held in accordance with international practices. The reserves have been invested largely in short-term securities - treasury bills, bank deposits and gold that are perceived to be the most liquid and safe

⁴ Consultant of portfolio currency risk at the Bank of Guyana. SDR basket had the following currency shares: US\$43.5 percent, Euro 27 percent, GBP 12.5 percent and Yen 17 percent.

instruments. This reflects the investment strategy of the Bank, which can be characterised as a passive, short-term investment strategy, with the objectives of preserving the principal value and maintaining maximum liquidity. Under this investment strategy, there is a high cost of holding reserves. This is because of the relatively higher cost of absorption/sterilisation of liquidity created from the increase in international reserves as well as from postponed investment in both social and economic infrastructure, which are at the same time urgent, to promote growth and development.

The high cost of holding reserves from the passive investment reserve strategy suggests that it is imperative for the central bank to enhance the return on its portfolios within risk parameters. This will require the Bank to establish a strategic asset/currency allocation that embodies the fundamental objectives of reserve management and hence diversify its portfolios into traditional and non-traditional higher yielding assets. Specifically, to this end, the central bank is required to establish multiple portfolios with different objectives. The Bank should establish two or more portfolios with the appropriate benchmarks, which takes into consideration strategic currency allocation; one for maintaining liquidity, another for current income and still another for long-term capital appreciation. The liquidity portfolio should comprise mostly short-term investments and cash deposits, which can be drawn upon on short notice for the liquidity needs of the bank. The portfolio for current income will comprise a longer maturity, between six months to one year, and should provide improved returns relative to liquidity in portfolios. The reserves designated for asset appreciation should be held in less liquid instruments of longer maturity in order to achieve the greatest return. Once the strategic asset currency/allocation is established, the appropriate performance benchmarks should be implemented. This should enable the Bank to achieve the best feasible strategy given the objectives and risk constraints of the Bank. It will also measure the value added of active management versus passive management of reserves.⁵

The lack of adequate reserve management capabilities and the need for minimising cost and improving returns especially in high yielding investment would require the Bank to solicit

⁵ A passive investment strategy is one that is held through time, being a portfolio with a neutral asset allocation which is the composition of assets that investors would hold if they did not have a view on the market. This can be used to measure the value added if the portfolio is actively managed.

external managers to invest that tranche of the reserves. External fund management usually have a competitive advantage of being based in the leading financial centres, thereby having better access to market information and contacts, as well as having the technological and research capabilities required for high yielding asset class. External fund managers can be seen as a benchmark for assessing in-house reserve management as well as providing capacity transfer services.

The implementation of appropriate benchmarks would require the central bank to understand and manage financial exposure which encompasses foreign currency risks, interest rate risk, credit risk and liquidity risk. Sound risk management techniques would have to be adopted that are suitable to the Bank's situation. RiskMetrics™⁶ is a commonly used market risk management methodology, which can be adopted. It consists of (a) RiskMetrics value at risk (VaR) methodologies, which map each flows of securities into standardised positions and estimate their market risk; and (b) RiskMetrics™ data set, containing financial market volatilities and correlations that are estimated daily.

Internal controls are essential for applying sound risk management practices. Skilled personnel and adequate infrastructure are therefore necessary. It is imperative that adequate national capability be developed through training in fund management activities using the most modern technologies. This can either occur through in-house training by external fund management and/or by outside in-house training.

Summary and Conclusions

Guyana's experience during the 1976-1990 period has shown that macroeconomic management becomes difficult and very frustrating when the level of foreign exchange is inadequate and access to foreign sources of finance is limited. The accumulation of reserves after 1990 illustrated the significant role it played in facilitating balance in international payments, stabilising exchange rate and enhancing credit worthiness. Although there has been a

⁶ RiskMetrics™ based on J.P. Morgan's market risk management experience and includes a software package to implement the RiskMetrics™ methodology.

sharp increase in international reserves, Guyana continued to maintain maximum liquidity of the available reserves at the expense of a higher yield.

In view of the high cost of holding reserves, it is imperative that the Bank of Guyana enhances the return on its portfolio by diversifying into non-traditional higher yielding asset classes and use external fund managers for management of its reserves. Greater emphasis should be placed on establishing the appropriate asset allocation, including optimal reserve level to meet the objectives of maintaining liquidity while maximising the return on the reserves.

Active reserve management is required for Bank of Guyana to preserve safety and liquidity while maximising the returns on its investments. Risk management is important and this requires greater emphasis on developing risk management system and capacity. This will encourage the central bank to adopt a more sophisticated approach to manage financial exposures in the conduct of reserve management. Further, in view of increasing pressure to enhance the return on its portfolio, the Bank should make its policies and practices in the management of the reserve available for public scrutiny. This will guarantee, to a large extent, that the reserves are properly managed for maximum benefit.

APPENDIX I

The Model

The conventional equilibrium models of the demand for international reserves is

$$\ln R_t = \alpha_0 + \alpha_1 \ln (M_t/Y_t) + \alpha_2 \ln MX_t + \alpha_3 \ln STL + \alpha_4 \ln D_t + \alpha_5 \ln R_{t-1}$$

where the demand for international reserves (R_t) depended on the volume of international transactions such as the scale factor i.e. sum of imports and exports (MX_t), the average propensity to import (M_t/Y_t) - a proxy of the degree of openness of the economy, the variability of the country's balance of payments (STL), the cost of acquiring reserves (D_t) and past levels of reserves. The model assumes that desired level of international reserves is not equal to actual level of international reserves and adjustment is done through the Cagan-Nerlove process. The rationale for this is that the cost of holding reserves affects adjustments in the level of reserve holdings. (Landell - Mills, 1989., Lizondo and Mathieson, 1987).

The demand for international reserves equation is estimated using OLS and filtered to remove any existing auto-correlation caused by the lagged dependent variables. The period estimated is 1976-1999 and the annual data are taken from the Bank of Guyana's Annual Reports and the IMF's International Financial Statistics. The estimated equation was tested for structural stability over time periods 1976-1986 and 1986-1999, using the Chow Breakpoint test. The estimates of the parameter in the equation are set out in Table VII.

The results of the model showed that all the estimated coefficients except for the scale variable, sum of imports and exports have the expected signs even though the significance of the coefficient differs considerably. The estimated coefficient of the dummy variable is positive and significant, suggesting that the holdings of international reserves are directly related to the IMF/World Bank structural adjustment program. The estimated coefficients for the average propensity to import and short term liabilities indicate that the degree of the economy's openness and variability measures also have influence on the demand for reserves which are consistent with IMF conditionality. The volume of international transaction coefficient proxy by the sum

of imports and exports suggests a negative relationship but insignificant. This inverse relationship may explain the balance of payments crisis the country has experienced and the less than desired level of reserves.

The results of the Chow Breakpoint test suggest that the long term demand for reserves has been unstable. This would suggest that inaccessibility to IMF/World Bank funds appears to have been most destabilising for the demand for reserves.

Table I
Regression Results

Dependent Variable is Rt				
Sample: 1976-1999				
Sample: 1976-1999				
Variable	Coefficient	Std. Error	T-Statistic	Probability
Mt/Yt	1.700833	1.567340	1.085171	0.2962
MXt	-0.257726	2.928038	-0.088020	0.9311
STL	0.490024	0.291216	1.682679	0.1146
Rt-1	1.415967	3.064785	0.462012	0.6512
Dt	0.698355	0.222398	3.140111	0.0072
∞	-4.324204	2.864506	-1.509581	0.1534
R-squared	0.840690			
Adjusted R-squared	0.783794			
S.E. of regression	0.289583			
Sum squared resid	1.174013			
Log likelihood	-0.025723	F-statistic		14.77583
Durbin-Watson stat	1.804937	Prob (F-statistic)		0.000037

APPENDIX II

Table I
Gold Prices 1995-2000
(US\$/per ounce)

	1995	1996	1997	1998	1999	2000
January	378.55	400.07	355.2	298.5	286.92	284.07
February	376.5	404.48	346.71	297.45	287.33	299.86
March	381.66	396.33	351.81	295.95	286.21	268.39
April	391.04	393.14	344.58	308.3	282.62	279.65
May	385.22	391.94	343.8	298.98	276.6	275.07
June	387.49	385.27	340.47	292.54	261.31	285.73
July	386.24	383.59	324.09	292.75	256.08	281.59
August	383.7	387.47	324.08	284.11	256.73	274.43
September	383.22	382.97	322.74	288.98	264.74	
October	383.07	381.07	324.87	295.93	310.72	
November	385.68	378.52	306.16	294.22	293.18	
December	387.5	368.98	288.74	291.68	282.95	
Whole year	384.16	387.82	331.1	294.2	278.78	

Source: International Financial Statistics, IMF

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