

MONEY SUPPLY, INFLATION AND THE BALANCE OF
PAYMENTS ZAMBIA 1970 - 1980

OLIVER HENRY MUTALE

B. A. University of East Africa, 1968

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To the memory of my daughter

Mutale Mafihlo, the "Accountant"

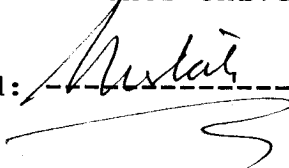
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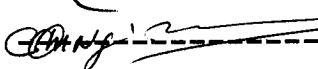
A handwritten signature in cursive script, appearing to read "Mutale", is written over a dashed horizontal line. Below the signature, there is a long, sweeping horizontal flourish.

This dissertation of Oliver Henry Mutale
is approved as fulfilling part of the
requirements for the award of the Degree
of Master of Arts (Econ) by the University
of Zambia.

Signatures of Examiners: -----



(H.S. AULAKH)



Date: 18-12-83-----

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CHAPTER 1

INTRODUCTION

In Zambia, since independence in 1964, the factors that have influenced the magnitude and direction of money supply are principally three: the balance of payments, the government expenditure and domestic credit. The formulation of monetary policy, very largely depends on the origin of the change in money supply. For instance, monetary developments that are associated with favourable balance of payments and surplus in the government budget, are viewed with little concern by the monetary authorities. This was the case during the early years of independence 1964 to 1970. During this favourable period, there were no undue restrictions on bank credit to the private sector and government borrowed insignificant amounts from the banking system. In spite of the rapid increases in money supply, the prices remained fairly low and stable because the domestic output was growing steadily.

Since 1970, the monetary policy has been primarily concerned with containing the ill effects of the deterioration in the balance of payments. The deterioration has drastically weakened the financial position of both the mining companies and the government. As a result the Government finances most of its expenditure by money creation. Central Bank credit to the Government usually exceeds credit to the rest of the economy, due to the credit restrictions imposed on this sector from time to time. Monetary developments in the Zambian economy do reflect these credit patterns.

Purpose of Study

As a lubricant of economic activity, money is a very significant instrument of economic organisation. Moreover recent research seems to indicate that money supply does affect the level of output and prices. The purpose of this study, however, is to analyse the effects of major economic factors on money supply. The study will consider the influence on money supply of such factors as the balance of payments, government expenditure and domestic credit creation of the banking system in the Zambian economy.

Scope of the Study

The period of the study, 1970-1980, has been determined mainly by the availability of data. However, wherever data and general information permit, our enquiry will extend back to the '60's. Apart from domestic credit and international reserves, there are several other factors that influence money supply such as the demand for money, interest rates, expected rate of inflation, just to mention a few. The emphasis in this study is on the factors that actually operate on the monetary base in Zambia: balance of payments, domestic credit and government spending. International reserves do indeed have an effect on the monetary base. Increased international reserves, if not sterilised widen the base. Similarly any increase in total domestic credit leads to a wider monetary base. The other variables to be considered are the national income and the ratio of currency in circulation to total money supply. The behaviour of these variables serves as basis of monetary policy formulation in Zambia.

Methods and Techniques

The study will be theoretical, analytical, descriptive and most importantly, quantitative. The descriptive and quantitative work draws on the data published by the Bank of Zambia, the International Monetary Fund (IMF) and the International Bank for Reconstruction and Development (World Bank). Other sources of information are the Zambian government and its agencies such as the Central Statistics office.

This study will attempt an econometric model for the money supply process in Zambia. The procedure for our investigation will consist of four main stages. First is the model specification. At this stage we shall identify which variables are relevant according to theory. The next stage is to built the model with certain hypotheses about the expected signs of the coefficients of variables. The third stage asks whether the model is relevant to the Zambian situation. Finally, we shall make our own observations based on obtained results.

Preview of Chapters

Chapter II provides basic information on the Zambian economy. Chapter III reviews major issues concerning the relationship between money supply and other economic variables. Chapter IV makes a review of monetary developments in Zambia. Chapters III and IV form the background to the econometric model in Chapter V. This Chapter also summeries the findings with regard to the money supply process in Zambia. Chapter VI concludes the study with some policy implications and recommendations.

THE STRUCTURE OF THE ZAMBIAN ECONOMY

Zambia became an independent country in 1964, having been a British colony. Besides being a colony, Zambia (Northern Rhodesia) along with Zimbabwe (Southern Rhodesia) and Malawi (Nyansaland)¹ formed constituent territories of the Central African Federation of Rhodesia and Nyansaland up to 1963. The economic role of Zambia seems to have been the producer of copper and the source of raw materials for the southern neighbour Zimbabwe which was at a more advanced stage. The advantages of staying in a federal scheme were then not apparent to Zambia. The developing of the three territories on a complementary basis met with failure. Zimbabwe had been developed for secondary industry, while Malawi was virtually relegated to an existence of no more than a market. Although Zambia had a heavy industrial set up, mainly characterized by the copper mining industry, it still remained largely an undeveloped territory at the breakup of the Federation of Rhodesia and Nyansaland in 1963. The slow development of the territory is attributable to a number of reasons. First and foremost was the policy of the Federal government which was to deliberately establish the manufacturing base of the Federation in Zimbabwe while manufacturing industry in Zambia was given minimal encouragement. Furthermore, the Zambian market for industry was narrower than the more competitive markets of Zimbabwe and South Africa. Another major obstacle to development was the lack of skilled manpower which persisted even after independence.

¹The name in brackets was the colonial name of each country.

Despite the undeveloped state of the Zambian economy, at independence Zambia had enormous financial capital, virtually untapped. As Harvey (1971) portrays it: "The Zambian Government, at independence in 1964, found itself with an extremely limited supply of capital in the physical sense but with an effectively unlimited supply of capital in the monetary sense.

What is more,..... the price of copper has moved unsteadily upwards in the post-independence years, so that in 1970 the Government still has both a large budget surplus and a large balance of payments surplus."¹ This favourable financial position enabled Zambia to embark on ambitious development programmes. Three development plans were drawn up within a period of 11 years, 1965 to 1976: the Transitional Development plan of 1965; the First National Development Plan (FNDP) 1966-71; and the Second National Development Plan (SNDP) 1972-76. The major objectives of the plans included creation of employment, boosting of agriculture to reduce the dependence on copper and improvements in social facilities such as for education and health. Some of these objectives have yet to be achieved for innumerable number of reasons, which it would be beyond the scope of this paper to discuss in detail. The Third National Development Plan began in January 1980, with similar objectives as the two previous ones, emphasizing diversification from copper and increase in agricultural output. While the first plan could easily be financed really adequately, the latter plans, the second and third, each involving substantial sums of money, faced enormous implementation problems, mostly due to lack of funds.

¹Charles Harvey: "The Control of Inflation in a very open Economy. Zambia 1964-9", East African Economic Review Vol. 3 June 1971, p. 1.

The Third Plan was rescheduled several times before it could be implemented. The period 1971 to date has seen the reversal of the favourable position of 1960's. Since 1971, the economy has been saddled with Government budgetary deficits, balance of payments deficits and inflation

TABLE 2-1

PERCENTAGE DISTRIBUTION OF GDP AT CONSTANT (1970)
PRICES AND VALUES, 1970 - 1980

	Agriculture	Mining	Manufacturing	Construction	Electricity & water	Transport & Communications	Other Services	Total
	10.0	32.6	11.6	7.0	1.8	4.6	32.6	100
	10.4	34.3	11.7	6.8	2.3	3.9	31.4	100
	10.4	33.6	12.0	7.3	2.3	3.8	31.6	100
	10.2	32.2	12.1	7.8	3.1	3.7	31.9	100
	10.8	29.5	10.9	9.5	3.4	4.0	31.9	100
	11.3	33.3	10.0	6.6	3.4	4.4	31.2	100
	11.7	32.7	9.9	6.3	4.0	4.3	31.1	100
	11.5	34.4	10.3	5.9	4.0	4.2	30.0	100
	11.3	29.7	11.2	5.7	4.6	4.6	31.3	100
	12.3	29.3	11.7	5.1	4.9	4.9	31.2	100

- Source: 1. Bank of Zambia, Report and Statement of Accounts (Annual Reports
2. The central Statistics Office, Monthly Digest of Statistics
Vol. XVII No. 1 to 3 January/March 1981.

The performance of the Zambian economy over the last decade 1971-1980, was rather erratic due to fluctuations in copper prices on the world market. The economy remains largely depended on copper production with limited diversification into agriculture. Table 2.1 illustrates the share of the major sectors of the Zambian economy. A brief comment on the major sectors is made in this part.

Mining:

In order to fully appreciate the structure of Zambia's economy one must inevitably begin with highlighting the dominant position occupied by the copper industry. Mining activities on average account for about one third of GDP and consist mainly of the mining and processing of copper. Zambia ranks fourth among the world's largest copper producing countries behind the U.S.A., USSR and Chile. Other mineral products significant to the economy are cobalt, a by-product of copper, lead and zinc and coal for energy. The performance of the mining sector has recently been disappointing. While the sector's share in real GDP averages 33 per cent over the entire decade, during 1979 and 1980, it dropped to 29 per cent. The drop in copper production may be due to several factors. One such factor is that the mining companies have found financial difficulties in the recent years and therefore new investment cannot be expected to be undertaken significantly. Technical difficulties of operating at greater mining depths coupled with falling ore grades are another factor.

Agriculture

In 1977 the World Bank Mission observed that "despite ample land resources for crop and livestock development, the contribution of the agricultural sector to increasing welfare, diversifying the economy and bridging the rural -urban gap has been below potential."¹ The need to develop agriculture is demonstrated by the fact that while population growth on average has been just over 3 per cent per annum during the 1971-80 period, agricultural output growth on average has been -0.7 per cent per annum - ranging from high growth rates to very low rates. The result of poor performance in the agricultural sector has forced Zambia to import about 40 per cent of food requirements. The imports include products for which Zambia has the potential to produce (for example maize, which is the staple food, wheat and barley, rice, vegetable oils, beef and potatoes).

The production in the agricultural sector is still dualistic. Nearly 50 per cent of the population is engaged in subsistence farming, producing mainly traditional crops such as maize, millet and cassava. Beef is also produced on the subsistence basis in some parts of Zambia. The commercial farming activities are engaged in the production of cash crops. Commercial farming ventures are concentrated in the Southern and Central Provinces along the main lines of rail transport which give ready access to the markets. The sector's performance is hampered by lack of skilled manpower and technical expertise.

¹World Bank, Basic Economic Report Zambia, June 1977. p. VI

Manufacturing and construction

The period 1965-70 saw rapid growth of the manufacturing output. Manufacturing output grew at 11.2 per cent per year in real terms for this period. Perhaps this is explained by the fact that while at independence in 1964 the base for the manufacturing sector was small, it got markedly broadened as a result of the rather aggressive development programmes that came underway, mainly involving import-substitution and import reproduction projects. The economic reforms that started in 1968 in particular set the pace for further expansion in manufacturing.

From around 1976, however, the manufacturing activity had declined. The fall in output is mainly the result of lack of raw materials which have to be imported depending on the availability of foreign exchange. The poor performance of the copper prices at the world markets immediately resulted in less and less foreign exchange for the country. The problems of the sector have been aggravated by the rapid increase in oil prices and transportation difficulties given the landlocked position of the country. Thus one may note that in the early '70s' the share of manufacturing sector in GDP, at 11 percent per year, matched that of the agricultural sector, and even overtaking it. However, by 1976 the agricultural sector, share took an edge over that of the manufacturing sector. Efforts to switch from imported to locally available raw materials and intermediate and capital goods have not resulted in significant progress.

The construction sector's performance was erratic. There was hardly any growth in this sector for the 1965-70 period. A turn-around only came after 1970. During 1970-76 period, a positive growth rate of 9.4 per cent per year, was registered.

Perhaps this was due to the fact that a number of larger projects had been started (for example, TAZARA, the Kariba North Bank and Kafue Stage II power projects). Later decline in construction was obviously due to the prevailing recession in the economy which still persists.

The Transport and Communication Sector

In 1968, the Bank of Zambia Annual Report aptly summed up the strategic role of the transport sector as follows:

"Since Zambia is an export economy which is landlocked, problems of transport assume crucial importance in the country's development programme. Not only has the transport system to ensure the export annually of some 700 000 tons of copper the country's main export mineral, but it has also to cater to the needs of imports of more than 2½ million tons of a variety of goods, ranging from foodstuffs to machinery and equipment. Any disruption or dislocation in the transport system is therefore likely to jeopardise the growth of the economy"¹

In view of what the Bank of Zambia annual Report says above, the development of Zambia's transport sector has largely been "predicated on the political changes occurring within the south central part of Africa over the last two decades. Zambia, being landlocked, has had to rely on the cooperation of its neighbours in providing access to the sea."²

¹Bank of Zambia, Report and Statement of Accounts for the Year ended December 31 1968 p.22.

²Bank of Zambia and Meridien International Bank Limited, : Republic of Zambia Economic Memorandum (undated).

Until the early '70s' Zambia's access to the sea was through three transportation routes.¹ These were:

1. a rail route through Zimbabwe to ports in Mozambique and South Africa.
2. a road route through Tanzania to the port of Dar-es-Salaam
3. a rail route through Zaire to the port of Lobito in Angola.

In 1972, the Zimbabwean route carried more than 60 per cent of exports and imports, while the Tanzanian and Angolan routes transported about 20 per cent and 15 per cent respectively. In January 1973, the border with Rhodesia was closed robbing Zambia of its Southern route. Following a civil war in Angola, the route to Lobito was disrupted in 1975. The alternative routes to East Africa were limited in capacity to handle the bulk of goods which were diverted to East African ports. The situation deteriorated further when Kenya-Tanzania border was closed to traffic in 1976. The rail link with Tanzania was opened in 1976, carrying about 83 per cent of Zambia's imports and exports compared to an average of 27 per cent in 1972.

4. Since Zimbabwe became independent, Zambia's transport problems have greatly been reduced.

Electricity and Water

Zambia relies on hydro-electricity, coal and oil for almost all of its energy requirements. Hydro-electricity and coal are produced domestically while all of its oil requirements are imported.

1. Economic Memorandum *ibid.*

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Hydro-electricity makes up approximately 60 per cent of energy supplies. Zambia has been a net exporter of hydro-electric power. Production comes principally from the Victoria Falls and Kafue Gorge plants. For Zambia, heavily dependent on mining and with an ambition to develop agricultural production by employing irrigation methods to supplement rains, energy has come to occupy a very important role in Zambia's economy.

The Public Sector

An observation of the government revenues and expenditures reveals a number of characteristics of the public finance in Zambia. There is a dependence on the mining revenues, although this has been declining since 1975. The contribution from non-mineral revenues is on the upward trend both in absolute and relative terms. Recurrent expenditures have tended to increase upwards. The Government savings are insignificant and nominal government capital formation has been declining.

The contribution of the mining industry to government revenue is shown in the Table on page 13.

TABLE 2.2

CONTRIBUTION OF MINERAL REVENUE TO GOVERNMENT
REVENUE

<u>Year</u>	<u>Total Current Revenue</u> K'm	<u>Mineral Revenue</u> K'm	<u>Per cent</u>
1970	432.4	171.5	39.7
1971	309.0	27.2	8.8
1972	315.2	27.7	8.7
1973	385.2	91.0	23.6
1974	647.5	252.2	38.9
1975	448.3	59.5	13.3
1976	443.0	11.6	2.6
1977	499.0	- 1.2	-
1978	549.9	62	11.3
1979	595.2	- 8.9	-
1980	767.6	41.7	5.4

Sources: Central Statistical Office, Monthly Digest of Statistics,
January/March 1981.

Since the recurrent expenditure has continued to rise compared to revenue, inevitably the Government has been running budget deficits. The Table below indicates the trend.

TABLE 2 - 3

CURRENT RECEIPTS VERSUS CURRENT EXPENDITURE

<u>Year</u>	<u>Total Current Revenue</u>	<u>Total Current Expenditure</u>	<u>Surplus/deficit</u>
970	432.4	275.0	+ 157.4
971	309.0	350.0	- 41.0
972	315.2	363.0	- 47.8
973	385.2	394.0	- 8.8
974	647.5	440.9	+ 206.6
975	448.3	581.0	- 132.7
976	443.0	608.9	- 165.9
977	499.0	660.7	- 161.7
978	549.9	647.1	- 97.2
979	595.2	676.0	- 80.8
980	767.6	1 082.0	- 314.4

Sources: Central Statistical Office, Monthly Digest of Statistics,
January/March 1981.

The deficits are financed by both domestic and foreign resources. In particular the Government's borrowing from the Central Bank has markedly increased. This takes the form of short-term loans to the Government by the Bank of Zambia, through treasury bills and other advances. The major contributing factors to the rapid rise in current expenditure have been the outlays on subsidies, increased costs of Government services such as health and education and increased level of constitutional and statutory expenditure necessitated by the expediencies of severity particularly in relation to the hostile stance of South Africa towards liberation movements in Southern Africa. Efforts are being made to reduce subsidies mainly on agricultural products, and parastatal enterprises are being encouraged to charge economic prices for their products. It is however not easy for the Government to cut down expenditure on social services, although efforts are being made to that effect.

Foreign Sector

Zambia almost entirely depends on copper for the export earnings. This makes the economy very vulnerable to changes in copper prices. Crucial to Zambia's economy is the role played by foreign exchange. Since 1970, "most of the problems currently being experienced by the domestic economy have arisen because of low copper prices and continuous rise in the prices of Zambia's imports resulting in heavy deterioration in her terms of trade with the rest of the world".¹

¹ Zambia, Economic Report 1981. p. 14

As can be seen in Table 2-7 of Appendix B, Zambia's terms of trade with the rest of the world have remained quite unfavourable during the entire 70's. There are a number of reasons for this. Foremost among these are the fluctuations in copper prices relative to the import prices. For Zambia, the whole period 1970-80, has been characterized by rapid increases in import prices, mainly the dramatic increases in imported oil prices, while on the other hand, the increases in export prices have been quite erratic and far between. The basic fact really is that the entire Zambian economy wholly depends on copper for its exports. And therefore any developments in copper prices on the world market are quickly reflected in the economy's terms of trade. The prospects for improving the terms of trade are at the present minimal. One major reason for this is that while the supply of copper has been increasing over the years, the demand for it has been falling largely because of the technological developments which have resulted in substitutes for copper and less use of it per unit of output.

In view of the chronic balance of payments overall deficits Zambia has found it necessary to depend on considerable external borrowing, mainly from the IMF. Apparently this will remain the typical pattern for quite sometime. Zambia will have to develop other commodities such as tobacco for exports to compensate the diminishing role of copper as the major export commodity of Zambia.

Financial Sector

In Zambia, the banking system consists of the Bank of Zambia as the Central Bank as well as the monetary authority and six commercial banks. One is Zambia National Commercial Bank Limited, which is a wholly-owned subsidiary of ZIMCO (alias Zambia Industrial Mining Corporation Limited), the parastatal holding company. The subsidiaries of foreign banks operating in Zambia are Barclays Bank of Zambia Limited, Standard Bank Zambia Limited and Grindlays Bank International (Zambia) Limited, constituting the three largest Banks in the country and the more recent addition, Citibank (Zambia) Limited. The Arab-backed Bank of Commerce and Credit International Limited commenced operations in very recent years. Under the Zambian law, foreign banks operating in Zambia are required to incorporate locally with a minimum paid-in capital of K2.0 million.¹

¹See the Economic Memorandum op. cit p. 23

Bank of Zambia

The Bank of Zambia (BOZ) is the country's central bank. It was established on August 7, 1964 as Bank of Northern Rhodesia under an Ordinance. In October 1964, when Zambia became an independent state, the Bank changed the name to the present name, the Bank of Zambia.

The Bank of Zambia constitutes the monetary authority with the usual responsibilities of a central bank. The responsibilities include the issue of Government money, regulating and supervising the commercial bank activities within the country, acting as the financial agent of the Government and implementing of the Government's monetary policy with regard to regulating domestic credits and controlling currency in circulation. Being responsible for the monetary policy, the Bank of Zambia has wide selective controls which include control of commercial bank loans to non-Zambian business, control of the expatriate owned banks' dealings with their parent companies, direct control of imports and control of repatriation of profits and wages of expatriate firms and employees respectively.

The Governor and members of the Board of Bank of Zambia are appointed and relieved of their offices by the President of Zambia at his dispensation. This exercise of authority by the President ensures that the Bank remains very responsive to the objectives of the Government.

The Bank of Zambia assets and liabilities are shown in Table 2-4 of Appendix A. It can be observed that assets increased from K461.0 million in 1976 to K1,117.6 million in 1980, representing an increase of 142.4 per cent over the five year period. More interesting are the changes in assets and liabilities in 1977 and 1978. Total assets and liabilities increased by 122 per cent in 1979 over the preceding year. This development reflected the monetary authority's "directive requirement that the commercial banks place all counterpart funds to payments arrears on deposit with Bank of Zambia."¹ This in effect was the deliberate "freezing" of commercial bank funds so that they do not count as part of banks' liquidity. Prior to this action, the commercial banks invested the funds largely in Government Treasury Bills. The freezing of the funds resulted in reduction of K381 million in banks' deposits (i.e. under liabilities from the Bank of Zambia point of view excluding banks' reserves and an increase of K541 million in holdings of Treasury bills).

The freezing of funds or the transfer of counterpart funds to the central bank considerably affected the amount of liquidity available to the private sector. Money supply "narrowly" defined only grew by 1.3 per cent while the "broad" money supply actually declined by 8.4 per cent in 1978 compared to the preceding year. The commercial bank lending to the rest of the economy also declined by 6.9 per cent.

¹Economic Memorandum op. cit. p. 24

The details of monetary developments are left until chapter IV. Suffice it to mention that in the total assets of the Bank of Zambia, one may notice that the Government securities accounted for the largest share, meaning that the Government was increasing its indebtedness to the Bank of Zambia every year. This kind of situation reflected the continued dependence of Government sector on the banking sector for financing its chronic deficits. Again, the repercussions on the economy are discussed elsewhere.

Commercial banks

The consolidated balance sheet of commercial banks is shown in Table 2.5 of Appendix A. Since we have covered the commercial banks while discussing the central bank balance sheet, it is not necessary to go over the balance sheet of the commercial banks.

What is of major interest to us is the extent to which commercial banks have been of assistance financially to the various sectors of the economy. All this is summarised in Table 2-6 of Appendix A. As can be seen from the Table, commercial bank advances were mostly given to mining, manufacturing and distribution sectors. This would appear to be at the expense of agriculture. When we are discussing domestic credit, particularly that component that is extended to the private sector or the rest of the economy, we shall bear in mind which sectors actually take the lion's share.

Other Financial Institutions

Apart from the commercial banks there are a number of special purpose financial institutions which inter alia include two development banks (the Development Bank of Zambia and the new Agricultural Development Bank); the National Savings and Credit Bank, (which performs the functions of the former Post Office

savings Bank), Zambia State Insurance, the National Provident Fund, the Commonwealth Development Corporation, the Agricultural Finance Company. The subject of this paper does not include them for detailed analysis.

CHAPTER III

MONEY SUPPLY, INFLATION AND THE BALANCE OF PAYMENTS: THE REVIEW OF ISSUES

It is not the purpose of, nor is it possible for this chapter to attempt a full-dress survey of literature concerning the link between money and other economic variables. Rather, the aim is much more limited both in time and scope, and very closely related to Zambia's own experience while at the same time drawing on the observed facts elsewhere. The focus will be on how other economic variables operate on money supply and conversely how money supply affects other economic variables. For this purpose, the other economic variables to be considered are inflation, government spending and the balance of payments.

Money Supply, and Inflation

There is one broad issue that has arisen again and again, namely, the connection between price movements and the changes in the supply of money. In his analysis of this issue, Friedman (1969) has made a distinction between the relation of stock of money to prices over longer periods and the relation of stock of money to prices over shorter periods.

Concerning the relation of stock of money to prices over longer periods, Friedman has had the following to say:

There is perhaps no empirical regularity among economic phenomena that is based on so much evidence for so wide a range of circumstances as the connection between substantial changes

in the stock of money and in the level of prices. To the best of my knowledge there is no instance in which a substantial change in the stock of money per unit of output has occurred without a substantial change in the level of prices in the same direction. Conversely, I know of no instance in which there has been a substantial change in the level of prices without a substantial change in the stock of money per unit of output in the same direction. And instances in which prices and the stock of money have moved together are recorded for many centuries of history, for countries in every part of the globe, and for a wide diversity of monetary arrangements.

There can be little doubt about this statistical connection. The statistical connection itself, however, tells nothing about direction of influence, and it is on this question that there has been the most controversy. It could be that a rise or fall in prices, occurring for whatever reasons, produces a corresponding rise or fall in the stock of money, so that the monetary changes are a passive consequence. Alternatively, it could be that changes in the stock of money produce changes in the prices in the same direction, so that control of the stock of money would imply control of prices. The variety of monetary arrangements for which a connection between monetary and price movements has been observed supports strongly the second interpretation, namely, that substantial changes in the stock of money are both a necessary and a sufficient condition for substantial changes in the general price level. But of course this does not exclude a reflex influence of changes in prices on the stock of money.¹

In contrast to Friedman's explicit views, Deane (1980) expressed the views that:

despite an enormous body of research by the so-called monetarist school, and the widespread acceptance in varying degrees of the policy doctrine, there still remains considerable uncertainty about such matters as the precise nature of the interrelationships between money on the one hand, and the prices and real output on the other hand.²

¹ Milton Friedman, The Optimum Quantity of Money, MacMillan, 1969 p. 171

² R S Deane: In G L Spencer, "Monetary Targets: A comparison of some alternative aggregates." Reserve Bank of New Zealand, Research Paper Number 30, May 1980, in the Preface.

In his study of inflation in Latin America, Robert Vogel (1974)¹ was able to show that inflation in Latin America was positively related to money supply. Vogel surveyed the twenty-year period 1950-69 for sixteen Latin American countries. He calculated the means and standard deviations of the inflation rates of the sixteen countries as measured by consumer prices as well as the means and standard deviations for the money supply growth (where money was defined as currency plus demand deposits). The average annual rates of inflation for the period ranged from 43.0 per cent for Uruguay to a mere 0.3 per cent for El Salvador and 1.1 per cent for Venezuela (see Table 3-1).

Vogel's findings were given some validity later by the statistical findings of Meiselman (1975)¹ who estimated the regression equation across sixteen countries:

$$p' = a + bM' + c\left(\frac{Y}{p}\right)' \quad (3.1)$$

where p' is the mean annual rate of inflation, M' is the mean annual money supply growth and $\left(\frac{Y}{p}\right)'$ the mean annual real-income growth, all measured as per cent per year. The regression results were:

$$p' = 1.35 + 1.05 M' - 1.38 \left(\frac{Y}{p}\right)' \quad (3.2)$$

(0.57) (22.31) (3.55)

$$R^2 = 0.98 \text{ (and the } t \text{ values in parentheses)}$$

These results strongly confirmed that secular inflation is associated with an increase in money per unit of output. The regression coefficients are elasticity estimates. The elasticity of the inflation rate with respect to the money

1. David I. Meiselman, "Worldwide Inflation: A monetarist view" in David I. Meiselman and Arthur B. Laffer (Ed.), The Phenomenon of Worldwide Inflation, Washington D.C.: American Enterprise Institute for Public Policy Research (1975) p.82

TABLE 3-1

INFLATION AND RELATED STATISTICS FOR SIXTEEN LATIN
AMERICAN COUNTRIES 1950 - 1969

	(b) Rate of Inflation		Money Supply Growth (b)	
	Mean	S. D.	Mean	S. D.
Uruguay	43.0	34.9	40.1	33.3
Bolivia	41.3	55.9	41.6	58.1
Brazil	35.1	21.5	38.2	22.1
Chile	28.2	14.6	35.2	12.8
Argentina	26.4	23.4	24.6	11.8
Paraguay	12.5	17.5	15.4	14.2
Colombia	9.2	8.2	16.5	5.5
Peru	8.5	5.8	13.4	6.0
Mexico	5.3	5.3	11.3	4.3
Nicaragua	3.4	6.1	8.6	11.1
Ecuador	3.0	3.3	8.8	8.2
Honduras	2.1	3.4	8.0	8.7
Costa Rica	1.9	2.2	9.0	7.9
Guatamala	1.1	2.8	5.9	7.4
Venezuela	1.1	2.8	7.9	8.8
El Salvador	0.3	1.5	3.5	6.9

(b) Per cent per year

Note: S. D. is the standard deviation. Inflation is measured by the consumer price index; money supply is currency plus demand deposits.

Source: Robert C Vogel, "The Dynamics of Inflation in Latin America 1950-1969", American Economic Review, March 1974 p. 105

supply growth was essentially 1.0, which indicated that the differences in the twenty-year inflation experience among the sixteen countries are directly proportional to differences in their respective rates of monetary growth, holding real income constant.

The elasticity of the inflation rate with respect to real income - 1.38. The standard error of the regression coefficient was 0.39, so that it, too, did not differ significantly from - 1.00, which meant that inflation differences among the sixteen countries are inversely proportional to differences in their respective changes in output. Throughout the exercise stability of income velocity was assumed.

The statistical work of Meiselman is extremely interesting; something, Ng'andwe (1980)'s extensive study should have carried out for Zambia, which happens to be also a less developed country with characteristics broadly similar to the majority of the Latin American countries. Ng'andwe (1980) however had recognised the link between money supply and prices, in Zambia, lending support to Friedman's arguments, which are hard to refute for lack of any empirical observations to the contrary. Ng'andwe (1980) stated that the main source of money supply since 1971 is the Government budget deficits. He pointed out that the bulk of the newly created money supply raises the effective demand without any effect on production or output. This is the unproductive money supply. The remainder trickles to the productive sector.

Thus it is easy here to discern in the situation of unproductive money supply an inflationary impulse as excess effective demand operates on limited supply of goods and services. In fact Ng'andwe (1980) argued that were it not for the central bank's capacity to control credit to the private sector, money supply could have exploded and induced a very high upward pressure on prices. At the same time Ng'andwe (1980) noted that these credit controls which tended to dampen the full impact of money supply movements on prices, resulted in underestimating the magnitude of inflationary pressure. It is certainly true that excessive creation of credit, especially to the Government is associated with inflation.

From Ng'andwe (1980)'s analysis, intuition would lead us to accept his argumentation. However, we find it hard to accept the proposition implied by Ng'andwe (1980)'s model that the changes in price increases (or decreases for that matter) follow right on the heels of money supply movements. Empirical evidence seems not to support this proposition, that is to say, the money supply does not have spontaneous effect on prices, but only with a lag. An explicit statement to this effect was made by Friedman (1969) in the United States, arguing that prices respond to money supply increases after a lag of between 12 to 16 months.¹ A further piece of evidence was made by Harberger (1963) in his study of inflationary process in Chile. He explains that:

It is perfectly obvious that the effects of increases in money supply upon the price level do not occur instantaneously.

1. Milton Friedman, op. cit. p. 180

The path by which such effects take place through time is of interest not only from a scientific point of view, but also from the standpoint of the policy maker..... one way of capturing the lag pattern by which money supply changes affect the price level is by inducing money supply changes with different lags as explanatory variables for the rate of inflation. Thus, if p_t represents the percentage change in the prices level during the year t , and m_t represents the percentage changes in money supply during the same year, and m_{t-1} the percentage change in money supply during the previous year, and so on, we may write:

$$p_t = a_0 + a_1 m_t + a_2 m_{t-1} + \dots \dots \dots 1$$

The observations regarding the lag are not trivial at all. The fact is that if the increase in money supply is identified to be the main cause of inflation, then obviously, the monetary authorities will think in terms of applying brakes on money supply. The monetary authorities will opt for a contractionary policy or tight money. But this policy measure, cannot as Ng'andwe (1980) implied, be expected to yield an instantaneous effect on prices. Far from it. Rather, a monetary policy formulated and implemented in this year, might take effect only months or years after. Thus the relationship between money supply and prices is not mechanical; it is affected by output and changes in the demand for money. To this end Dornbusch and Fischer (1981) have confirmed for the United States that:

the growth rate of money and the inflation rate do move together over long periods. However, the relationship is not exact. In part, this lack of an exact relationship reflects the role of other factors - such as fiscal policy changes, aggregate demand and supply disturbances and shifts in money demand.²

1. Arnold C. Harberger, "The Dynamics of Inflation in Chile," in Measurement in Economics ed. by C. Christ and others, Stanford University Press 1963. pp. 219-250

2. Rudiger Dornbusch and Stanley Fischer, Macroeconomics second Ed. McGrawHill International Book Company. pp 425-428

We have tried to test two propositions by Ng'andwe (1980). One proposition is that the relationship between money supply and prices is instantaneous. The other proposition is that money supply did not exert significant pressure on prices until after 1970. To test both propositions, we compared the growth in money supply with the rate of change in prices in Zambia first in a shorter-run period of a year and secondly in longer-run period of 3 years (see Tables 3-2 and 3-3). As can be seen from the Tables, there is some relationship between money supply and prices but that it is more significant in a longer-run than in a shorter-run period. For the short-run we took a year, while for the long-run, we took a 3 year-moving average. In order to see the difference between the two period intervals more clearly we graphed the changes in money supply along with changes in the prices (see figures 3-1 and 3-2).

Table 3-2 clearly shows that the relationship cannot be instantaneous, this disposes the first proposition. However, Ng'andwe (1980)'s other proposition that it is only after 1970 that money supply became identified with an increase in prices is borne out rather remarkably well.

Dornbusch and Fischer (1981)¹ have formalised the relationship between money supply and prices, which could hold true only if one were to assume that the strict version of the quantity theory is practical and true.

1. Dornbusch, R and Fischer, S op. cit., pp. 422 - 424

TABLE 3-2

MONEY SUPPLY CHANGES AND CHANGES IN PRICES

	<u>Annual Per centage Changes</u>														
	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
Money Supply (m1)	36.2	18.6	29.1	11.6	5.7	0.02	1.0	20.9	9.5	21.1	17.1	2.7	1.3	30.9	0.01
Consumer Price Index (CPI)1	10.2	5.0	10.9	2.4	2.6	6.0	5.3	6.4	8.4	10.1	19.0	19.9	12.4	11.1	11.6

TABLE 3-3

	<u>3 Year Moving Average</u>														
	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
Money Supply (M1)	28.0	19.8	15.5	5.8	2.2	7.3	10.5	17.2	15.9	13.6	7.0	11.6	10.7		
Consumer Price Index (CPI)	8.7	6.1	5.3	3.7	4.6	5.9	6.7	8.3	12.5	12.5	16.3	17.1	14.5	11.7	
Sources of data															

1. The index used is for the low income group for which data is available

Sources: Bank of Zambia Quarterly Statistical Reviews and Central Statistics Office
Monthly Digests of Statistics.

FIGURE 3-1

ANNUAL PERCENTAGE CHANGE IN MONEY SUPPLY AND INFLATION

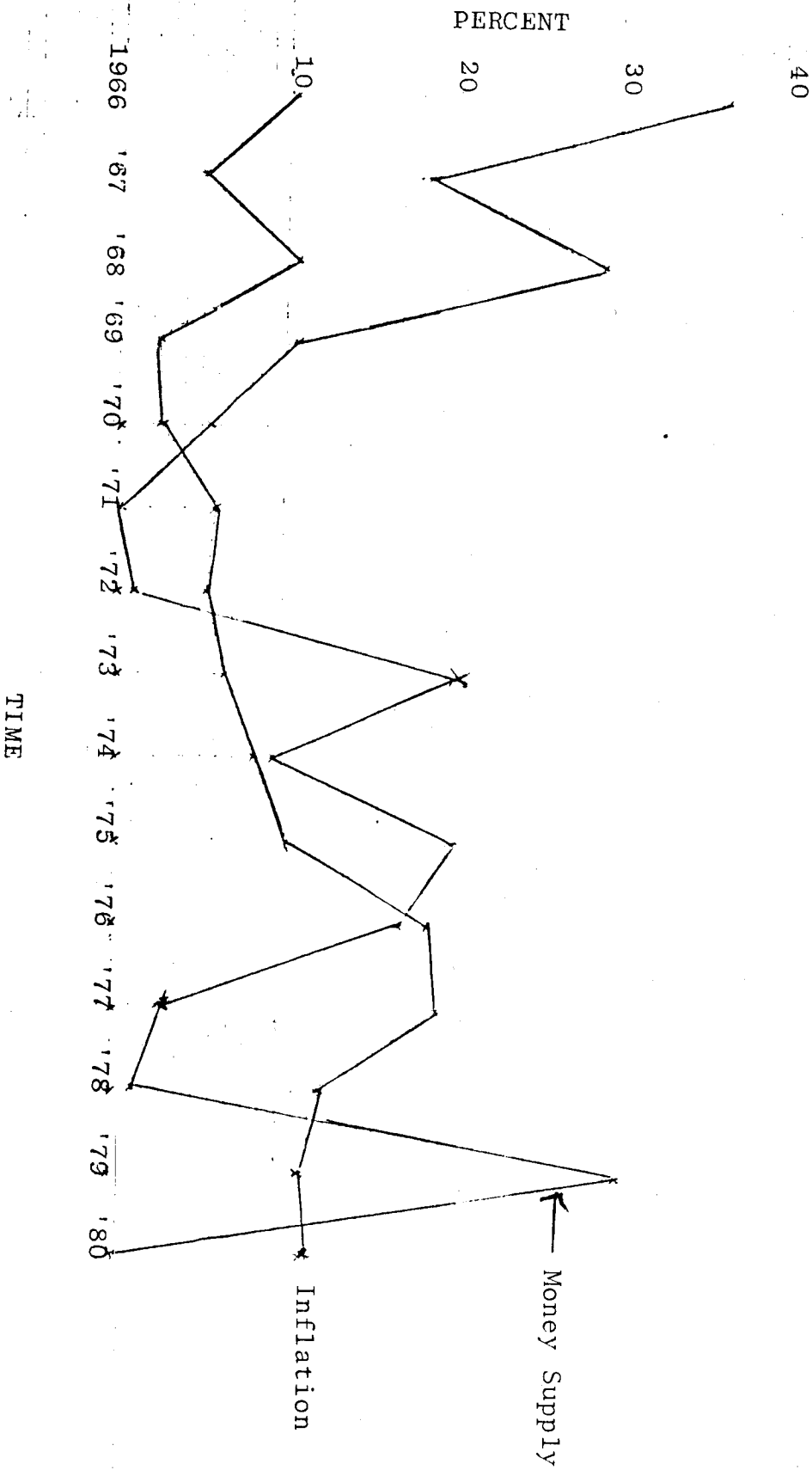
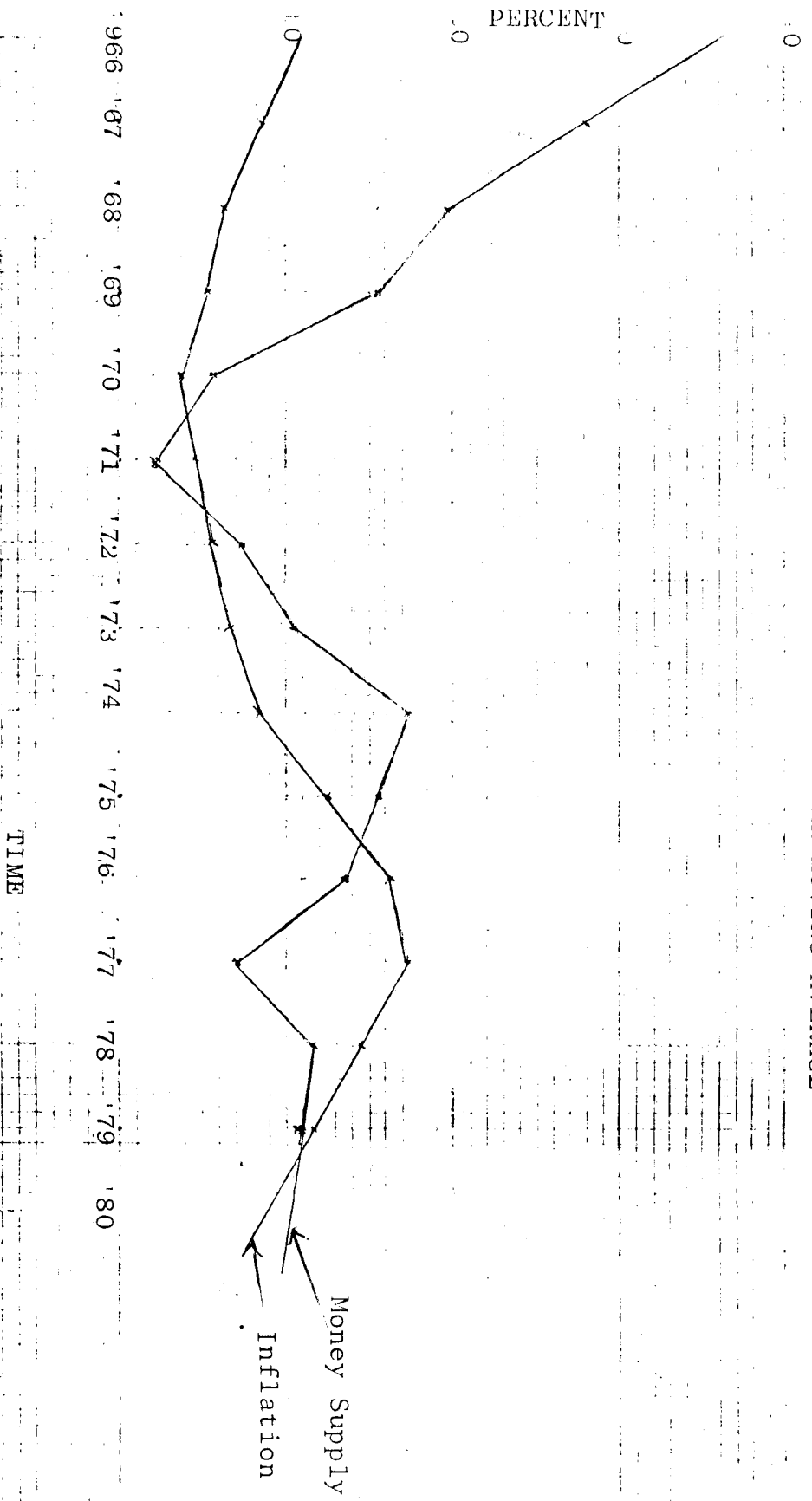


FIGURE 3-2

PERCENTAGE CHANGE IN MONEY SUPPLY AND INFLATION
THREE-YEAR MOVING AVERAGE



Dornbusch and Fischer (1981) assume an economy with a constant growth rate of money and a constant level of output, and with everyone fully adjusted to the presence of inflation. In this situation there is a simple relationship between the growth rate of money and the inflation rate. In the Dornbusch and Fischer (1981) model, the growth rate of money is denoted by $m = \Delta M/M$ and the rate of inflation by $\Pi = \Delta p/p$. This leads to the first equation thus:

$$\Pi = M(m) \quad (3.3)$$

Equation (3.3) states that in a stationary economy - an economy where real income is constant - the rate of inflation is equal to the growth rate of the nominal quantity of money. The equilibrium condition in the money market is

$$\frac{M}{P} = L(i, y) \quad (3.4)$$

$$M = PL(i, y) \quad (3.5)$$

where $\frac{M}{P}$ is the real cash balances, M nominal money, i and y interest rate and national income respectively. Equation (3.4) and (3.5) state that monetary equilibrium requires that money demand equals money supply. Equation (3.4) states this equilibrium condition in terms of real money demand and supply. Equation (3.5) states the condition in terms of nominal demand and supply.

Dornbusch and Fischer (1981) consider the long-run equilibrium where all adjustments have taken place and assume therefore, that output and interest rates are constant. With output and interest rates constant, the demand for real money balances is constant.

This is what equation (3.4) is stating. To maintain the equality between the supply and demand for money, changes in the nominal money supply must be matched by corresponding changes in prices. For instance, should the stock of money be increasing at an annual rate of 5 per cent, prices would have to be rising at the rate of 5 per cent annually to maintain constant the real money supply M/P and thus maintain equilibrium in the market.

It is the view of this study that the model as set out by Dornbusch and Fischer (1981) no longer is valid. The model assumes proportionate changes for money supply and prices. The strict quantity theory is not empirically supported at all. As Ng'andwe (1980) pointed out, the relation between money and its velocity was clearly illustrated when Fischer's theory, was adopted by Roosevelt in 1933. Money supply was deliberately increased with a view to raising prices in order to stimulate the depressed economy. However the prices did not increase. The reason for this was that "as money was created, people, frightened as they were in those Depression years, simply held on to it. Low velocity offset the increased quantity" and left the low price unchanged (Galbraith, 1977 p. 194).

Ng'andwe (1980) has succinctly summed up the points against the extreme form of the Quantity Theory:

Thus, while the bulk of influence of an increase in money supply may be on the price level, Fisher's exact proportional relation between changes in money supply and changes in the price level may be seen as extreme form of the Quantity Theory. Otherwise, it is now generally accepted that changes in money supply will affect both prices and output.

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Thus on the basis of the Quantity Theory, the growth in money supply is treated as being equal to the combined growth in output and the price level by Mundell (1971), Jonung (1976) and Branson and Myhrman (1976).¹

Having dispensed with the Quantity Theory postulates, we ought to emphasise however that it has been argued by some people, among them Friedman (1969), that while inflation is essentially caused by the expansion in money supply, there might also be a reflex action. That is to say, the expansion in the money supply may not be independent of inflation.

In concluding this part it should perhaps be stated that inflation as a monetary phenomenon in Zambia started in the '70's. On the other hand, in the '60's, inflation was principally a result of cost-push factors such as wage rises.

In Zambia, like in any monetary regime, the demand for money does affect the amount of money that has to be supplied. Only Ng'andwe (1980) appears to have been aware of its importance when he discussed the relative amount of currency to the total money supply. In this regard, we should find the work by Phillip Cagan (1958)² instructive. However, the scope of this study does not permit any more than these cursory remarks.

¹Ng'andwe op cit. p. 27

²Phillip Cagan "The demand for currency Relative to Total money supply," Journal of Political Economy, August 1958 pp. 303-328

In all literature surveyed in Zambia, only Mutale (1978) made reference to the concept of 'money supply per unit of output'.¹ This concept is the king-pin of the monetarist inflation theory inseparably linked with the names Milton Friedman (1968; 1970; 1971) and Anna J Schwartz (1973). One may also count the works of David E Laidler (1975) and Michael Parkin (1975) in the general Friedman approach, while Karl Brunner and Allan H. Meltzer (1972; 1976) as well as Harry G Johnson (1972) develop the monetarist theory with other types of models. Empirically the monetarist hypothesis contends that the various rates of inflation in different countries can be explained by the respective rates of growth of money supply per unit of national product.. Schwartz (1973) tested this hypothesis for the period 1952-69 by means of a sample containing 40 countries. In a diagram with the rate of growth of the money supply per unit of output on the abscissa and the inflation rate on the ordinate, the observations were distributed relatively narrowly about the 45° line. The simple correlation coefficient was 0.942. Schwartz concluded "that the key to understanding secular price change now as in the past is the behaviour of money stock per unit of output".² Frisch (1977) has argued that the close correlation between the rates of the money stock per unit of output remains uncontested. What is still "open for discussion however, is the assumed direct causality".³

¹ Georgina Mutale: "The process of inflation and the problems of growth in Zambia" Bank of Zambia. Mimeo, 1978 Table V (a)

² Anna J Schwartz, "Secular Price Change in Historical Perspective," Journal of Money, Credit, Banking Part II, Feb. 1973 5 (1) p. 267.

³ Helmut Frisch, "Inflation Theory 1963, - 1975, A'second Generation Survey" Journal of Economic Literature Dec. 1977 Vol. XV No. 4 p. 1298.

Mutale (1978) tested for Zambia this monetarist theory by a simple regression:

$$P = 0.56 + 3.4 \frac{M_1}{Y/P}$$

(0.08) (0.32)

$R^2 = 0.95$

Where P is the consumer price index, M_1 is the nominal money supply and Y/P is the national income deflated by consumer price index. Although her results tentatively supported the monetarist theory, it certainly does not quite resolve the problem of causality. The equation highly suffers from the autocorrelation between the variables.

Most of the literature brought up on the tradition of the "quantity theory" recognises the sort of influence money supply does exert on the level of prices. In Zambia, Ng'andwe (1980) addressed himself considerably to this question in his analysis of the causes of inflation in Zambia. In this analysis we see the direction of causation. Money supply increases are the driving force behind increases in prices. We have also seen from the analysis of Mutale (1978) and Ng'andwe (1980) that the Government expenditure financed by borrowing from the central bank is one major source of money supply. What has not been adequately considered is the role of wages in money supply changes although Mutale (1978) Harvey (1971) and Ng'andwe (1980) appear to have discerned the link. While referring to the various wage and salary commission, Mutale (1978) highlighted the basic element in wage and salary increases in the following words:

however, the massive injection of funds into the economy through wages and salary awards increased the purchasing power and the effective demand of these people. With the supply constraints, prices rose appreciably. For example the rate of consumer price increase jumped from 8.5 per cent in 1975 to 15.8 per cent in 1976 for the high income group while the rate in the low income group bracket was even higher rising from 10.1 per cent to 18.7 per cent during the same period.¹

In an earlier comment by Harvey (1971) regarding the effects of wage awards of 1966 (resulting from the Brown Commission), we note the recognition of the fact that increases in wages added purchasing power to the workers and hence raised the effective demand. Harvey described the connection aptly:

"in 1965 an average of 296 000 Africans were employed at an average wage of K428 per annum; and 33 000 others at K3,498. That is, the wage bills were K127 million and K225 million respectively. By 1968, the wage bills were K279 million and K141 million. That is, by 1968 the African wage bill was twice as big as the non-African, having been only just larger in 1965."²

Observing the comments by Mutale (1978) and Harvey (1971) the study came to the conclusion that there must exist a connection between money supply and wages. It is the view of this study that the direction of causation is from wages to money supply, at least that is what it appears to be. The study views the autonomous wage increases of 1960's and 1970's in Zambia as having been able to push up the level of prices and calling forth an increase in money supply. This increase in wages must have been matched by an increase in money supply.

¹ Georgina Mutale op. cit. p.9

² Charles Harvey op. cit. 49

This is evident from the fact that in Zambia, there is a high dependency on cash payments for wages which tends to raise the monetary base as wage bills rise. If we assume a constant velocity of money, then to accommodate increases in transactions, money supply will have to increase. In Zambia velocity has remained fairly stable. Increases in wages led to increased transactions and since velocity is fairly constant, there was an increase in money supply. This view seems to have the support of the cost-push theorists, as Trevithick (1977) has observed,

"cost-push theorists, while acknowledging the high degree of statistical association between the price level and the money stock, maintain that the direction of causation is entirely the reverse of that of the monetarist view. Instead of regarding increases in the money supply as provoking increases in the price level, the correct way to read the evidence is to view autonomous increases in money wages pushing up the price level and calling forth increases in the supply of money. The supply of money accommodates itself to the level of money income which, in turn, varies principally as a result of trade union pressure on wages. The central bank is assumed to act in such a way as to increase the supply of money in circulation whenever the price level rises in order to maintain full employment. Monetary policy does not play an active role in provoking inflation and is hence useless in controlling inflation. The supply of money is determined ultimately by the behaviour of money wages"¹

This study is merely stating that any wage increases ought to have in their wake, an increase in money supply to sustain them. In that sense money supply is not playing as a driving force to price increases. It is playing a passive but at the same time an important role in ensuring that money is available to pay for the goods at higher prices. The opinion expressed by Trevithick can lead to considerable controversy. A detailed discussion, would be beyond the scope of this paper.

¹ Trevithick J A INFLATION A GUIDE to the Crisis in Economics, Penguin Books Limited, England 1977. pp. 97 - 98

While acknowledging that there is an effect on money supply caused by an initial change in wages, we suppose it is very difficult to estimate statistically the link between increases in wages and money supply. The reason perhaps is that we cannot easily identify changes in money supply that take place solely on account of wage rises. Wage increases in Zambia were a one-shot act that could only lead to one-shot increase in money supply for a given moment. Any later increases in money supply can only be the result of the operation of factors other than wages. Thus we observe that barely two years after independence in 1964, the Brown Commission of 1966 awarded wage increases to the African miners, by as much as 22 per cent. In that year, money supply in relative terms rose. The O'Riordan salary Commission awarded 5-15 per cent increases. In 1972 the Government raised the minimum wages in the industrial and distribution sectors. The mine workers received in 1976 wage increases averaging 12 per cent, with a provision of a further increase of 4 per cent in 1977. The Mwanakatwe Commission gave wage increases of between 1.5 and 36 per cent. All these wage increases, as it can be seen, were at various intervals. Obviously then the money supply changes took place only in the years affected by the Commissions awards. While the wage increases in per centum appear quite substantial, one cannot deduce that that money supply rose proportionately by the same amount. This is far from the truth. All we can say is that money supply increased by a certain amount, relatively. In absolute terms money supply could even show a decline.

Money Supply and the Balance of Payments

At this point it is necessary to look more closely at the theoretical propositions that may perhaps be of help in analysing the deficits and any possible adjustments in Zambia's balance of payments. One such proposition, predominantly associated with Johnson (1958) is that balance of payments deficits are a reflection of an excessive money supply. Johnson made the first explicit statement of what has come to be known as the 'monetary approach' to balance of payments. Since 1958, this approach has been interpreted by several other economists.¹ Johnson clearly outlined the monetary implication of balance of payments:

A deficit means that payments by residents exceed receipts by residents, and this implies either one of two things. The first possibility is that residents are running down their cash balances, so that there is an increase in the velocity of circulation of money. With a deficit financed by running down of cash balances, the balance of payments deficit would obviously be self-correcting in time, because eventually residents would reduce their cash balances towards zero, and in the process of doing so the rate of interest will rise, demand will be restricted, possibly the supply of goods for export will increase and a variety of factors will set to work which will tend to correct the situation. But nowadays it is very unlikely that monetary authorities will be able to give the economy time to work out the correction of the disequilibrium, because the excess of payments over receipts has to be financed in foreign currency and the monetary authority may well have insufficient reserves to allow the balance of payments deficit to go on until it corrects itself.

¹ For a collection of essays on this topic, see Jacob Frenkel and Harry G Johnson (eds), The Monetary Approach to the Balance of Payments (London: Allen & Unwin 1976). See also D G Pierce & D M Shaw, Monetary Economics, Theories, Evidence and Policy (U.K) Butterworths & Co. (Publishers) Ltd, 1974.

The second possibility is that the monetary authority replaces the cash offsetting internal monetary operations. This will happen automatically if the authority follows a policy of stabilizing interest rates. In this case, the deficit will not be self-correcting: It will be corrected¹ only when the policy of the monetary authority is changed.

Dornbusch and Fischer (1981), have reacted to the above analysis by stating that there is nothing especially monetary about the above interpretation of remedies for external imbalance. They think that it is simply and "obviously true that for any given balance of payments deficit, a sufficient contraction of money stock will restore external balance. The reason is that a monetary contraction, by raising interest rates and reducing spending, generates a contraction in economic activity, a decline in income, and therefore a decline in imports."²

Dornbusch and Fischer (1981) therefore suggest a more sophisticated interpretation of the problem which recognises the link between the balance of payments deficit, foreign exchange market intervention, and the money supply. In this case the automatic mechanism is for the sale of foreign exchange by the central bank which reduces the stock of high-powered money. The Central Bank merely sells one asset (the foreign exchange) and buys another (the high-powered money). This process automatically leads to a decline in the stock of money in a deficit country.

¹ Harry G Johnson, "The Balance of Payments," Pakistan Economic Journal Vol. III No. 2 June 1958 pp. 16-28 reproduced in Harry G Johnson Money Trade and Economic Growth, Harvard University Press, Massachusetts 1967 p. 18.

² Dornbusch, R and Fischer, S op. cit. p. 650

Since the money supply is thus linked to the external balance it is obvious that this adjustment process must ultimately lead to the right money stock so that external payments are in balance.¹ Thus it is obvious that the suspension of this adjustment mechanism will only take place if the central bank undertakes sterilization operations.

The International Monetary Fund has placed great emphasis on the monetary approach to the balance of payments, in its analysis and formulation of economic policies for countries in balance of payments difficulties, such as Zambia. We should therefore spend some time to examine the IMF procedure in analysing balance of payments problems.

The balance sheet of a central bank comprises liabilities and assets. The liabilities are the high-powered money.² On the assets side, a central bank can hold both the foreign assets including foreign exchange reserves, gold and claims on other central banks for Government - and domestic assets, or 'domestic credit'. Domestic credit consists of the monetary authority's holdings of claims on the public sector (which actually is Government debt) and claims on the private sector (usually loans to commercial banks).

¹ Our exposition here will strictly be along the lines of Dornbusch and Fischer (1981). The opinions expressed herein are however ours, and reflect the relevance to the Zambian economy.

² "High-powered money" or "monetary base" consists of currency (notes and coins) and commercial bank deposits at the Bank of Zambia. This will be dealt with in detail later when we consider the monetary process.

The balance sheet gives us

$$\Delta NFA = \Delta H - \Delta DC \quad (3.7)$$

where ΔNFA denotes the change in net foreign assets, ΔH the change in high powered money, and ΔDC the change domestic credit. The equation says that the change in the central bank's holdings of foreign assets is equal to the change in the stock of high-powered money (ΔH) minus the change in domestic credit (ΔDC). The most important thing about equation (3.7) is that ΔNFA is the balance of payments. The official reserve transactions, which is all that NFA is, are equal to balance of payments such that we can rewrite the equation (3.7) as:

$$\Delta NFA = \Delta B = \Delta H - \Delta DC \quad (3.8)$$

where ΔB is Balance of payments.

In order therefore to have a stabilization policy package for itself, a country must decide on a balance of payments target ΔNFA^* ¹. A country must then know how much of a deficit she can afford and then adjust policies to make the projected deficit no larger. The target will be based on the level of and the running down of existing reserves as well as on what the country can mobilize in the form of credits and loans from abroad. The next step is for a country to estimate the extent by which demand for money will increase. The planned changes in the stock of high-powered money H^* will have to be just sufficient to produce, via the money multiplier process,

¹ The asterisk stands for a target

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the right increases in the stock of money to meet the expected increase in demand.¹ Then, given ΔNFA^* and ΔH^* , Equation (3.8) tells the monetary authority how much domestic credit it can extend consistent with its balance of payments target and expected growth in money demand. It is typical for the IMF, in drawing up a stabilization plan to include among its suggestions, a limit on the the expansion of domestic credit. The limit provides a "ceiling" on domestic credit expansion. The adoption of such a numerical ceiling could be useful in helping the central bank avoid the temptation of expanding its loans to the Government or private sector. Equation (3.8) suggests simplistic solutions to a balance of payment problem, for it implies that should there be a reduction in the rate of domestic credit, the balance of payments should always balance almost immediately. Let us therefore examine the channels through which the curtailment of domestic credit improves the balance of payments. Essentially and basically a tight money policy means that something is being done to control domestic credit. If we take and consider an economy that is experiencing growth and some inflation, it implies that the demand for nominal balances is rising.

In an economy such as Zambia's there is no evidence to support the view that an increase in interest rates will result in an inflow of funds on the capital account.

¹ "The proponents of the monetary approach to the balance of payments theory claim that the balance of payments surplus B can be formulated in terms of demand and supply of money thus, $B = \Pi [L(\Pi) - M]$ where $L(\Pi)$ is the demand function for money, M is the actual money supply both in the stock sense, and Π is the desired (usually assumed constant) speed of adjustment of the demand and supply to each other.
"[T] C Tsiang 1977 pp. 20-21]"

This study has not found any period in Zambia's economic history, when interest rates responded to changes in money supply. The common practice in Zambia is that the monetary authorities fix the interest rates, reflecting a "financial repression." The monetary approach assumes that capital movements are allowed freely in order to give the desired effect on interest rates. This assumption is violated in the Zambian case because of restrictions on capital movements. Therefore targetting money supply effects on interest rates, as IMF often does for an economy like Zambia's where there are capital restrictions in force, is unrealistic and ineffectual. The movements of capital funds in and out of Zambia invariably respond more to outside forces or other domestic factors than to changes in interest rates, which at any rate take place at long intervals of time. But of course if the fixed rate of interest happens to be lower than interest rates abroad, and if there are no restrictions on capital transactions, capital movements can take place from lower interest rates to the higher interest rates. This as a matter of fact took place in 1969 and 1970. As the IMF (1978) was able to observe, from independence in 1964 to 1971, capital transactions in Zambia were relatively free of restrictions. In that case, "the direction and the size of capital flows were sensitive to the differential between domestic and foreign interest rates and to changes in domestic credit conditions."¹

¹ International Monetary Fund, Staff Report, April 21, 1978 p. 49

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Thus in 1969 when the Eurodollar rate rose sharply, short term capital movements resulted in an outflow of K163 million, about half of which was due to a shift in deposits of mining companies from domestic banks abroad, while domestic credit to the private sector increased by about 9 per cent. In 1970, the outflow was reversed. In that year the Eurodollar interest rate fell markedly and Zambia experienced an inflow of K163 million. In 1972, restrictions on capital flows which were introduced became markedly more stringent. The Zambian authorities prohibited within given limits, transfer of capital by residents. The mining companies were not allowed to hold deposits with banks abroad. Therefore, since 1972, capital movements have been due almost entirely to borrowing and repayments of loans and foreign investment. However, even with this restriction, capital flows continued to respond significantly to domestic credit policies. The importers could for example raise short term loans with sellers abroad by use of the suppliers credit. When repayments were due the local banks could meet them relatively easily. But that was only when copper prices were high enough to earn adequate foreign exchange reserves for the Zambian economy. Thus in 1974, the authorities issued an exchange circular requesting importers to finance imports locally. As a result, the net inflow of import credit was limited to about K20 million despite an increase of K156 million of imports in that year. In early 1975, faced with rapidly declining export earnings, the authorities lifted the requirements on domestic import financing and adopted restrictive credit policies towards the private sector with a view to inducing an inflow of short-term capital.

From the analysis above we may conclude a few things. To begin with, let us examine the role of interest rates in Zambia. It would appear that so long as the interest rates are controlled by the authorities, the automatic mechanism presumed by the monetary approach would falter. Theoretically under a contractionary policy aimed at narrowing the balance of payments deficit, we would expect interest rates to go up. Money would become tight in Zambia and would only be offset by an inflow of capital into Zambia on account of high interest rate in Zambia. This inflow would lead to an improvement in the overall balance of payments. The whole of this scenario would only be possible if Zambia could lift all the restrictions on capital transactions. In the case of Zambia the liberalization of capital flows would be disastrous. Most likely there would be more outflows abroad than inflows taking all the political and economic factors in Zambia into consideration. These observations should be qualified. If for example foreign exchange were always made available, there would be justification for the liberalization of the capital flows. After all this was the case during the period 1964 to 1971. Backed by adequate foreign exchange reserves Zambia should be able to attract import - related short-term capital movements at least. This kind of flows would keep the local factories operating at reasonable capacities and employment would be assured. It is supposed even with regard to any other types of capital transactions that the inflows would take place if outside investors were assured that they can repatriate their earnings. Foreign exchange availability seems to stand central to all the balance of payments adjustments problems.

Zambia has not got adequate foreign exchange reserves to buttress liberalization of capital movements.

We have so far only discussed the effects of money supply changes on interest rates and how the latter affect the capital flows. It is also important to examine the relevance of the monetary approach to Zambian imports of physical goods as well. To begin with, we assume an increase in money supply. This would induce a rise in prices. The domestic prices including export prices will go up, assuming other things equal. Once export prices go up, the foreign demand for them will fall, and thus the volume of exports will be smaller than before. That implies a fall in export earnings. Furthermore, domestic demand for imports will go up as imports will become cheaper with an increase in domestic prices. The domestically produced goods will relatively be dearer. As exports fall and imports increase, the balance of payments will worsen. If we relax our assumption then the ultimate result will according to the Marshall-Lerner condition, depend on the elasticities of exports and imports.

In the case of Zambia, we cannot expect such dramatic results as the theory predicts, that is with regard to the current account of the balance of payments. However, it is a fact, that has also been established elsewhere in other developing countries, that Zambia's imports are mainly the 'essential' commodities. Therefore the demand for imports is inelastic. For that matter the foreign demand for Zambia's exports is inelastic. The elasticities for both exports and imports are too low to satisfy the Marshall-Lerner condition.

This is certainly a weakness in applying the monetary approach to the Zambian economy. A contractionary policy on the other hand would lead to different results. Imports will become more expensive. Export prices will also become cheaper. Again it is not possible for Zambia to take advantage of all these for reasons we have covered earlier.

For monetary policy purposes, we can make a number of observations. If Zambia plans for more employment, it will have to follow an expansionary policy. But as we have observed above, this can only be done at the risk of its balance of payments. Should Zambia opt for a contractionary policy, there will hopefully be a surplus, but only at the expense of employment. As far as the so-called monetarists are concerned, therefore, a deficit in the balance of payments reflects an expansionary policy and a surplus reflects a contractionary policy. For the monetarists, the policy options are simple and straight forward. To remove a deficit, Zambia should embark on a contractionary policy. Zambia would also have to remove trade restrictions and liberalize trade. Liberalization of trade would result in an outflow of resources in view of Zambia's "small position as open economy" in contrast to bigger economies.

Devaluation

Zambia devalued the Kwacha in 1976 and 1978. Ng'andwe (1980) however argued that devaluation of the Kwacha is of limited effectiveness in bringing about the desired objectives aimed at correcting the balance of payments disequilibria for Zambia. In particular he pointed out that with devaluation,

Zambia does not at all realize any additional foreign exchange earnings, as theory would suggest.¹ We would certainly agree with his critical views. In Zambia, it can be observed that the only effect of devaluation is an increase in the Kwacha value of Zambian exports, represented by copper. Consequently, the Zambian authorities increase their holdings of the Kwacha. And also, since the mining companies get their export receipts in Kwacha, the volume of revenue will rise, thus improving the profitability of the mining companies.

The Government on its part will realize higher revenue from the mining companies. Thus the main effect of devaluation is to improve the operating profits of the mining companies and the Government revenues. Further, the only costs that are affected are those with import content. The local wage costs for example are not, since they are a local component. The lack of effect on local production and thence employment is due to the fact that copper is sold in a foreign currency (the pound sterling), which is not affected at all by the Kwacha devaluation. Thus the demand and price situations abroad remain unchanged. Instead therefore, of the exports being the "prima mobile" of output, they merely affect the profits of the mines and Government revenues. In our view, it is important here to mention the fact that we cannot see the exchange rate as any effective policy instrument in redressing a balance of payments disequilibria in Zambia. If the Zambian Kwacha was a hard or convertible currency, then the exchange rate would be regarded favourably as an instrument of policy.

¹Ng'andwe, op. cit., pp. 187 - 191

In sharp contrast to Ng'andwe (1980), Samanta¹ made it appear that devaluation of the Kwacha had very good chance of improving the economy. He does not state clearly how this would come about. Instead he makes a lot of generalities about devaluation in the world-wide context, and suddenly contrives to make them applicable to the Zambian situation.

Considering the fact that the theme of Ng'andwe (1980)'s paper is inflation, it is surprising that he did not address his mind to the effects of devaluation on the domestic prices. As we have explained above, "the monetarist approach sees the balance of payments as a purely monetary phenomenon; in the extreme, deficits and surpluses are caused by too much or too little monetary expansion and can only be corrected by a reversal of monetary policy. More importantly, the approach claims that devaluation works solely through deflating the real value of the domestic money supply and is thus equivalent to a policy of monetary contraction"² Thus in the context of monetarist approach, one way to adjust a balance of payments disequilibrium is devaluation, which has the effect of contracting the real balances.

¹Purna Samanta, "Aspects of Devaluation, Competition, Regulations and Price Policy, "Unza occasional Paper No. 5

²W T Newlyn and R P Bootle - The Theory of Money - Clarendon Press. Oxford. Third Ed. 1979. p. 159

This leads to increased hoarding and less expenditure by residents of a deficit country. The real balance effect and reduced absorption interact to produce a positive effect on the balance of payments. The process is well explained by Omotunde Johnson (1976):¹ "The decline in real cash balances, which reduces domestic absorption relative to domestic real income and output, implies increased hoarding. With a zero rate of domestic credit expansion by the monetary authorities, this desired accumulation of cash balances produces a balance of payments surplus that continues until actual and desired cash balances are equal."

We considered this previously when discussing the monetarist approach. It is however, an aspect Ng'andwe (1980), Mutale (1978) and Samanta should have examined at some length. All this criticism is intended to show that money supply is the tool in bringing about policy changes. By changing the value of money (by changing price level), demand for money is changed, and this leads to a number of consequences on balance of payments. As Dornbusch (1973) has pointed out "with the nominal quantity of money given, hoarding in the home country is an increasing function of the price level. An increase in the price level (due to devaluation)² creates a stock excess demand for money and causes expenditure to decline relative to income as the community attempts to restore the real value of cash balances."³

¹ Omotunde E G Johnson, "The Exchange Rates as an Instrument of Policy in a Developing country, "IMF Staff Papers Vol. XXII No. 2 July 1976 pp. 335-338

² Author's Parenthesis

³ Rudiger Dornbusch "Devaluation, Money and Non Traded Goods," in the American Economic Review, Vol. 63, NO. 5 1973 p. 872.

We can see that money supply is playing a crucial role.

Dornbusch (1973) has distinguished between the short-run and the long-run effects of devaluation but this would be beyond the scope of this paper. However, for those interested it would be worthwhile to read Dornbusch's paper.¹

¹ R Dornbusch, op. cit. pp. 873-875.

Money Supply and Government Expenditure

As Ng'andwe (1980) and Mutale (1978) had correctly pointed out, since 1971, money supply increases in Zambia have been associated with the chronic deficits in the Government budgets. To Finance a deficit a government has four main possible sources of funds. It can borrow from the central bank, commercial banks or the non-bank public. The fourth source is the funds from abroad. We consider in this section the effects on money supply of each type of raising funds by the Government.

Loans from the Central Bank

It has been empirically tested that government domestic expenditure which is financed by money creation is expansionary. The transmission mechanism is fairly simple. When the Bank of Zambia buys securities of the Government, it exchanges them for Government deposits (The Bank credits the Government with the amounts of proceeds in its books).

When the Government spends borrowed funds, it is in effect transferring ownership of the deposits to the public, who then transfer them to their banks in exchange for demand deposits at the banks. Thus, the ownership of the deposits at the Bank of Zambia finds its way to commercial banks, and the money supply expands by a multiple of the reserve increase. Thus, the reserve base or the monetary base is increased as well as the money supply and hence this type of financing government expenditure is described as the "monetization of the debt".

External Loans

Government borrowing from abroad has been a significant source of Government finance. External loans and grants invariably come in form of goods and services which raise domestic absorption. The effects of an external loan is to increase Zambia's overseas assets. At the Bank of Zambia, the Government account is credited with the proceeds of the loan. In terms of its monetary effects, the financing of a fiscal deficit by an external loan, is initially much the same as selling securities to the Bank of Zambia. It represents a direct monetization of the budget deficit. In some instances a government may sterilize the external reserves and the money supply will not expand. This sort of action is usually taken to stem inflationary pressures in an economy.

Loans from Commercial Banks

When commercial banks extend credit to the Government, the level of money supply remains the same. The commercial banks lend to the Bank of Zambia cash balances they hold on behalf of the public. The act of Government borrowing means that money is withdrawn from the public. However, when the Government spends the money, it amounts to giving back the money into the system.

One might then conclude that borrowing from commercial banks is not expansionary. One might examine this point of view in the following terms.

Supposing there are no excess reserves (no margin of "free" reserves), we can then see that commercial banks can lend to the Government only by reducing considerably credit to the rest of the economy. Thus the sale of Government treasury bills to commercial banks in Zambia, implies that the cash of the commercial banks is reduced when the cash balances are exchanged for the treasury bills. This leads to the reduction in credit extended to the rest of the economy or the private sector. Money supply will contract.

Loans from Non-Bank Public

In majority of the developing countries, this way of financing a fiscal deficit is considered to have no expansionary effects on money supply and is therefore least inflationary. Let us consider Bank of Zambia's public debt sales or open market operations designed to sell securities to the non-bank sector. The non-bank financial institutions, and the public generally, pay for securities by utilizing deposit balances with banks, thereby reducing the money supply. The commercial banks finance this flow of loan funds to the Bank of Zambia by running down their cash balances at the Bank of Zambia or if their cash holdings are insufficient, by selling their own holdings of securities to facilitate the transfer of funds.

Borrowing from the non-bank private sector thus reduces both the money supply and the reserve assets (cash balances, treasury bills and the Government securities of the banking system).

In Zambia sales of Government securities to the non-bank public has not been on a significant scale because majority of the people do not have adequate savings to draw upon. The bond and stocks scheme for example, was shortlived in '70's. In Zambia most savings are in form of pension funds and social security contributions. The Government does not normally tap these funds for fiscal purposes.

CHAPTER IV

MONETARY AND CREDIT DEVELOPMENTS 1965-80

Factors affecting the supply of money

Supply of money in Zambia comes principally from three sources: The balance of payments, the government budget and bank credit. The total sum of central bank's claims on government and the claims on the rest of the economy is the total domestic credit.

This chapter sets out to review, over the period 1965-80, the developments in money supply in relation to its principal sources mentioned above. In Zambia the main feature of the balance of payments is the role played by copper prices. Variations in copper prices to a very large extent, determine the direction and the magnitude of monetary aggregates. If, for example, there should be an increase in copper prices it would be expected that foreign exchange reserves would increase. The increase in foreign assets would lead to the expansion in the monetary base, resulting in an increase in money supply. An increase in domestic credit has similar effects on money supply.

In Zambia, as a matter of fact, the central bank (the Bank of Zambia), periodically, usually annually, forms a view about the level of domestic credit, international reserves and money supply. The attitude taken, and therefore the monetary policy formulated and implemented, all depend on the origin of increases in money supply. Thus, the changes in money supply that are associated with favourable balance of payments developments are viewed with little concern, whereas, changes in money

Table 4-1

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THE FACTORS AFFECTING MONEY SUPPLY IN ZAMBIA 1965-80

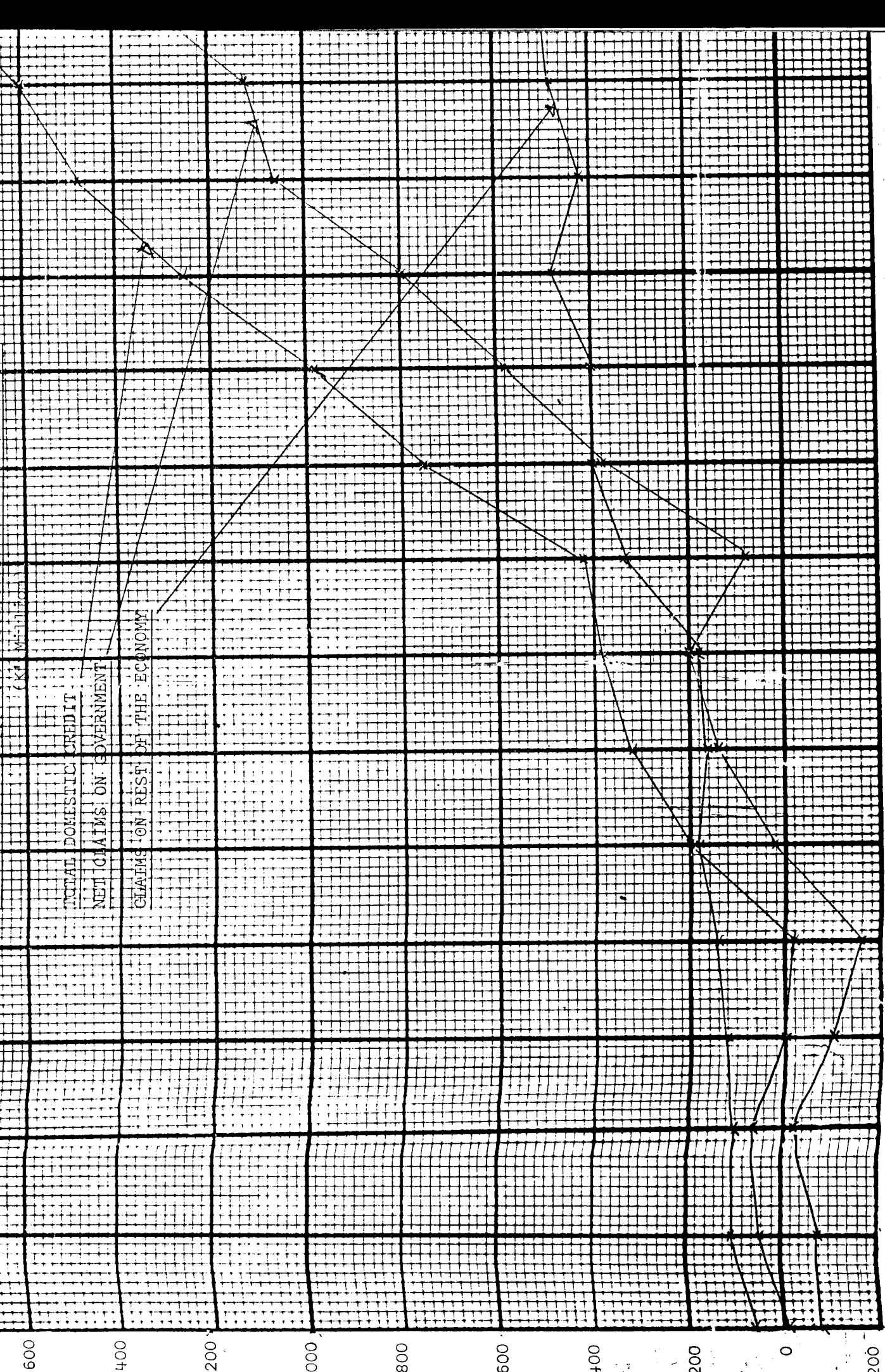
(K' Million)

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
International Reserves	143	150	129	142	263	557	400	118	124	132	96	79	56	47	71	71
Domestic Credit	-42	-13	38	63	3	-27	202	312	380	414	765	971	1261	1484	1605	1859
Net Claims on Government	(-84)	(-80)	(-58)	(-28)	(-109)	(-164)	(19)	(147)	(205)	(78)	(372)	(571)	(791)	(1062)	(1122)	(1354)
Claims on Rest of the economy	(42)	(67)	(96)	(91)	(112)	(137)	(183)	(165)	(175)	(536)	(393)	(400)	(470)	(422)	(483)	(505)
Narrow Money Supply (Currency plus demand deposits), M ₁	83	113	134	173	193	204	199	201	243	266	322	377	387	392	513	509
Quasi - Money	31	40	48	58	100	170	120	140	173	175	171	247	312	248	319	398
Broad Money Supply (M ₁ plus Quasi money) M ₂	114	153	182	231	293	374	319	341	416	441	493	624	699	640	832	907
	(In Per Cent) ¹															
International Reserves	6.1	-13.7	7.1	52.4	35.4	-45	-26	1.8	1.3	1.3	-8.2	-3.4	-3.7	-1.3	-3.8	0
Domestic Credit	25.4	4.6	13.7	-26	-10.3	61.3	34.4	19.9	8.0	79.9	41.8	46.5	32.1	18.8	30.6	30.6
Net Claims on Government	3.5	14.4	16.5	-35	-18.8	49.0	40.0	17	-31	67.0	40.4	35.3	39.0	9.3	28.0	28.0
Net Claims on rest of the economy	21.9	19.0	-2.3	9.0	8.5	12.3	-5.6	2.9	39	12.9	1.4	11.2	-6.9	9.5	2.6	2.6
Money Supply, M ₁ *	34.2	19.0	26.9	26.8	27.7	-14.7	7.0	22.0	6.0	11.8	26.6	12.0	-8.4	0.3	9.0	9.0
Money Supply M ₂ *	36.2	18.6	29.1	11.6	5.7	0.02	1.0	20.9	9.5	21.1	17.1	2.7	1.3	30.9	0.01	0.01
Memorandum Item:																
Annual change in domestic credit	-	-	-	65.8	-521	-	-	54.5	21.8	8.9	84.8	26.9	29.9	17.7	1.1	15.8

Sources: Bank of Zambia Quarterly Statistical Reviews. Because of the omission of "other items (net)" explanatory factors do not account for the total variation on the money supply.

¹ Changes in per cent of the money supply (money and quasi-money) outstanding at the end of the previous year.

² Percentage change over the preceding year.



supply that are associated with domestic credit are carefully reviewed. Table 4-1 summarizes the developments in the factors affecting the money supply, namely, international reserves (or foreign assets) and domestic credit, over the period 1965-1980.

Developments in 1965 - 1970 period

As can be seen from Table 4-1 international reserves increased every year during the 1960's. The only decline during this period was in 1967, when the balance of payments recorded a small deficit. During years with rapid increases in export earnings such as in 1966, 1969 and 1970, the rise in international reserves contributed to the increases in money supply between 1965 and 1970. In all the years, during this period, the increase in money supply resulting from higher levels of international reserves were partly offset by a reduction in the Government's net debtor position vis-a-vis the banking system, as denoted by a minus sign before "Net Claims on Government."

The reason for this is simply that the Government had adequate financial resources. The Government deposits in the banking system were far in excess of its borrowing from the banking system. It is not therefore surprising that Ng'andwe (1980) observed that "between 1965 and 1970 net Government borrowing from the Bank of Zambia was insignificant - amounting to K4.5 million for the whole period."¹

¹Ng'andwe op. cit., p. 159

What lends support to Ng'andwe (1980)'s finding is that in all the years between 1965 and 1970 inclusive, the Government had incurred a deficit in the budget only in 1967 and 1968. The picture is rather different when we consider credit to the rest of the economy over this period extending from 1965 to 1970. Table 4-1 shows the trend in "Net claims on the rest of the economy." The net claims expressed as a proportion of total supply of "broad" money in percentage terms, stood at 21.9 per cent in 1966 over the preceeding year. In 1967, the credit to the rest of the economy or the private sector¹ slowed down to 19 per cent, while in 1968, the credit actually recorded a negative growth. We shall dwell on the events of 1968 at some length in order to highlight the factors that contributed to the drastic slowing down in credit to the private sector in 1968.

Until about the middle of 1968, the expansion of credit to the private sector was the main factor influencing the money supply. As Table 4-1 indicates, during 1967, credit to the private sector declined, recording - 0.06 percent over the previous year. The sharp drop in credit was bound to happen. As part of the economic reforms announced by the President at Mulungushi on April 19, 1968, the Bank of Zambia was authorised to formulate selective controls relating to credit to the private sector. Up until April 1968, the bulk of commercial credit was claimed by the expatriate business sector. This was perhaps because commercial banks found the lending to the expatriate business much easier compared to the task of trying to promote Zambian

¹The term "private sector" in Zambian statistics is normally taken to include enterprises of a commercial nature in which the State has majority share ownership. This is the definition we shall adopt in this paper.

business. Moreover, the bulk of the credit was channelled to medium-to-large scale expatriate businesses, which had little, if any beneficial influence on the small Zambian businesses. The Bank of Zambia selective controls have to be seen against this backdrop. The Bank of Zambia had to grant a prior approval for each new loan or advance made by commercial banks to Expatriates or non-Zambians - individuals and enterprises, except for amounts of less than K1 000. In this context "non-Zambian" was defined to include any enterprise which was less than 100 per cent Zambian-owned. The primary purpose of this measure was to divert credit from non-Zambian to Zambian enterprises.

In view of the fact that, at the time, virtually all major borrowers were foreigners the measure in effect provided the Bank only with a powerful instrument for regulating the total volume of credit rather than diverting it to Zambians. Under this measure, the Bank of Zambia, could for the first time, have influence over the distribution of credit between sectors of the economy. The measures of 1968 arrested the rapid increase in money supply which characterised earlier years, Credit to the private sector other than parastatal sector, declined because of the restrictions on lending to foreign owned business entities. The commercial banks as a result, held large balances at head offices abroad.

1969 saw a very sharp decline in domestic credit. The policy measures in this year were an extension of those taken in 1968 the objectives of which were re-emphasised in 1969, namely, to discourage non-Zambian enterprises from using domestic finance

while repatriating profits. However, the severe restrictions of 1969, in hindsight only show the concern of authorities to clamp down on inflation, although inflation was already down anyway.

Developments 1970 - 1980

This period may be described as the most difficult for the Zambian economy ever since Zambia became independent in 1964. The financial problems began in 1971 and have persisted ever since. Since 1971, therefore, the monetary authorities have placed a great deal of emphasis on checking the adverse effects of the deterioration in the balance of payments. To this extent one may justifiably conclude that by and large, the fluctuations in copper prices predominately play an important, if not the primary role, in determining monetary policy in Zambia.

Throughout the period, with an exception of 1974, there has been a decline in international reserves. The decline in foreign assets does exert a negative influence on both the Bank liquidity and money supply.¹ In 1971, the rapid expansion in credit extended to the Government to finance the deficit in that year, coupled with the restrictions on commercial bank lending to the private sector was not large enough to offset the decline in net foreign assets and the growth rate of money supply actually fell, from 27.7 per cent in 1970 to a negative 14.7 per cent. If the domestic credit had been expanded sufficiently, money stock would have risen as it does when responding to an increase in net foreign assets.

1

In this Chapter "Money Supply" is defined "broadly" - currency and demand deposits plus time and savings deposits.

The effect of a deficit in the balance of payments is to reduce the stock of money. The effect of credit creation is to increase the stock of money. These are offsetting forces.

Over the period 1971 to 1973, there were two boosting forces operating on money supply. There was rapid extension of credit to the Government whereas credit to the private sector was restricted. The result of these two factors contributed to growth in money supply of 7 per cent in 1971 and 22 per cent in 1973. The financial difficulties emanating from the balance of payments deficits became of concern to the monetary authorities in 1972. Thus "between the end of May and the beginning of June, new monetary measures were enacted by the Government in order to slow down the rate of increase of commercial banks' lending to the private sector, to cut import demand and to help finance the Government deficit."¹ Thus in this year, banks were requested to limit credit extended to the private sector and the liquidity ratio was raised from 25 to 28 per cent, while the reserve requirements for demand and time deposits were increased from 8 to 12 per cent and from 3 to 8 per cent respectively. These measures were aimed at reducing the ability of the banking system to lend. In addition, companies were required to limit their borrowing by being obliged to respect a one to one debt/equity ratio in case of Zambian companies and a one to two debt/equity ratio for foreign companies. As a result of these measures, credit to the private sector declined by 10 per cent compared to an increase of 33.6 per cent annually in 1971.

¹ Bank of Zambia: Report and Statement of Accounts for the year ended 31 December 1972 p. 56.

In spite of the relaxation in credit requirements during 1973, credit to the private sector did not pick up as expected. Part of the reason is that the border with Rhodesia was closed. In Zambia, the level of economic activity still appeared depressed. Resulting from these two factors, there was in the business community an air of uncertainty. Throughout 1973 the credit to the private sector could only manage an increase of a mere 6 per cent.

In 1974, particularly in the month of April, copper price at K1 328 per tonne reached its highest peak recorded since independence. The increase in copper prices led to an improved budgetary performance and therefore reduced credit requirements for the Government. The monetary authorities, having been relieved momentarily from financial pressures, took the opportunity to reactivate credit policies. Credit expansion was encouraged, the objective of which was to reduce the backlog of liquidity in the banking system. By these means it was hoped that the private sector would receive sufficient credit for expansion. Furthermore, the liquidity in commercial banks would be used towards reducing the cost of financing imports. Accordingly, the Bank of Zambia directed commercial banks to provide domestic financing for imports and prohibited importers from borrowing abroad. In addition, it requested as it had on previous occasions, the mining companies to maintain deposits with it. These measures resulted in bank borrowing by the private sector rising sharply.

In 1974 outstanding credit at K336 million was double that of 1975 at K175 million.

It should also be noted that there was a modest increase in international reserves from K124 million in 1973 and K132 million in 1974 (see Table 4-1). The net claims on the private sector increased by 39 per cent compared to a decline of 31 per cent in the net claims on Government. Looking back at the behaviour of copper prices from 1974 to say 1976, one wonders why the authorities had implemented the measure restricting foreign borrowing. Quite understandably, the intention was to restrict an outflow of foreign exchange as commission, interest rates and foreign bank charges fell due. But in comparison to inflow of foreign capital for example, in the form of suppliers credit, the advantages appear to have been less. It is not surprising that the 1974 Bank of Zambia A.D. Circular 63 prohibiting foreign financing was withdrawn in the following year. This perhaps was done to forestall huge increases in money supply that would result from too rapid expansion in credit to the private sector. The fear of inflation was of prime concern to the authorities. Apart from this, it was hoped that lifting the requirement imposed on importers to finance their orders of goods abroad domestically would help to bring in short-term capital, which would in turn help to reduce pressure on external reserves.¹

¹For the information presented here, see the IMF Mission Report on Zambia May 20, 1975 p.30

In 1975, total domestic credit as a proportion of broad money rose by 80 per cent broken down into 67 per cent increase in credit to the Government while the remainder of 13 per cent represented claims on the private sector. The decline in private credit reflects the adoption of a more restrictive stance by the authorities towards private sector credit. Since domestic financing of import orders encouraged commercial bank credit to the private sector, this had to be stopped in favour of foreign financing. The aim was obviously to restrain growth in domestic credit. Another feature of 1975, is that international reserves declined by 27 per cent in 1975 on an annual average basis. International reserves as proportion of broad money declined sharply by 8.2 per cent (that is a negative figure). The substantial borrowing by the Government offset the negative effect on money supply by the fall in international reserves. The Government borrowing was reinforced by borrowing of the mining companies from the banking system to meet their working capital requirements. This was due to the fact that prices of copper remained depressed in 1975, leading to financial difficulties in the mining industry. Thus, in 1975, the expansion in domestic credit could have resulted into explosive money supply growth were it not for the offsetting influence of the rapid decline in international reserves and restrictions on commercial bank credit. Money supply growth was therefore modest in 1975.

The financial problems, emanating from the balance of payments overall deficit in 1975, extending into 1976, made the authorities take further steps to tighten monetary policy aimed at restricting the growth in aggregate demand and releasing pressure on the balance of payments. The Bank of Zambia discount rate which had stood at 5 per cent since 1967, was raised by one per cent, making it more costly for the commercial banks to borrow from the central bank. The minimum reserve requirement on demand deposits was raised from 12 to 15 per cent which absorbed as much as K13 million in commercial bank's free reserves, which totalled K14.5 million at the end of 1975. Furthermore, the whole structure of interest rates on bank deposits and loans was raised. The interest rate on savings deposits rose from 4 to 6 per cent, while the interest rates on fixed-term deposits rose between 1.75 and 2.25 per cent. The maximum lending rate was increased from 10 to 11 percent and the minimum rate on overdrafts was raised from 7.5 per cent to 8.25 per cent. The statutory minimum amount of liquid assets was raised from 28 per cent to 30 per cent of the bank's liabilities to the public.¹

¹For data presented here refer to Bank of Zambia Report and Statement of Accounts for the year ended 31 December 1976 p. 77.

All these measures, coupled with the import restrictions, resulted in a sharp fall in the bank credit to the private sector. The exception was only the parastatal and mining "components" of the private sector which found the need to borrow. The mining companies borrowed much less than the statutory or parastatal bodies which depended heavily on bank credit for their operations. Notwithstanding this increase in statutory bodies heavy borrowing from the banking system, the private sector credit remained practically unchanged. It rose by a mere 1.4 per cent expressed as a proportion of broad money or on an annual basis, by a mere 2 per cent. However, total domestic credit rose rather sharply by almost 42 per cent, representing almost entirely Government demand for credit. The money supply rose much more rapidly in 1976 than in 1975. This growth was attributable to the accumulation of deposits by the mining companies as well as restrictions on external payments and transfers.

The developments of 1976 continued broadly along the same trends in 1977. With the exception of the mining companies, credit to the private sector was restricted during 1977. As a result of this, the commercial banks held excess reserves considerably above minimum requirements. During 1976 and 1977, the proportion of excess reserves to total reserves averaged at some 18 per cent. The slack development in credit to the private sector did not offset completely the increase in overall domestic credit, which in fact rose at an annual rate of 39 per cent; and as a per cent of money supply, at 47 per cent. This growth in domestic credit originated from the large borrowing by the Government and the mining companies, both of whose financial position was rapidly deteriorating. Normally we would expect that an increase in domestic credit would herald an increase in money supply. However, in the case of 1977, money

supply grew by only 12 per cent. Perhaps this could be explained by the offsetting factor like the deterioration in the balance of payments in 1977. But more importantly credit restrictions to the private sector were also a major factor.

The domestic credit development of 1977 formed the backdrop to the stabilization programme undertaken by the authorities in 1978, primarily at the request of the IMF. It had been observed perhaps with some justification, that the monetary authorities alone had very little scope for reducing the rate of domestic credit expansion unless something was done to reduce the credit requirements of the Government and the mining companies considerably. It became necessary, therefore, to put pressure on the Government to cut back its borrowing volume from the banking system. It was evident also that the mining companies must work towards reducing their operating costs. The monetary and credit policy measures undertaken in the 1978 package included the following:

1. the Government and mining companies would only borrow within quarterly sub-ceilings.
2. ceilings were imposed on commercial bank lending as well as having commercial bank excess reserves frozen, to keep the excess liquidity from being converted into increased expenditures, and the Kwacha was depreciated by 10 per cent to improve the cashflow of mining companies.

Resulting from the 1978 measures, overall domestic credit declined in 1978, mainly because of restrictions on credit to the private sector. On the other hand credit to the Government and mining

companies remained rather high. The expansionary effect of credit to the Government and the mining companies on money supply was however, insignificant because of the contractionary effect of the 1978 balance of payments deficit.

The Developments for 1979 and 1980 were aligned very closely to the 1978 stand-by arrangements with the IMF. In 1979, net foreign assets holdings of the banking system went up due to the surplus on the balance of payments which was attributable to higher copper prices. The mining companies reduced their credit requirements from the Bank of Zambia. As a result of the continuation of the restrictive monetary and credit measures of 1978, the claims on the Government declined. But the net claims on the private sector offset that. In 1980, "Zambia successfully completed the two year stand-by arrangement with the International Monetary Fund."¹

Because the recent data is subject to the revision by the Bank of Zambia and the Central Statistical office, not much can be said about 1979 and 1980 developments, especially with regard to the the effect of credit on money supply.

The review of the monetary and credit developments in Zambia has to a certain extent high-lighted the explicit relationship between changes in domestic credit and the balance of payments.

¹Bank of Zambia: Report and Statements of Accounts for the year ended 31 December 1980, p. 74.

Increases in domestic credit by inducing corresponding increase in money supply, exert pressure on the balance of payments. In order to see this clearly, a number of calculations would have to be done. For example, given the particular values of exports, net capital inflows and net foreign assets, it would be possible with a given domestic credit multiplier, to calculate the change in domestic credit that is necessary to bring improvements in the balance of payments. Supposing as a result of statistical calculations, it is found that for the balance of payments to improve, domestic credit would have to be equal to K80 million, then, any increase in domestic credit exceeding this figure would be viewed with concern. On the other hand domestic expansion of less than K80 million would tend to improve the balance of payments. This statistical approach can facilitate the formulation of monetary policy measures.

CHAPTER V

AN ECONOMETRIC ESTIMATION OF THE MONEY SUPPLY PROCESS IN ZAMBIA

Theory of Money Supply Determination

This chapter, based on an econometric model, considers the factors which determine the supply of money and any changes in the supply of money. The money supply analysis, which has been developed in recent years both on the theoretical and empirical level, has mostly been based on the relationship between money supply and the monetary base through a multiplier. This relationship is summarised in a multiplier-base expression of the following form:

$$M = mB \quad (5.1)$$

where M is the money supply, defined as demand deposits plus currency held by the non-bank public. B is the monetary base or the "high-powered money" and m is the money multiplier.

The monetary base comprises assets that are eligible to satisfy the reserve requirements of banks. Total reserves can be considered from two points of view: the "Sources" side and the "Uses" side.

We first explain the sources side of the Monetary base. Through the buying of government securities in the bond market, the central bank provides "unborrowed" (or non-borrowed) reserves RU, denoting that member bank borrowings are excluded.

¹The analysis of the model developed here draws on the work by William Branson (1972).

These reserves are raised through the central bank's open-market operations. The central bank buys government bonds in the bond market and issues cheques drawn on itself to the sellers of the bonds. The sellers deposit the cheques in the commercial banks. Because the cheques are drawn on the central bank, the commercial banks treat them as deposits with the central bank. These deposits constitute reserves of the commercial banks at the central bank. The theoretical exposition followed here normally applies to countries with developed money markets. In Zambia, the sale of bonds is mainly to meet current expenditure needs of the government. The mechanism is however, similar to open-market operations. The effect on money supply is the same.

The central bank also supplies "borrowed" reserves RB , by lending to the commercial banks through the "discount window" at a ruling discount rate. The borrowed funds are deposited at the central bank and treated as reserves.

The sum of unborrowed and borrowed reserves is the total reserves, R , from the "Sources" side. Total reserves on the "Uses" side comprises total reserves of commercial banks at the central bank and currency in circulation, CC . Commercial bank reserves consist of required reserves, RR , and excess reserves RE , if any.

The monetary base, B , can be used to develop a theory of money supply determination.

The theory is developed through the following basic equations:-

$$(5.2) \quad RU + RB = R = RR + RE + CC$$

$$(5.3) \quad RU = RR + RE - RB + CC = RR + RF + CC$$

$$(5.4) \quad M = CC + D$$

$$(5.5) \quad CC = cM$$

$$(5.6) \quad D = (1-c)M$$

$$(5.7) \quad RR = r \cdot D = r(1-c)M$$

$$(5.8) \quad B = R_d + CC + NF$$

$$(5.9) \quad R_d = DCG + DCR$$

where RU = unborrowed reserves

RB = borrowed reserves

R = total reserves

RR = required reserves

RE = excess reserves

CC = currency in circulation

RF = free reserves, the difference between excess reserves and borrowed reserves

M = Money Supply

D = demand deposits

B = Monetary Base ("high-powered money")

R_d = total domestic credit

NF = Foreign assets (or international reserves)

DCG = central bank claims on government

DCR = central bank claims on the rest of the economy

c = the proportion of money supply held in form of currency by the public

$1-c$ = the proportion of money supply held in current account by the public

r = the reserve ratio for commercial banks

It is assumed that all the unborrowed reserves RU are lent to the government, in which case they are equivalent to claims on government DCG . Similarly, all borrowed reserves RB are accounted for by commercial banks, making them equivalent to claims on the rest of the economy DCR . Thirdly it is assumed that the NF are not sterilized and these international reserves will be denoted by R^f , in the model. The model developed here is based on these three restrictive assumptions, to be reflected in the specification of the model later.

We can now develop the expression for money supply, M , as follows: Substituting equations (5.5) and (5.7) into equation (5.3), we have

$$RU = r(1 - c)M + cM + RF$$

$$RU - RF = r(1 - c)M + cM$$

$$= \left\{ [r(1 - c) + c] \right\} M$$

$$M = \frac{RU - RF}{r(1 - c) + c}$$

$$M = \frac{RU - RF}{r + c(1 - r)} \quad (\text{re arranged})$$

$$M = \frac{1}{r + c(1 - r)} (RU - RF)$$

The $\frac{1}{r + c(1 - r)}$ is the money multiplier

The Monetary Base, B , is related to $(RU - RF)$ as follows:

From equation (5.3)

$$(5.10) \quad RU - RF = RR + CC$$

But $CC = cM$ from equation (5.5) therefore

$$(5.11) \quad RU - RF = RR + cM$$

$$(5.12) \quad RR = RU + RB - RE - cM \text{ from equation (5.3)}$$

Substituting equation (5.12) into equation (5.11) we have

$$(5.13) \quad RU - RF = RU + RB - RE - cM + cM$$

$$(5.14) \quad RU - RF = RU + RB - RE$$

But $RU + RB$ is the monetary base B

Hence we may write

$$(5.15) \quad RU - RF = B - RE$$

If we assume that the banks are fully banked, then, $RE = 0$,

In that case,

$$RU - RF = B \text{ by equation (5.15)}$$

By definition

$$M = mB \text{ by equation (5.1)}$$

$$\text{Hence } M = m (RU - RF)$$

$$= \frac{1}{r+c(1-r)} RU - RF$$

The hypotheses¹

According to theory, the following are expected signs in the model:

$$M_{RU} > 0$$

$$M_{RF} < 0$$

$$M_C < 0$$

$$M_r < 0$$

¹ For the proof of these hypotheses see Appendix B. In this Section, subscripts indicate the partial derivatives.

The Model

$$(5.16) \quad M = mB$$

$$(5.17) \quad m = \frac{1}{r + \frac{c}{1-r}}$$

$$(5.18) \quad B = R_d + R^f \\ = DCG + DCB + R^f$$

Equation (5.16) shows a functional relationship between money supply and the monetary base. Similarly equation (5.17) tells us that the multiplier is a function of the reserve ratio, r , as well as the cash ratio, the small c . Hence:

$$(5.19) \quad M = M(m, B) \text{ and}$$

$$(5.20) \quad m = m(c, r)$$

The monetary base, B is a function of the domestic credit R_d and the international reserves R^f such that

$$(5.21) \quad B = B(DCG, DCR, R^f)$$

From equations (5.19), (5.20) and (5.21) we can infer that the money supply is therefore a function of the cash ratio, reserve ratio, claims on the government, claims on the rest of the economy and the international reserves. We can now state this functional relationship as follows:

$$(5.22) \quad M = f(c, r, DCG, DCR, R^f)$$

which in linear form can be expressed as

$$(5.23) \quad M = B_0 + B_1 c + B_2 r + B_3 DCG + B_4 DCR + B_5 R^f$$

Theory tells us that expected signs are:

$B_1 < 0$ and $B_2 < 0$. On the other hand $B_3 > 0$, $B_4 > 0$ and $B_5 > 0$ by the additive property.

The equation in (5.23) is the one we shall estimate for Zambia. We shall however ignore the reserve ratio variable, r . This is all due to the fact that the reserve ratio in Zambia is normally fixed by the monetary authorities and is changed at long intervals of time. We are adding one more variable, the national income, (Y) . Money supply is positively related to the national income.

We therefore have in linear form the following single-form equation to estimate the money supply process in Zambia:

$$(5.24) \quad M = B_0 + B_1 C + B_3 DCG + B_4 DCR + B_5 R^f + B_6 Y$$

We shall estimate for both the money supply narrowly defined M_1 (i.e. demand deposits plus currency in circulation) and the broadly defined money supply M_2 (i.e. M_1 plus savings and time deposits).

The Empirical Results of the Estimation

The problems encountered were mainly those associated with the available computer package at the University of Zambia. The snag with the Statistical Package for Social Sciences (SPSS) is that it does not have the characters for a "minus" sign in the original data although it does print out the "negative" figures. The data collected from the Bank of Zambia on "claims on Government" is depicted by a minus sign when the debtor position with the Bank is nil (that is, the Government debt with the Bank is completely offset by the Government deposits at the Bank). This is the position from 1965 to 1970 during which period the financial position of the Government was extremely sound. On the other hand a "positive" sign in front of a figure, indicates that the Government is owing the Bank. This is the picture from 1971 to 1980, the period associated with deficits in the Government budgets.

In view of what has been said about minus signs in the original data, observations were limited to a ten-year-period 1971-80. Obviously therefore the results cannot be regarded all that conclusive and there is need to carry out the same exercise on another suitable computer package.

In the estimations of the monetary process, regressions were run for the both definitions of money supply, M_1 and M_2 respectively. Money supply was treated as the dependent variable and regressed on the explanatory variables as appear in equation (5.24) in the preceding section.

In our work, the Ordinary Least Squares Method (OLSM) was used. The results are summarized in Table 5-1 below:

TABLE 5-1

The Empirical Results of the Money Supply Process in Zambia 1971-80

$$M_1 = 357.995 + 0.353DCG^* + 0.441DCR - 0.177c^{**} - 0.084R^f + 0.132Y^{**}$$

(-2.18)
(-0.75)
(9.35)
(4.98)
(-11.20)

$$\bar{R}^2 = 0.94$$

$$DW = 0.25$$

$$M_2 = 688.803 + 0.337DCG + 0.349DCR^{**} - 0.205c - 0.084R^{f**} + 0.241Y^{**}$$

(-0.20)
(7.02)
(8.92)
(6.22)
(-11.59)

$$\bar{R}^2 = 0.96$$

$$DW = 0.25$$

t ratios are given within the parentheses.

\bar{R}^2 = coefficient of determination adjusted for the degrees of freedom

- DW = The Durbin - Watson Statistic
 ** = Significant at the 0.05 level in a two-tail test
 * = Significant at the 0.10 level in a two-tail test

The insignificant t values of some of the explanatory variables vis-a-vis a high value of R^2 , the coefficient of determination, suggested the possibility of the presence of a multicollinearity problem. However, the applications of the Farrar-Glauber test showed that the problem was not severe since none of the ratios of the partial correlation coefficients between the explanatory variables to the value of R exceeded one. This could have, of course, been evident even otherwise in view of the fact that the value of R is 0.99 in the case of both models.

The results in the Table show that all the coefficients have the expected or correct signs except the one for R^f . In equation for (M_1) DCG is significant only at the 90 per cent level, while c, R^f and Y are highly significant at 95 per cent level. Only DCR is not at all significant. The wrong sign for the R^f , reflects, in our view, the fact that the increase in money supply occurred despite the decline in international reserves (which form part of the monetary base). This increase in money supply could only have come about through expansion in overall domestic credit. In other words, as we saw in the preceding chapter, domestic credit offsets the declines in the level of international reserves. The explanation of DCR being insignificant is perhaps the fact that during the period 1971-80, the Monetary Authorities have been now and again enforcing credit controls. This has had the tendency to suppress the full impact of DCR on narrow money supply.

In Equation for (M_2) on the other hand, DCR is highly significant while DCG is not at all. Perhaps significance of DCR in this case reflects the practice of parastatal companies (particularly the mining companies) to hold a large proportion of their money in "time and savings" deposits ("quasi-money). On the other hand, most Government money is mostly in current account (hence the significance only in respect of M_1).

This is why perhaps the reason why DCG with respect to M_2 is not significant.

It should be noted that it is difficult to say whether there is positive serial correlation according to the Durbin - Watson statistic because there are fewer than the minimum 15 observations.

CHAPTER VI

CONCLUSION AND POLICY IMPLICATIONS

This study focused on money supply as it is influenced by other economic variables. The factors that influence money supply in Zambia are principally the level of domestic credit and international reserves. It has been discovered in this study that during the period 1970-80, international reserves did not have significant impact on the growth of money supply. In spite of this, money supply expanded markedly. The growth in money supply derived its impetus from the expansion in overall domestic credit.

It is the view of this study that monetary policy is essentially determined by the developments in balance of payments. A surplus on balance of payments results in higher income for the mining companies and higher revenue receipts for the government. A deterioration in the balance of payments has the opposite effect, a drop in the revenue receipts from the mines. In the absence of revenue from the mining companies, the government's other principal source of finance is the loans from the central bank. This borrowing from the Bank of Zambia is and should be the main area of concern for the monetary policy. It is habitual for the government to resort to the borrowing from the central bank whenever international reserves decline. However, the government least thinks of the repercussions of money creation on the economy. It has to be observed that the government borrows to finance mainly consumption which is highly dependent on imports.

It is also the view of this study that in Zambia, there is lack of interest on the part of the monetary authorities in studying the magnitude of domestic credit expansions in a more systematic way. Quite often, the credit ceilings imposed on borrowings of the government from the central bank have largely been ignored. Formulation and administration of monetary policy therefore becomes harder than it would otherwise be. What ever monetary policy is worked out tends not to be effective because of the unrestricted credit to the government. If, for instance, the monetary authority wants to stop an excessive expansion in money supply it should restrict all forms of credit and thereby monetary policy would be given a chance to operate more effectively.

However, it is the view of this study that monetary policy fails not because of the budgetary needs of the government alone. Misdirected credit to consumption by commercial banks in Zambia has also the effect of increasing demand for imports with the consequent adverse effects on the balance of payments. This point should really not be ignored. In Zambia majority of borrowers from commercial banks are from commerce and manufacturing industry. The bulk of goods manufactured in Zambia are made from imported raw materials and mostly consumer goods. Obviously then if cash balances in commercial banks were backed freely by foreign exchange, the deficits in balance of payments would not easily disappear in the short run. Credit for productive ventures, however, has long term positive effects on balance payments.

A P P E N D I X A

Economic Data

TABLE 2-4

BANK OF ZAMBIA: ASSETS AND LIABILITIES 1976-80

(K'million)

	1976	1977	1978	1979	1980
ASSETS					
Foreign Exchange	55.1	38.8	26.1	56.3	60.4
Gold	5.4	5.4	7.2	8.4	8.4
SDR's	17.7	10.5	12.4	4.3	-
Total Foreign Assets	78.2	54.7	45.7	69.0	68.8
Government Securities	194.5	193.0	730.0	651.9	742.1
Advances to Government	82.0	63.0	178.2	178.2	178.2
Advances to banks	4.2	8.2	8.2	3.8	6.6
Other investments	53.1	123.6	114.5	80.9	61.9
Other assets	49.0	53.8	26.8	62.7	60.0
LIABILITIES					
Capital Reserve Fund	28.2	30.2	30.2	30.2	30.2
Currency in circulation	138.3	136.9	154.8	151.8	174.1
SDR allocations	22.7	22.7	25.2	40.2	55.2
Other bankers' Deposit	4.4	5.2	476.2	336.3	448.0
Government Deposits	17.9	21.8	7.5	2.3	(150.0)
Bankers' reserves	65.6	80.3	74.8	99.0	103.1
Other Deposits	88.1	87.5	250.6	318.5	325.0
Other Liabilities	95.8	111.7	84.1	70.2	132.0
TOTAL ASSETS/LIABILITIES	461.0	496.3	1103.4	1046.5	1117.6

Sources: Bank of Zambia Report and Statement of Accounts for the year ended December 31 1980

TABLE 2-5

COMMERCIAL BANKS: ASSETS AND LIABILITIES 1976-80

(K'million)

	1976	1977	1978	1979	1980
ASSETS					
Notes and coin	17.3	18.6	24.1	25.9	23.5
Balances held:					
Bank of Zambia	70.0	81.5	559.2	435.5	544.0
Zambian banks	71.7	51.7	66.3	45.0	90.8
Banks abroad	9.7	6.1	26.1	75.0	44.4
Treasury bills	236.7	467.0	85.7	231.6	232.9
Loans and Advances	324.7	333.0	301.6	387.3	431.6
Bills of Exchange	30.0	29.2	10.5	15.8	12.2
Government Securities	45.4	65.9	56.4	49.7	42.2
Other assets	76.9	108.2	121.0	178.8	127.1
LIABILITIES					
Demand Deposits	278.3	299.3	289.5	425.3	358.3
Savings Deposits	68.2	81.4	86.0	90.3	105.2
Time Deposits	174.4	253.5	191.7	249.8	282.9
Government Deposits	39.9	39.9	8.2	6.8	32.5
Amounts Owed:					
Zambian Banks	16.3	14.0	20.9	19.1	24.7
Banks Abroad	7.1	13.9	10.4	5.0	31.1
Bills Payable	13.1	7.8	8.3	15.4	14.3
Other liabilities	285.4	451.4	636.0	632.9	664.9
TOTAL ASSETS/LIABILITIES	882.7	1161.2	1251.0	1444.6	1538.8

Source: Bank of Zambia Quarterly Statistical Review Vol II No. II
June 1981.

TABLE 2-6

COMMERCIAL BANKS SECTORAL ADVANCES AS PERCENTAGES OF TOTAL
ADVANCES 1970-79

Agriculture	Mining Quarrying	Manu- factu- ring	Building & Construction	Distri- bution	Trans- port	Fina- ncial Insti- tution	Other sectors
4.8	3.1	26.8	13.6	25.3	3.2	4.1	18.0
11.7	9.5	19.6	10.1	23.5	2.9	3.9	18.9
5.4	15.0	18.8	6.8	24.1	2.8	5.8	21.4
6.8	16.4	18.4	3.7	26.2	4.0	7.5	18.0
6.0	19.9	22.9	2.6	19.0	4.0	1.7	24.4
3.4	28.3	20.3	2.1	19.1	5.1	4.9	22.9
3.0	24.0	20.8	2.4	18.1	5.1	3.6	22.9
4.0	26.0	17.6	2.1	16.7	6.1	4.8	28.1
5.8	12.5	19.0	3.1	13.9	13.6	2.6	29.6
4.5	9.8	18.2	3.5	18.7	6.9	4.8	65.6

Source: Bank of Zambia Quarterly Statistical Review Vol. II No. II
June 1981.

Other sectors are Personal Accounts, Other (which includes services, water supply and sanitary services, electricity production and distribution, and unallocated items), Government and Non-residents

A P P E N D I X B

Trade Data

TABLE 2-7ZAMBIA'S TERMS OF TRADE - INDEX (1970-80)

<u>Year</u>	<u>Export Prices</u>	<u>Import Prices</u>	<u>Terms of Trade Index</u>
1970	100	100	100
1971	78	105	74
1972	80	111	72
1973	117	126	95
1974	134	157	85
1975	84	194	43
1976	100	217	46
1977	97	248	34
1978	103	299	35
1979	195	374	50
1980	201	486	41

Sources: Zambia, Economic Report 1981

APPENDIX C

TABLE 5-2

BASIC DATA FOR THE REGRESSIONS FOR MONEY SUPPLY PROCESS IN ZAMBIA

Year	National Income Y (K'Million)	Narrow Money Supply M1 (K'Million)	Broad Money Supply M2 (K'Million)	Currency in Circulation CC (K'Million)	$M = \frac{CC}{M}$ (Ratio)	Claims on Government DCG (K'Million)	Claims on the rest of DCG (K'Million)	International Reserves F (K'Million)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1965	0650	082.67	113.72	018.55	0.19	084.76	42.40	143
1966	0782	113.43	153.49	028.36	0.22	080.18	66.97	150
1967	0891	134.36	181.88	035.11	0.23	058.10	96.14	129
1968	0981	172.71	230.71	040.53	0.21	028.45	90.90	142
1969	1240	192.69	292.92	040.53	0.18	108.45	112.28	263
1970	0970	204.05	373.67	042.85	0.18	163.77	136.88	367
1971	1214	193.59	318.53	058.28	0.24	186.35	182.74	200
1972	1327	201.34	341.08	051.35	0.24	147.17	164.10	118
1973	1340	242.89	415.46	069.39	0.23	205.05	174.85	124
1974	1714	265.67	440.65	079.64	0.24	078.07	335.83	132
1975	1892	322.09	492.89	102.35	0.27	371.80	392.89	096
1976	1844	376.75	623.47	121.11	0.26	571.12	399.54	079
1977	1953	386.47	698.67	118.43	0.24	791.08	470.31	056
1978	2218	391.68	639.40	130.86	0.27	1061.79	422.21	047
1979	2358	513.29	832.17	126.17	0.20	1121.64	483.00	071
1980	2986	509.41	907.10	151.07	0.23	1354.42	505.34	071

APPENDIX D

MATHEMATICAL PROOFS

PROOF FOR THE HYPOTHESES REGARDING MONEY SUPPLY,
 MONETARY BASE AND MULTIPLIER¹

$$\begin{aligned} \text{Given } M &= \frac{RU - RF}{r + c(1 - r)} \\ M_{RU} &= \frac{1}{r + c(1 - r)} > 0 \\ M_{RF} &= - \frac{1}{r + c(1 - r)} < 0 \\ M_C &= - \frac{RU - RF}{[r + c(1 - r)]^2} < 0 \\ M_r &= - \frac{RU - RF}{[r + c(1 - r)]^2} < 0 \end{aligned}$$

¹The subscripts indicate partial derivatives

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