

THE DETERMINANTS OF THE INFLATIONARY PROCESS IN
ZAMBIA (1973-1993)

BY
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A Research Paper submitted to the Department of Economics, University of Nairobi, in Partial Fulfillment of the Requirements for the Award of Master of Arts Degree in Economics.

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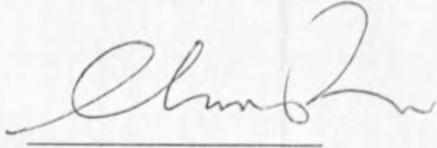
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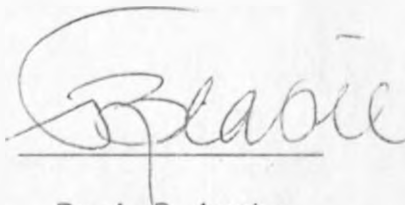
DECLARATION

This paper is my original work and has not been presented for a degree in any other university.

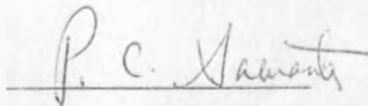
A handwritten signature in cursive script, appearing to read 'C. Bowa', written over a horizontal line.

Bowa, C.

This Research Paper has been submitted for examination with our approval as university Supervisors.

A handwritten signature in cursive script, appearing to read 'A. B. Ayako', written over a horizontal line.

Dr. A. B. Ayako

A handwritten signature in cursive script, appearing to read 'P. C. Samanta', written over a horizontal line.

Dr. P. Samanta

DEDICATION

In memory of my late brother Titus Bowa, and to all my brothers and sisters.

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ABSTRACT

Zambia experienced relatively low inflation rates from independence (1964) to 1974. During this decade, the economy was characterized by annual inflation rates of less than 10 per cent. However, due to the external economic shocks of the period 1974/75, namely, the three-fold increase in oil prices in 1974 and the drastic reduction in the price of copper by 40 per cent the following year, the annual inflation rate rose to 10 per cent. Since then, the economy has continued to register increasing annual inflation rates year after. In fact, from 1989, with the IMF/World Bank supported structural adjustment program firmly in place, the annual inflation rate went beyond 100 per cent. The concern for inflationary effects particularly on macroeconomic policies in an open economy under strict deregulation and liberalization necessitated this study.

In order to carry out a thorough investigation of the main determinants of inflation in Zambia, ordinary least squares technique was employed. The model comprised five regression equations. These equations were estimated by the PC-Give econometric modelling package using annual data. The following variables were regressed on the current annual inflation rate: current money supply, lagged money supply, current nominal income, lagged nominal income, opportunity cost of holding money, current nominal exchange rate, lagged nominal exchange rate, current nominal wages and lagged nominal wages. Five equations were tested in an effort to capture whether or not inflation in Zambia could be attributed to the monetarist, structuralist, or cost-push schools of thought.

The principle findings of the study largely attributed the inflationary process in Zambia to the monetarist and structuralist schools of thought. Changes in money supply and exchange rate adjustments were particularly found to be significant determinants of the inflationary process in Zambia. Orthodox monetary economics would imply a tightening of fiscal and monetary policies in order

to reduce money supply changes. However, for the case of Zambia, such a recommendation should be implemented with care as it might result in unwarranted recession in the country. Instead a cautious monetary control should be complemented by increasing output. There must be emphasis on enhancing the supply side rather than demand side for overall growth in the economy, particularly in the context of structural adjustment. Adjustments in the nominal exchange rate should be stabilized in order to contain inflation. There is need to boost production in the export sector through various incentives to exporters. This study did not find the wage variables as appropriate variables to address if inflation has to be controlled and sustained in Zambia.

CHAPTER 1

INTRODUCTION

1.1 **Economic Structure and Reforms:** Prior to independence, Zambia (Northern Rhodesia, then) was part of constituent territories of the Central African Federation of Rhodesia and Nyasaland up to 1963. The other two constituent territories were Zimbabwe (Southern Rhodesia) and Malawi (Nyasaland). The prime economic role that was assigned to Zambia was extraction of copper. Moreover, she had to serve as a source of raw-materials for Zimbabwe's manufacturing sector which had advanced considerably during the colonial period. During the federation, Malawi had been relegated to a mere market of the territories. In 1963, the federation broke-up. Despite Zambia's heavy industrial set-up, the territory remained largely undeveloped. Consequently, the slow economic development of Zambia after independence has been attributed to the neglect of the manufacturing sector during the federation in favour of Zimbabwe, the extreme emphasis and attention that has all long been assigned to the mining industry and limited market industrial products in comparison to the industrial product markets in Zimbabwe and South Africa. Furthermore, economic development was also hampered by an acute shortage of skilled manpower at independence. Despite the undeveloped state at independence, the Zambia economy had enormous financial capital for investing in various sectors of the economy

(Mutale, 1982). Hence, Zambia inherited a strong economy at independence with substantial scope for economic development. The economic base of the country hinged on raw-material extraction, namely copper and other minerals such as Zinc, Cobalt and lead.

Against this background, it must be acknowledged that the Zambian government had trapped itself in huge a burden of expenditure as result of policies that emanated from the Mulungushi Reforms of 1969. The Mulungushi Reforms empowered the government of the Republic of Zambia (G.R.Z) to take over the running of not only the commanding heights of the economy, but virtually all aspects of business and social enterprises. The government took over ownership and direct control of insurance companies, tourism firms, hotel management, banking, to name only a few. In the management of these corporations, the government rendered most of them inefficient and therefore prone to losses. Ultimately, the government took over the responsibility of financing the loss making companies and corporations.

Furthermore, since independence, the economy has continued to depend on the mining sector whose contribution to exports has been highest. Consequently, the mining sector has continued to be the leading foreign exchange earner, and the mainstay of the economy. This was recognised by Zambia's economic managers in the late 1960s, unfortunately, it has continued to characterize the economy.

Due the economic crises that emanated from the external shocks of 1974/75, namely, the three-fold increase in oil prices in 1974

and the drastic reduction in the in the price of copper by 40 per cent the following year, the government responded by establishing a stronger relationship with both multilateral and bilateral donors. Although Zambia had first sought assistance from the International Monetary Fund (IMF) in 1971, only limited fund facilities had been exploited. With the implementation of a two-year Action Program in 1978, various fund facilities came into use. The Action Program targeted the achievement of stabilization in the economy, reducing the inflation rate and improving the balance of payments position. This program did not meet with success. Instead, the external debt soared and the government substantially reduced its reserves of foreign exchange to the level only sufficient to finance about eight weeks of imports (Andersson, et al, 1992).

When the Action Program expired in 1980, the government desired to adhere to a "controlled economy" for a period of two years. However, declining mineral revenues signalled to policy makers that sustainability of the economy depended largely on the diversification of production. To this effect, the Economic Recovery Program (ERP82) was designed. The major objective of the program was to restructure the economy by providing economic incentives for production and promoting economic growth. Controlled prices were to be phased out, and replaced by "market forces". There was going to be diversification of exports. Interests rates were to be decontrolled, tariffs reduced, prices deregulated, the tax system reformed, the trade system liberalized, parastatals

reformed and agricultural producer prices increased. Hence, ERP82 was a typical IMF program.

In the implementation of ERP82, the central focus of the SAP was on the adoption of a floating exchange rate regime. In October, 1985, the Kwacha was subjected to auctioning. This was accompanied by deregulation and liberalization of the economy. Monetary and fiscal policies were to be used as instruments of stabilization. Due to the drastic depreciation of the kwacha that ensued within one year which neither the IMF/World Bank nor the government had anticipated, the government broke relations with the IMF/World Bank supported Structural Adjustment Program (SAP). The kwacha had drastically depreciated because of under funding and speculation. Higher inflation rates were registered and food riots occurred in some parts of Zambia (Allsopp, et al, 1989).

The reaction of the government was to abandon ERP82 in favour of a home-grown policy package: the New Economic Recovery Program (NERP87). This program was a complete reversal of ERP82. A fixed exchange rate was put in place, prices were controlled for some 23 commodities, and interest rates were fixed. Debt payments were fixed within the range of 10 per cent of export earnings. The Foreign Exchange Management Committee (FEMAC) was set up to administratively determine the exchange rate. NERP87 partly pursued structural adjustment. However, structural adjustment was to be realized by "growth from our own resources". In response, the donor community reduced aid by 30 per cent from U.S. \$ 500 million to U.S.\$ 350 million.

Due to the severe shortage of foreign exchange, FEMAC could only meet 10 per cent of the total applications for foreign exchange. Hence, in July, 1989, the government once again resumed ties with the IMF/World Bank and cancelled the "controlled economy". A harsh SAP was introduced in July, 1989. It was called the New Economic Program (NEP89). This program was also typical of IMF prescriptions. Tight monetary and fiscal policies were instituted. Domestic credit creation was to be reduced. Positive interest rates were targeted. The inflation rate was to be reduced and sustained. In order to reduce the fiscal gap, subsidies to consumers and producers were to be reduced, or removed altogether. Improved revenue collection was emphasized. Market forces were to be relied upon in order to realize adjustment. An institutional reform was to be effected. Trade liberalization was targeted. The government introduced a dual foreign exchange rate system in February, 1990. The first window was controlled by the Bank of Zambia. The exchange rate at the second window was to be determined by market forces. In April, 1991, the two exchange rates merged and the first window was closed. NEP89 also implied a reliance on market prices. The controlled pricing was cancelled for all goods except maize and fertilizer.

With the multi-party elections pending in October, 1991 to usher in the second republic, the United National Independence Party (UNIP) could not pursue the implementation of the policies it had agreed on with the IMF and World Bank any more vigorously. NEP89 nearly collapsed. There was an increase in money supply.

beyond what was envisaged. Privatization of parastatal companies went on at an extremely slow pace. Subsidies on maize and fertilizer could not be scrapped. The civil service employees were awarded a large increment. Government expenditure increased beyond program targets. Hence, donors withdrew their support towards NEP89 just prior to the elections.

With the new government in power, the IMF/World Bank resumed their support to the economic recovery program. This support was based on the framework of the Policy Framework Paper (PFP) 1991 - 1994 and the Rights Accumulation on Program 1992-1995, as negotiated for between Zambia, IMF, the World Bank and the bilateral donors. The PFP is merely a continuation of ERP82 and NEP89. The main objectives of PFP include the liberalization of both the external and domestic sectors and institutional reform such as privatization of the parastatal sector, liberalisation of the maize sector and the re-organization of the civil service. A commitment to tight monetary and fiscal policies has been emphasized and adequate capital inflows from donors has been targeted (Ndulo, et al, 1994).

1.2 Macroeconomic Performance: Zambia experienced relatively low inflation rates from independence (1964) to 1974. During this decade, the economy was characterized by annual inflation rates of less than 10 per cent. In fact, during this decade, Zambia enjoyed ten consecutive years of economic prosperity. Between 1964 and the early 1970's, Zambia had one of the highest per capita incomes in

Africa. However, the strength of the Zambian economy was brought to a test by the adverse world price movements in the period 1974/75. In 1974, oil prices increased three-fold. In 1975, there was a drastic reduction in the price of copper. Consequently, foreign exchange earnings dropped significantly due to the double impact of lower mineral receipts and an enormous oil import bill. Following this economic crisis, the annual inflation rate rose to 10 per cent in 1975 from 2.6 per cent in 1970. The rise continued year after year. For instance, whereas the annual inflation rate registered in 1973 was 8.2 per cent, it increased to 18.9 per cent in 1976 (see table 1). When the second oil price increase was effected in the late 1970's, the Zambian terms of trade had fallen by 70 per cent between 1972 and 1980. As a result of the 1974/75 economic crisis, the Gross Domestic Product (GDP) per capita declined for almost ten consecutive years. Hence, Zambia was reclassified from a middle income country to a low income country (Andersson, et al, 1981). The adverse external effects of 1974/75 led to an exacerbation of Zambia's fiscal budgetary disequilibrium. For instance, whereas Zambia experienced fiscal surpluses in 1973 and 1974 of K 308.0 million and K 83.0 million, respectively; the subsequent years have been characterized by chronic fiscal deficits (see table 1). In order to finance the deficit, the Zambian government has resorted to foreign borrowing, domestic borrowing, seeking grants from abroad, and printing money (see table 2). The consequence has been a rise in the annual inflation rate and excess liquidity in the economy. For example, from 1974 to 1978, the annual inflation rate

rose from 8.2 per cent to 16.4 per cent. Excess liquidity also increased from 4 per cent in 1974 to 19.8 per cent in 1978 (see table 3).

It must be acknowledged that the vulnerability of Zambia's economic structure was largely due to Zambia's extreme dependency on copper, the weak manufacturing sector, the neglect of the agricultural sector, and the openness of the economy. For instance, except for the years 1978, 1984, 1985, 1986, 1987, 1988, and 1989, when copper exports contributed 88 per cent, 85 per cent, 83 per cent, 85 per cent, 85 per cent, 88 per cent and 88 per cent respectively, the contribution of copper to total exports has been 90 per cent and over for the period 1970-1990 (see table 4). Hence, the dependency on the mining sector ensured that the world recession was transmitted to all sectors of the economy.

On the macroeconomic policy front, the government was characterized by poor economic management between 1964 and 1982. This included an overly expansionary fiscal and monetary policies. In fact, the government hardly sought recourse to fiscal and monetary policies as instruments of stabilization. The result was reduced microeconomic efficiency through various distortions. Policies resulting in disincentives such as an overvalued exchange rate, high cost import-substitution industrialization, as well as an inefficient public sector and parastatal activities were in place. Subsidies were provided by the government on a spectrum of items, particularly on food products, education and health facilities. To a greater extent, this had a bearing on increasing

the level of government expenditure, hence increased fiscal deficits which had to be monetized. This resulted the transmission of inflation in the economy.

With the inception of the structural adjustment reforms in 1978, the inflation rate dropped by 4 per cent. The late 1970's oil price hike also implied that the annual inflation rate had to increase from 10.4 per cent in 1979 to 12.8 per cent in 1982. When the Zambian currency-kwacha was subjected to auctioning later on in 1985, the inflation rate increased from 35 per cent in 1985 to 55 per cent in 1986. Because of the volatile increase in the annual inflation rate, the government changed its policy from a "free market" economy to a "controlled economy" in May, 1987. Hence, from 1986 to 1987, the annual inflation rate dropped by 8 per cent. However, this rate could not be stabilized. It continued to rise though by small points despite a "controlled economy". Owing to poor economic performance, the government once more opted for a "market economy" in July 1989 and abandoned the "controlled economy". This time, the annual inflation rate went up dramatically from 55 per cent in 1986 to 128 per cent in 1989. However, after this sharp increase in 1989, there followed a reduction in the annual inflation rate for two consecutive years. From 1991, however, the annual inflation rate has continued to rise with 1992 registering 191 per cent and 1993 registering 183 per cent. In fact, the economy entered an hyper-inflationary phase in 1992 (Ndulo, et al, 1994).

It must be noted that the high inflation rate experienced in 1989 was due to price decontrol, the introduction of the mealie-meal coupon system and the rise in the price of maize meal. Furthermore, the shift from a "market economy" to a "controlled economy" in 1987 had culminated in suppressed inflation. In 1990, the high annual inflation rate was largely due to increase in wages and housing allowances and Zimoil's price rise on oil products. In 1991, the annual inflation rate increased further because of the removal of meal meal subsidy. The high annual inflation rate in 1992 resulted from another wage increase awarded to civil service employees of about 135 per cent. However, from June, there has been a rise in the annual rate of inflation. Apart from the salary increases, a number of factors have contributed to the inflationary process. The rapid liberalization of the financial and foreign exchange markets have resulted in positive real interest rates and a real depreciation of the kwacha (Ndulo, et al, 1994).

Table 1 : Selected Economic Indicators (1970-1993)

Year	Real GDP Growth (%)	Inflation Rate (%)	Budget Deficit (km)	Formal Employment (1000)
1970	-13.7	4.6	23.4	353.20
1971	0.1	6.0	-194.2	365.60
1972	-9.8	5.1	-178.0	364.80
1973	-1.0	6.4	306.0	373.44
1974	-5.8	8.2	83.0	384.89
1975	-2.4	10.0	-298.5	393.49
1976	4.3	18.9	-298.5	368.79
1977	-4.3	18.8	-266.3	370.45
1978	0.6	14.0	-124.7	366.96
1979	-3.1	10.4	-233.2	373.87
1980	3.1	11.6	-558.5	379.30
1981	6.2	12.3	-532.4	374.80
1982	-2.8	12.8	-679.7	367.51
1983	-2.0	18.7	-396.0	363.80
1984	-1.3	20.4	-232.4	365.19
1985	2.6	35.2	-581.9	361.52
1986	0.7	54.9	-2103.4	360.54
1987	2.7	47.2	-1166.3	361.83
1988	6.3	53.9	-3715.9	360.72
1989	0.1	128.3	-5528.4	359.60
1990	-2.0	109.5	-9802.9	365.30
1991	-1.8	93.4	-156.9	491.26
1992	-2.8	191.4	-123.9	511.04
1993	4.0	183.2	-19615.9	506.84

Sources: Central Statistics Office, Bank of Zambia, ILO.

Table 2 Sources of Deficit Finance in Km (1981-1990)

Year	Deficit	Net Foreign Borrowing	Net Domestic Borrowing	Money Printed	Domestic Total
1981	532.4	278.6	79.5	174.3	4
1982	679.7	139.3	-4.3	557.3	91.4
1983	396.0	189.8	238.8	-32.5	52.1
1984	232.4	5.8	52.8	173.8	97.5
1985	581.9	109.1	68.0	404.8	81.1
1986	2103.4	556.2	59.0	1488.2	71.6
1987	1166.3	56.6	40.9	1068.8	95.1
1988	3715.9	2078.6	41.2	1596.1	34.2
1989	5528.4	1842.9	39.7	3646.8	88
1990	9802.9	59.5	36.7	6155.4	92

Source: Ministry of Finance

Table 3

Commercial Bank Liquidity (1970-1988)

Year	Total liquidity (k'000)	Liquidity Ratio (%)	Statutory Reserve Requirement (%)	Excess Liquidity (%)
1970	117,284	43.9	26.9	17.0
1971	107,435	37.4	25.5	11.9
1972	145,294	47.1	23.1	24.0
1973	199,463	53.4	26.8	26.6
1974	144,341	34.7	10.7	24.0
1975	228,974	52.7	26.2	26.5
1976	415,151	72.7	29.4	43.3
1977	687,838	102.4	18.9	83.5
1978	307,864	53.5	31.7	21.8
1979	479,499	61.4	27.5	33.9
1980	479,739	58.1	25.2	32.9
1981	411,435	47.4	14.1	33.3
1982	643,368	53.8	26.8	27.0
1983	727,071	55.1	29.8	25.3
1984	972,982	63.1	30.8	32.3
1985	1,352,065	70.6	21.6	49.0
1986	3,091,639	80.7	18.1	62.6
1987	4,705,308	81.5	17.1	64.4
1988	6,557,967	82.0	14.5	67.5

Source: Bank of Zambia

Table 4: Gross Domestic Product and Copper Dependency (1970-1990)

Year	GDP	CU	$\frac{C}{G}$	$\frac{C}{GDP}$	$\frac{C}{X}$
1970	2695	686	58	36	96
1971	2697	636	36	23	94
1972	2962	701	19	24	92
1973	2934	683	29	32	95
1974	3132	709	53	32	93
1975	3056	648	13	13	91
1976	3187	712	3	17	92
1977	3035	659	0	11	91
1978	3067	654	0	12	88
1979	2973	584	0	18	90
1980	3063	609	5	16	94
1981	3352	560	1	14	94
1982	3155	592	0	11	93
1983	3108	576	4	15	92
1984	3084	551	6	14	88
1985	3279	480	8	16	85
1986	3346	460	13	18	83
1987	3503	483	7	14	85
1988	4216	422	2	10	85
1989	4170	451	11	12	88
1990	4130	441	17	9	92

Note: GDP figures always correspond due to data inconsistency
 Definitions: GDP= Gross Product in 1980 prices
 CU = Copper production in thousand of tonnes

C/GDP= contribution of copper to GDP (per cent)
C/G = contribution of copper to government (per cent)
C/X= contribution of copper to exports (per cent)

Source: Per A'ke Andersson, 1993, p. 12.

1.3 Statement of the Problem

The external shocks of the period 1974/75 led to a progressive increase in Zambia's inflation rate, though steadily up to 1982. With the introduction of the IMF/World Bank supported structural adjustment programme (ERP82) which subsequently subjected the currency (kwacha) to auctioning, the annual inflation rate did not only increase at an increasing rate but the increase became volatile. It is worth noting that in fact, since 1974/75, the rate of growth of real gross domestic product has always been surpassed by the growth in the rate of inflation. Similarly, since the 1974/75 period, the fiscal deficit has on average been increasing particularly after the introduction of the IMF/World Bank supported structural adjustment program in 1982 despite its emphasis on strict fiscal discipline. The main forms of financing the deficit which have characterized the Zambian economy have been through foreign borrowing, domestic borrowing (printing of money), and grants from abroad which could have contributed to the inflationary process.

It is the task of this study to examine critically the main determinants of inflation in Zambia using the monetarist, cost-push and structuralist views of inflation. The study will ultimately

endeavour to attribute inflation causation in Zambia to either monetary factors or non-monetary factors in order to aid policy direction. Owing to great emphasis on government efforts to reduce the rate of inflation to levels that would enhance both foreign and domestic investments in the country through the freeing of interest rates and the exchange rate, liberalizing foreign currency control regulations, the offer of state owned enterprises for privatization, reduction of the fiscal deficit, and dismantling of monopolies, this study will point to appropriate variables to address in containing inflation, particularly on the policy front.

1.4 Objectives of the Study.

From the foregoing, the objectives of the study are:

- (i) to analyze the nature and main causes of inflation in Zambia
- (ii) to investigate whether or not inflationary causation in Zambia can be attributed to monetarist, structuralist, or cost-push schools of thought, and
- (iii) to contribute to policy advice on the macroeconomic front to the institutions concerned.

1.5 Rationale of the Study

Given that in 1973 the rate of inflation was only 6 per cent and that in 1993 it was 183 per cent, it would particularly be prudent to undertake this study. The various structural adjustment

packages coupled with breaks in implementation due to government policy will provide an interesting component in observing what factors caused inflation in certain periods and for the overall period. Furthermore, since inflation may be propagated by macroeconomic variables, for instance, exchange rate, interest rates, etc. this study will be both policy relevant and policy oriented. Institutions such as the university of Zambia, ministry of Finance, ministry of commerce and industry, Zambia Revenue Authority, the central statistics office and others may particularly benefit from the recommendations of this study.

1.6 Scope of the Study

Largely owing to the unavailability of data, this study will cover the period 1973-1993. Nevertheless, where data and any relevant information to the study will be available, the study may incorporate the economic developments relevant to the topic dating from as early as the 1960s. The variables that will enter the model in testing the determinants of the inflationary process in Zambia will include money supply, lagged money supply, nominal income, lagged nominal income, the nominal exchange rate, lagged nominal exchange rate, the inflation expectations, nominal wages and lagged nominal wages. Besides these variables, there are other variables that may explain inflation causation in Zambia such as foreign inflation, interest rates, supply inelasticities, low productivity, droughts, the harmful economic effects of the

liberalization of the domestic financial sector, et cetera. Again, due to limitations on data availability and difficulties in deriving proxies for certain variables, it will be almost impossible to include them. However, the variables to be included in the model will suffice to attribute inflation causation to the monetarist theory, structuralist theory, or to the cost-push theory.

CHAPTER 2

REVIEW OF LITERATURE

2.1 Theoretical Literature

2.1.1 The Monetarist Perception of Inflation

Monetarists contend that the fundamental cause of inflation is excessive money growth that is not matched by the rate of growth of real output (Harberger, 1963). In fact, this monetarist view of inflation was earlier put forward by Cagan in 1956. The idea behind this argument is that an increase in monetary growth tends to push the price level in an upward trend hence inflation.

Aghevli et al (1978) have provided key studies on the relationship between the deficit and inflation. They support the view that inflation runs both ways from the deficit to inflation, and from inflation to the deficit. The explanation of Aghevli and Khan differs from the Cagan model which treated money exogenously. The Cagan model viewed inflation as being caused by monetary growth only, without any feedback from inflation to the deficit. The feedback effect is related to government's desire to extract real resources at a faster rate than was sustainable at a given rate of inflation, thus resulting in an increase in money supply and

further inflation (Aghevli, et al 1978). They argue that inflation leads to widening fiscal deficits financed through the banking system thereby leading to further increases in money supply and subsequently prices. Implied here is that while the fiscal deficit can be inflationary, the fiscal deficit can also be caused by inflation. According to this view, fiscal deficits whether they are monetarist or not (i.e. money financed or bond financed) are necessarily inflationary.

2.1.2 The Structuralist Perception of Inflation

The structuralists views about inflation are that in a typical developing country, inflation is a natural consequence of particular structural rigidities (Ndebbio, 1993): These structural rigidities result from imbalances in:

- (i) The low growth rate of agricultural supply in the wake of rapidly expanding food demand,
- (ii) The public finance bottleneck; where the government fails to raise enough revenue to match an increasing level of public expenditures, and
- (iii) The foreign trade rigidity - the inability of exports to realize revenues to match and increasing import demand.

The structuralists cite these rigidities/bottlenecks as forces behind monetary growth which leads to inflation as per monetarists' explanation. The structuralists contend that as long as these bottlenecks remain in place, inflation would be hard to reduce. In

other words, the causes of inflation are rigidities that affect the relative price structure and hence, the absolute price level.

2.1.3 The Cost-Push View of Inflation

The cost-push economists' views about the causes of inflation are similar to the structuralists. The cost-push economists' views were strongly emphasized in the 1950s and 1960s. They emphasize union wage pressure and monopoly pricing policies as the main causes of inflation. They also cite crop failures, commodity shortages and Organization of Petroleum Exporting Countries (OPEC) administered increases in the price of oil as causes of high levels of inflation. They also link the level of inflation to the indexation of wages in the economy. Their argument is that with strong trade unions, nominal wages are likely to go up once the price level rises in the economy. Hence periodic adjustments in the nominal value of wages in line with the movements of the price index is essential to match if inflation has to be checked. In the same vein, the indexation of the nominal exchange rate in line with the consumer price index is necessary. The structure of the economy should allow the indexation of nominal wages and the nominal exchange rate to the rate of inflation. Otherwise, wages, or the exchange rate could fuel inflation.

Morrison (1982) identified five structural factors that explained why some developing countries were likely to be prone to inflationary tendencies. He singled out the level of economic

development, growth of government revenues, instability of government revenues, government control over expenditure, and the extent of government participation in the economy. He particularly blamed these factors for largely being responsible for causing government deficits.

In operational terms, the variables in the price estimating equations present many difficulties not only in developed countries but also in Less Developed Countries (LDCs) where financial markets are in their infancy (London, 1989). London singles out the difficulty of finding an appropriate measure of the stock of money. He concludes that for LDCs, with in many instances only two monetary aggregates, there appears to be a consensus that M2, and not M1 is a more suitable variable. Andersson et al (1992) have concluded that changes in money supply growth have a direct effect on inflation in Zambia with a time lag of two years. In his analysis, he uses M2 to represent money supply.

As regards the price terms, London (1989) notes that it is often difficult to decide on whether or not to choose the Gross Domestic Product (GDP) or Gross National Product (GNP) deflator, the Consumer Price Index (CPI) or any other variable that would reflect price trends in the economy. He concludes that the choice should be between the more often available fixed-weight CPI and the less frequently available GDP deflator in LDCs. In this study, the CPI would be used to obtain the inflation rates.

The incomes variables also present a problem. Despite many theories, particularly those relating to the consumption function

in LDCs, London(1989) recommends the use of either GDP or GNP directly. In this study, GDP at current prices will be used.

Changes in the exchange rate in Zambia affect the inflation rate in three different ways. The devaluation/depreciation of the kwacha affects the price level since the price of imports are adjusted upwards. This is the case of the short-run. Zambia being an extremely import dependent country, this effect is very important. Furthermore, a rise in the price of imported intermediate commodities will result in increasing production costs for entrepreneurs. Ultimately, entrepreneurs will transfer the change in price to consumers. Secondly, changes in the exchange rate affect exports. Exports are crucial in determining the volume of imports in a country. Thirdly, Andersson et al (1991) have argued that an exchange rate change might have a positive effect on the fiscal budget if the government is a net seller of foreign exchange on the financial market. In this study, since the "black market" exchange rate and the "official exchange" rate are at par, and due to difficulties in arriving at the "black market" exchange rate in various years, the official exchange rate as reported by the Bank of Zambia will be used.

In Zambia, there appears to be a real wage rigidity (Andersson, et al, 1991) have noted that nominal wages seem to have increased in accordance with the consumer prices. This is in order to retain the purchasing power of employees. Compensation to employees in most instances has assumed the trend of price developments. Many trade unions have won for their employees

favourable collective agreements. As regards the wage variables, the nominal wages in both the agricultural sector and non-agricultural sector will be used, and this will only include employees in the formal sector.

Unlike in industrialised economies with full fledged financial markets where a wide range of assets and corresponding rates of return are available, this is not the case for a country like Zambia. Faced with this difficulty, the practice in literature, following Harberger, has been to approximate the opportunity cost of holding money by the expected rate of inflation. It will be assumed that past changes in the rate of inflation ($P_{t-1} - P_{t-2}$) will be the variable affecting the expected cost of holding money, and hence velocity.

2.2 Empirical Literature

From the onset, it must be acknowledged that literature on inflation has grown tremendously both in empirical and theoretical content. Literature on the subject is so enormous currently that one has to be a specialist in order to be an authority on the subject. In certain instances, it is not clear whether the constructions of those authors who have provided rigorously formulated models are complementary or competitive (Turvey, 1951).

Cagan (1956), in his classic study of inflation sought to explain the monetary characteristics of hyper-inflation that were displayed by seven such episodes following the two world wars. The

countries that were investigated included Australia, Germany, Greece, Hungary I, Hungary II, Poland and Russia. These countries exhibited hyper-inflation rates ranging from 46 per cent to 19,800 per cent per month. Cagan employed a complete monetary framework model. He dealt with the relationship between changes in the price level and the quantity of money. The main conclusion of this study was that none of the seven hyper-inflations had self generating price increases. The price increase remained closely linked to past and current changes in the quantity of money. Cagan could not accept theories that blamed inflation on increases in wages or prices of imported commodities. He therefore indicated that an extreme rise in prices depended almost entirely on changes in the quantity of money, other things being equal.

On Latin America, a continent that has been prone to high rates of inflation, Harberger (1963) carried out a study on inflation in Chile. He regressed the percentage change in the price level on the percentage change in real income, percentage change in money supply, percentage change on the opportunity cost of holding money, and also on the percentage change in the wage level. Harberger found 80 per cent explanatory power. He found real income and money supply to be significant in determining the price level in Chile. The price expectations and wage variables were found to be insignificant.

Argy (1970) also conducted a major study on structural inflation for 22 developing countries taking all of them together. He constructed indices to test structural hypotheses. For purposes

of comparison, he added two monetarist variables: money supply and real income. Other than the "inelastic food supply" factor which exhibited some significance, all the other structuralist variables performed poorly. He found the monetarist variables to be significant. Argy attributed the causation of inflation in the 22 developing countries to be consistent with the monetarist approach rather than the structuralist approach. He however, conceded the difficulty in designing appropriate proxies for structuralist variables than for the monetarist variables.

In Pakistan, Azhar undertook a study between 1959 through 1973. Using a monetarist model to study inflation in Pakistan, he regressed the consumer price index on money supply, lagged money supply and real income. Azhar also confirmed the monetarist view of generalized excess explanation of inflation. He found that lagged money supply performed better than current money supply. His results were also consistent with a proposed possibility of a lag between monetary growth and price changes.

Onis, et al (1990) investigated the relationship among exchange rate, inflation and money supply in Turkey. Using Vector Auto regressive (VAR) as well as a complete model, they found that the strong impact of exchange rate devaluation on domestic inflation and the endogenous nature of the monetary base deserved particular attention. On an overall basis, they found that non-monetary, supply side elements made a substantial contribution to the inflation process in Turkey. They rejected the pure monetarist

interpretation on the current inflation in Turkey then. Their results were consistent with the structuralists' views.

On the African continent, several studies on inflation have been undertaken as well. In Ghana, one of the earlier key studies on inflation was conducted by Lawson (1966). She noted that deficit financing led to excess liquidity. This was found to be the main source of Ghana's inflation. This finding was in conformity with the monetarists view of inflation causation. The other main cause of inflation that Lawson observed was the local food prices which she blamed for the general cost of living. This observation was consistent with the structuralist view on the importance of "inelastic food supply" in the inflationary process. Four years later, another study on the causes of inflation in Ghana was conducted by Ahmad (1970). He found that excessive monetary expansion caused by government borrowing from the banking system to finance the budget deficit led to strong inflationary pressures in the economy. Ahmad's study was consistent to Lawsons'.

In trying to study the impact of deficit financing on inflation and capital formation in Nigeria, Oyejide (1972) made an empirical study by relating domestic money supply to inflation using a similar equation to Fischer's. The study recommended that less emphasis on deficit financing could limit price inflation since there seemed to exist a direct correlation between the general price level and measures of deficit financing over the period 1957 - 1970.

Another study on the determinants of the inflationary process in Nigeria was conducted by the Nigerian Institute of Social and Economic Research (NISER) in 1974. Key papers on this conference revealed that neither monetary nor structural factors alone could explain inflation in Nigeria. The consensus on this conference was that both factors were responsible for accelerating the inflationary process.

A much more comprehensive study on the causes and determinants of inflation in Ghana was undertaken by Ewusi (1977) over a twenty year period. He found deficit financing, excess liquidity, low productivity, balance of payments problems, increases in wages and salaries, and supply inelasticities as causes of inflation. This finding was consistent to both monetarist and non-monetarist factors.

Ajayi, et al (1980) also carried out a study on Nigeria to determine the main causes of inflation. Theirs was to find whether or not inflation in Nigeria was determined by developments in the external or internal sectors. Using econometric models, they observed that, to a large extent, inflation was determined in the external sector. Nonetheless, the internal sector also complemented the external sector in causing inflation.

On the Ugandan economy, Elbadawi (1990) asserted that fiscal deficit and crop finance greatly determined monetary emission and inflation. Another major determinant of inflation was the parallel market exchange rate. This rate has been used by price-setters in the economy. Elbadawi further added that the preliminary

determinant of monetary growth (M1 and m2) in Uganda was domestic credit expansion which was determined by the fiscal deficit and crop finance requirements.

Ndung'u (1993) carried out a comprehensive study on the dynamics of the inflationary process in Kenya for the period 1970 to 1991. Using a monetarist model, namely an error correction form of a model, he empirically showed monetary growth, interest rate changes, real income growth and excess money printing were important determinants of inflation in Kenya assuming a closed economy. When he opened up the model in his analysis, he found that the exchange was the most important variable in accounting for innovations in the domestic price level. On the policy front, he concluded that the failure of the government to control the rate of inflation, especially from the late 1980s was due to the inappropriate monetary and fiscal policies accompanying the exchange rate policy.

On the Zambian perspective, Aron, et al (1990) investigated the relevance of the parallel exchange rate (or premium) to domestic inflation. They used a simple econometric model of inflation in which the premium affects domestic inflation directly through the traded goods prices and indirectly through disequilibrium in the money market. They found that foreign inflation and the depreciation of the parallel exchange rate were important cost-push factors causing acceleration in the rate of domestic inflation. The other channel of excess demand for non-traded goods working through the money market and reflected by the

change in rate of depreciation of the parallel exchange rate has, however, been small and slightly significant on inflation.

In a more recent study, Adam, et al (1993) observed that the acceleration in the rate of inflation during 1992 and the first few months of 1993 led Zambia to a hyper-inflationary position. Despite an extremely tight fiscal policy in 1992, and owing to the drought situation, the monthly rate of inflation in April 1993 pointed to an annual rate of inflation of more than 300 per cent. Adam and Bevan observed that the relationship between budget deficit financing and inflation as earlier portrayed has tended to be weak. Instead, the hyper-inflation was attributed to inflationary expectations, lack of sustained control of money supply, and harmful economic effects of the liberalization of the domestic financial sector.

Ndulo, et al (1994) also carried out an empirical investigation on the Zambian inflationary process. Their study employed co-integration tests and Granger non-causality tests. Further, they built an error correction model based on a monetary factors (M2), real income growth (copper price) and cost push factors as exchange rates and foreign prices. They also included lagged inflation. They observed that the domestic inflationary process in Zambia was complex. They found expectations about inflation could be important. Monetary expansion was also important. They concluded that the long-run relationship between the price level and the money stock was important. In the external sector, among the factors that were identified was the inflation

rate in South Africa. It affected Zambia with a three months lag. The other factor they identified was the changes in the exchange rate which was driving the rate of inflation up.

2.3 Overview of the Literature

Drawing from theoretical literature, one may deduce that the major cause of inflation according to the monetarist school is excessive money growth (Cagan, 1956, Harberger, 1963). The excessive money growth is a resultant effect of government's desire to extract real resources at a faster rate than was sustainable at a given rate of inflation, thus resulting in an increase in money supply and further inflation (Aghevli, et al, 1978). Inflation in turn leads to widening fiscal deficits financed through the banking system hence resulting in monetary growth and subsequently prices. Hence, while fiscal deficits can be inflationary, the fiscal deficit may also induce inflation. As per structuralist explanation, it is apparent that inflation is almost unavoidable in a developing country due to the inherent structural rigidities in the economy (Ndebbio, 1993). Structural rigidities in these economies depict a characteristic of supply being exceeded by demand. The structuralists blame these rigidities on monetary growth which consequently leads to inflation as observed by the monetarists. It must be acknowledged that the cost-push economists' views are similar to the structuralists' views. The cost-push theory of inflation establishes a linkage between indexation of

wages and inflation in the economy. They argue that union wage-pressure and monopoly pricing may push the price level in an upward trend, hence resulting in inflation. They also point to the indexation of the nominal exchange rate in line with the consumer price index to be necessary if inflation levels have to be checked. Crop failures and OPEC administered oil price increases have been blamed for high inflation rates registered in many developing countries (Samuelson, 1987). On the theoretical literature, these are the main determinants of the inflationary process according to the three schools.

Empirically, various studies have showed that to a large extent, inflation has been attributed to deficit financing, excessive monetary growth and income growth. Monetarist variables seem to explain much of the high inflation rates experienced in the developing world. According to the literature reviewed in this study, over 55 percent of the studies conducted in 37 countries reviewed that monetarist variables were responsible for high rates of inflation experienced.

Non-monetarist factors have also considerably contributed to high inflation rates in many developing countries. As per literature reviewed in this study, less than 45 per cent of the studies conducted in 37 countries reviewed that non-monetarist factors (structuralist and cost-push) were responsible for inflation causation. Non-monetarist factors included local food prices, low productivity, supply inelasticities, changes in parallel, or official exchange rates, foreign inflation.

inflationary expectations, unfortunate effects of the liberalization of the domestic financial sector, changes in wages and salaries, and droughts.

This study doesn't deviate substantially from the studies reviewed above in terms of methodology, dependent variables to be regressed on the price level and the data type. In fact, the methodology to be implied in this study will be adopted from Diz's (1970) model which he used to explain to what extent various factors contributed to the inflationary process in Argentina. The independent variables in his regressions were: money supply, real income, nominal wages, the official peso/dollar exchange rate, and a measure of price expectations. The dependent variables were the cost of living and the wholesale price indices (Leventakis, 1980). It must be acknowledged, however, that Diz's (1970) model was based on Harberger's (1963) model.

CHAPTER 3

METHODOLOGY

3.1 Econometric Model Specification

As earlier stated in the foregoing, this study will be drawn upon Diz's (1970) model to explain to what extent various factors contribute to inflation causation. Hence, I will use the following estimating price equations:

$$P_t = a_0 + a_1M_t + a_2M_{t-1} + b_1Y_t + b_2Y_{t-1} + C_1X_t + C_2X_{t-1} + dZ_t + E.W. + E.W. + e_t$$

$$1$$

$$P_t = a_0 + a_1M_t + a_2M_{t-1} + b_1Y_t + b_2Y_{t-1} + C_1X_t + C_2X_{t-1} + dZ_t + e_t$$

(2)

$$P_t = a_0 + a_1M_{t-1} + b_1Y_t + b_2Y_{t-1} + dZ_t + e_t$$

(3)

$$P_t = a_0 + a_1M_t + a_2M_{t-1} + b_1Y_t + b_2Y_{t-1} + e_t$$

(4)

$$P_t = a_0 + a_1 M_t + a_2 M_{t-1} + c_1 X_t + dz_t + E.W_t + E.W_{t-1} + e_t \quad (5)$$

Where:

P_t = Current inflation rate,

M_t = rate of change in the stock of money in the current period,

M_{t-1} = rate of change in the stock of money in the previous period,

Y = growth rate of nominal income in the current period,

Y_{t-1} = growth rate of nominal income in the previous period,

X_t = rate of change in the exchange rate in the current period,

X_{t-1} = rate of change in the exchange rate in the previous period,

$Z_t = P_{t-1} - P_{t-2}$ = expected rate of inflation = opportunity cost of holding money,

a_0 = captures trends in velocity resulting from trends in expected costs of holding money,

W_t = Percentage change in the wage-rate in the current period,

W_{t-1} = Percentage change in the wage rate in the previous period, and

e_t = captures the unexplained variation by explanatory variables in the model.

There are five equations to be estimated as illustrated above. For purposes of capturing the significance of different variables

as per various theories of inflation, the regressions will be as follows:

Equation 1: The purpose of this model is to capture the three different theories to the explanation of inflation causation in Zambia. The three theories relate to the monetarists, structuralists and cost-push schools of thought. The main concern is to estimate the model with all the variables in an effort to capture the variables that significantly account for inflation causation. Hence, the following variables will be regressed on P_t : a_0 , M_t , M_{t-1} , Y_t , Y_{t-1} , X_t , X_{t-1} , Z_t , W_t , and M_{t-1} .

Equation 2: The essence of this model is to empirically determine how monetarist and structuralist variables would explain inflation causation in Zambia in the absence of the cost-push variables. To this effect, the following variables will be regressed on P_t : a_0 , M_t , M_{t-1} , Y_t , Y_{t-1} , X_t , X_{t-1} , and Z_t . This modelling is particularly necessary due to emphasis placed on controlling these macro variables if inflation has to be reduced and sustained in Zambia.

Equation 3: This model is an attempt to estimate how significant monetarist and inflationary expectations variables only can explain the inflationary process in Zambia. For some time, it has been argued that the expected inflation rate has considerably influenced people's portfolio balances, hence the necessity of testing the significance of these variables with the monetarist ones. Consequently, the following variables will be regressed on P_t : a_0 , M_t , M_{t-1} , Y_{t-1} , and Z_t .

Equation 4: This will be a presentation of a purely monetarist model. Its essence will be to test to what extent monetarist variables can explain inflation in Zambia in the absence of non-monetarist factors. It has also been argued that the main determinant of inflation in Zambia is excessive monetary growth. In this equation hence, the following variables will be regressed on P_t : a_0 , M_t , M_{t-1} , Y_t , Y_{t-1} .

Equation 5: After estimating the four equations above as per various theories, an elimination of some variables which will be apparently extremely insignificant will be done. The essence of this will be to observe if the overall explanatory power of the model ~~of the model~~ will improve with respect to the equations above.

3.2 Estimation Procedure

The model for inflation in Zambia will be estimated by regression analysis. Specifically, ordinary least squares (OLS) technique will be used as an estimation procedure for the regression equations. The motivation for employing OLS as an estimation technique was necessitated by its ability to predict or explain the effect on one variable resulting from changes in several variables. OLS serves as a suitable estimation procedure because the main purpose of the study is to explain or predict movements in the dependent variable, P_t which are implicitly caused by the independent variables, M_t , M_{t-1} , Y_t , Y_{t-1} , X_t , X_{t-1} , Z_t , W_t , and

W_{t-1} . Furthermore, OLS minimizes the vertical sum of the squares deviation from the fitted line. Hence, the use of OLS will be equivalent to searching for parameter estimates which minimize the error sum of squares. The suitability of the OLS technique in this study implies that all the five regression equations to explain the determinants of the inflationary process shall be estimated by this technique using the PC-Give econometric modelling package.

3.3 Data: Types and Sources

In the investigation of the determinants of the inflationary process in Zambia, secondary annual data will be used. The first set of variables to enter the model will be current money supply and lagged money supply. Money supply will be represented by M2. The second set of variables will be current nominal income and lagged nominal income. This set of variables will be represented by GDP at current prices. It must be acknowledged that the difficulty in obtaining quarterly data on this variable party compelled me to use annual data. The third set of variables will be the nominal exchange rate and the lagged nominal exchange rate. Despite other exchange rates that prevailed during the time frame of this study, the end of period exchange rate as reported by the Bank of Zambia will be used. The fourth variable to be incorporated in the model will be the opportunity cost of holding money, or the inflation expectations variable. In this study, this variable will be represented by past levels of inflation rates, namely: $P_t - P_{t-1}$.

It has been argued that past inflation levels affect people's decisions about asset holding. The fifth and final set of variables to enter the model will be current nominal wages and salaries in the formal sector & salaries. These will be represented by the total wages and salaries paid out in the agricultural and non-agricultural sectors. Total formal employment will also be obtained in order to gauge the rate of change. Again, owing to quarterly data unavailability on this variable, annual data will be used in estimating the model. It is hoped, however, that the general picture of the dynamics of inflation which will emerge from annual data will be similar to what would obtain if quarterly data was used.

The data for estimating the model was collected mainly from the Bank of Zambia (BOZ) and the Central Statistics Office (CSO). This data is secondary in nature and is derived from the following publications:

1. Bank of Zambia: Quarterly Financial and Statistical Review (1988, 1992),
2. Bank of Zambia: Report and Statement of Accounts for the Year Ended December 31, 1988,
3. Bank of Zambia: Statistics Fortnightly, Vol. 1, No. 5 & 11,
4. Central Statistics Office: Monthly Digest of Statistics (1976-1991),
5. Central Statistics Office: Consumer Price Statistics (1989-1994),
6. Central Statistics Office: Country Profile (1992), and

7. Republic of Zambia: Budget Address (1992 and 1993).

Further sources of data included: the Ministry of Labour and Manpower Development, Ministry of Finance, the University of Zambia (Economics Department) publications, International Labour Organization Year books (various issues), and from, the IMF International Financial Statistics Yearbooks (IFSs), also various issues.

CHAPTER 4

ANALYSIS OF EMPIRICAL RESULTS

This chapter presents the empirical results and data analysis of the study. Economic interpretation of the empirical results has particularly occupied more attention in this chapter. As earlier alluded to, the five regression equations pertaining to inflation causation in Zambia were manipulated through the aid of an econometric modelling package: PC-Give. The results are presented in summary below:

Table 5: Summary of Regression Results (1973-1993)

EQUATION	R ²	DW	F
1. $P_t = -16.02 + 0.66M_t + 0.50M_{t-1} - 8.73Y_t + 9.08Y_{t-1} + 0.37X_t -$ $(-1.99) (2.26) (1.40) (-0.09) (0.91) (3.57)$ $0.34X_{t-1} - 0.17Z_t - 0.09W_t - 0.45W_{t-1} + e$ $(-2.76) (-0.61) (-0.18) (0.78)$	0.934	2.46	18.00
2. $P_t = -11.57 + 0.61M_t + 0.60M_{t-1} - 9.23Y_t - 9.60Y_{t-1} + 0.39X_t -$ $(-2.07) (2.34) (1.87) (-1.01) (1.03) (4.25)$ $0.32X_{t-1} - 0.18Z_t + e$ $(-2.82) (-0.68)$	0.933	2.33	25.83
3. $P_t = -10.49 + 0.86M_t + 0.55M_{t-1} - 5.70Y_t + 5.89Y_{t-1} -$ $(-1.02) (2.46) (1.19) (-0.43) (0.43)$ $- 0.08Z_t + e$ (0.21)	0.831	1.66	14.80
4. $P_t = -10.73 + 0.89M_t + 0.57M_{t-1} - 3.67Y_t + 3.79Y_{t-1} + e$ $(-1.08) (2.90) (1.28) (-0.42) (0.42)$	0.831	1.62	19.67
5. $P_t = -14.33 + 0.56M_t + 0.74M_{t-1} + 0.28X_t -$ $(-1.64) (2.10) (2.39) (2.44)$ $0.8Z_t + 0.6W_t + 0.11W_{t-1} + e$ $(-0.37) (0.11) (0.17)$	0.891	1.35	19.01

Note: Figures in parenthesis represent t-values

Table 7

Summary of Results

MODEL	$t_{crit} (0.10, 20df)$	$t_{crit} (0.05, 20df)$	$F_{crit, 0.05at}$	$F_{crit} at$
1	1.73	2.09	(9, 11)=2.90	(9, 11)=18.00
2	1.73	2.09	(7, 13)=2.83	(7, 13)=25.93
3	1.73	2.09	(5, 15)=2.90	(5, 15)=14.80
4	1.73	2.09	(4, 16)=3.01	(4, 16)=19.80
5	1.73	2.09	(6, 14)=2.85	(6, 14)=19.01

Equation 1: The explanatory power of this model is good, and the results appear satisfactory and reasonable. The explanatory variables account for about 93 per cent of the variations in the rate of inflation. For instance, Harberger's empirical model revealed 87 per cent explanatory power on his study of the determinants of Chilean inflation in 1963. Leventakis' model revealed 96 per cent explanatory power in his study of inflation in Greece. The F- statistic at the 0.05 level (see table 6) also indicate the rejection of the null hypothesis that parameter are equal to zero. Instead, the parameters in the overall equation are statistically significant. The intercept is not significant at the 0.05 level and is bearing a negative sign, implying a negative downward trend in velocity. This might mean that the cost of holding money is falling overtime. As would be expected on priori grounds, current money supply and lagged money supply are affecting the rate of inflation positively. However, only current money supply is significant, while lagged money supply is insignificant at 5 per cent level of significance. The sum of the two regression coefficients for the two variables are not significantly different

from +1, indicating that an increase in the money stock of 1 per cent would lead to about a 1 per cent rise in the rate of inflation within two years in Zambia, other things remaining constant. Harberger (1963) and Leventakis (1980) also found money supply changes to be important factors in explaining inflation in Chile and Greece respectively. In fact, several studies both in developing countries and developed countries have singled out monetary changes as a crucial variable to control in reducing and sustaining inflation. Gerdes also found money supply to be significant in accounting for inflation in seven Eastern and southern African countries in 1989. In his cross-sectional study of Latin American countries, Vogel (1974) also found monetary changes a significant variable in inflationary causation. Furthermore, as one would expect, current nominal income, or output has a negative sign as output growth dampens inflationary pressures. However, the output variables are not statistically significant at the 0.05 level. In fact, while current output has the expected sign, lagged output has an incorrect sign. The sum of the coefficients in model 1 are significantly different from -1. This shows that a proportionate change in both current nominal income and lagged nominal income does not lead to a proportionate change in the rate of inflation. The current exchange rate has the correct positive sign, implying that it is positively related to the inflation rate. In fact, this variable is statistically significant at 5 per cent level of significance. Lagged exchange rate changes has an incorrect negative and is insignificant at the 0.05 level. This

result confirms Ndulo's (1994) findings that Zambian inflation is influenced by the nominal exchange rate in the short-run. There seems to be a close positive interaction between current exchange rate adjustments and inflation levels. However, the sum of the coefficients of current nominal exchange rate and lagged nominal exchange rate are significantly different from +1. The significance of the current nominal exchange rate in accounting for inflation is further confirmed by the fact that if this variable is excluded from the model, the explanatory power of the model falls by 10 per cent. This result is not surprising Zambia being an extremely open economy. The opportunity cost of holding money variable has a wrong sign and is also statistically insignificant at 5 per cent level of significance. This may be because the proxy employed was not appropriate, or because lagged changes in the inflation rate do not appreciably affect the inflation rate in Zambia. This result is similar to Haberger's findings. However, Leventakis (1980) and Gerdes (1989) found the opportunity cost of holding money significant in explaining inflation in Greece and Zambia respectively. The current nominal wages has a correct sign, but is statistically insignificant at 5 per cent level of significance. Lagged nominal wages has an correct sign and is also insignificant at 5 per cent level of significance. The Durbin-Watson statistic for the overall model is 2.46. This statistic is quite acceptable as it indicates the absence of serial correlation of the residuals, suggesting that all the significant variables explaining inflation causation in Zambia were included in the model.

Equation 2: With the exclusion of the wage variables from the model, it is still satisfactory and reasonable with good explanatory power, implying that current nominal wages and lagged nominal wages almost add nothing to the explanation of the rate of inflation. However, the elimination of the wage variables improves the coefficient for lagged money supply, and lagged money supply becomes significant at 10 per cent level of significance. Current money supply still bears the correct sign and is significant both at 5 per cent level of significance and at 10 per cent level of significance. The intercept improves with the exclusion of the wage variable from the model. However, it is still negative and statistically insignificant at 5 per cent level of significance. Current nominal income and lagged nominal income now bear the correct sign, indicating the presence of multicollinearity between the wage variables and lagged nominal income. Nevertheless, both current nominal income and lagged nominal income fail to pass the statistical tests either at 5 per cent level of significance, or at 10 per cent level of significance. In similar studies, Harberger (1963), Leventakis (1980) and Gerdes (1989) also presented results that showed that the income variable was insignificant. Even in the absence of the wage variables, the nominal exchange rate still has the correct sign and is statistically significant at 5 per cent level of significance. Lagged nominal exchange rate still bears an incorrect sign and is statistically insignificant at 5 per cent level of significance, indicating that the past nominal exchange rate changes do not influence the rate of inflation. The

opportunity cost of holding money variable has an incorrect sign, and is statistically insignificant at 5 per cent level of significance. The conclusion that the wage variable adds almost nothing to the explanation of inflation is exhibited by the fact that even without this variable, the rest of the variables still explain 93 per cent of the variations in the rate of inflation. The Durbin -Watson statistic is 2.33, implying no serial correlation of the residuals. In fact, this means that all the significant variables have been included in the model. In this model too, the F-statistic point to the rejection of the null hypothesis. The parameter estimates in the equation are statistically significant at 5 per cent level of significance.

Equation 3: This model reveals the reduction in the explanatory power of the model by about 10 per cent. This is as a result of eliminating the wage variables and the exchange rate variables. However, the model passes the F-statistic test at the 0.05 level, implying the rejection of the null hypothesis that parameters in the model are equal to zero. The parameters in the model are in fact still significant. The intercept, however, increases, but is still negative and insignificant at 5 per cent level of significance implying a negative downward trend in velocity. As expected, current money supply and lagged money supply are bearing a correct positive sign. However, with the exclusion of the exchange rate variables, lagged money supply ceases to be statistically significant. Only current money supply remains statistically significant at 5 per cent level of

significance. As regards output variables, current output is bearing the correct sign whereas lagged output is having an incorrect sign. However, both variables are statistically insignificant at the 0.05 level. The opportunity cost of holding money variable still maintains an incorrect sign and is insignificant at 5 per cent level of significance. With the exclusion of the wage and exchange rate variables, the Durbin-Watson statistic reduced to 1.66 indicating the presence of auto correlation of the residuals. This result indicates that some significant variable(s) have been left out in the model. In this case, it appears the exchange rate variable is a significant variable to the explanation of the inflationary process in Zambia.

Equation 4: With the exclusion of the opportunity cost of holding money variable to allow for a purely monetarist model, the explanatory power of the model doesn't change at all. Variations in the rate of inflation are still being accounted for by 83 per cent. Like the wage variable, the opportunity cost of holding money variable adds almost nothing to the explanation of the inflationary process in Zambia. However, the coefficients in the model are statistically significant as per F-statistic test of the null hypothesis at 5 per cent level of significance. This shows that monetarist variables are a significant contributor to inflation causation. The intercept reduces, though slightly. Nevertheless, it still remains negative and insignificant at 5 per cent level of significance. The money supply variables still remain positively related to inflation. However, only current

money supply is statistically significant whereas lagged money supply is insignificant at 5 per cent level of significance. As regards the income variables, current nominal income has the correct negative sign whereas lagged nominal income has an incorrect positive sign. Both variables are insignificant at 5 per cent level of significance. The Durbin-Watson statistic reduced slightly to 1.62 indicating the presence of serial correlation of the residuals, and an omission of significant variables in the model.

Equation 5: With the elimination of the variables that were apparently insignificant from the model, namely: current nominal income, lagged nominal income, and the lagged nominal exchange rate, the model's explanatory power increases from 83 per cent as per monetarist model to 89 per cent. The F- statistic at the 0.05 level also indicate the rejection of the null hypothesis that parameters are equal to zero. In fact, the parameter in the equation are significant. The intercept reduces, and still maintains its negative sign and insignificance at 5 per cent level of significance. Both current money supply and lagged money bear the correct sign, and are statistically significant at 5 per cent level of significance. With the sum of the coefficients not significantly different from +1, this result shows that an increase in money supply of 1 per cent in Zambia subsequently leads to about a 1 per cent rise in the rate of inflation other things being equal. The current nominal exchange rate variable stands out with the correct positive sign and is statistically significant at the

0.05 level. The opportunity cost of holding money variables still bears the incorrect sign, and is statistically insignificant at 5 per cent level of significance. The current nominal wage and lagged nominal wage variable are bearing correct signs. However, they are insignificant both at the 0.05 and 0.10 levels. The Durbin Watson statistic of 1.35 indicates the presence of serial correlation of the residuals however. As the nominal and lagged income variables are eliminated from the model, particularly, the current nominal wage variable improves, indicating the existence of multicollinearity between the two variables.

CHAPTER 5

SUMMARY OF CONCLUSIONS AND POLICY IMPLICATIONS

The principle findings of this study largely attributed the inflationary process in Zambia to the monetarist and structuralist schools of thought. There is enough evidence supporting the quantity theorists in explaining inflation in Zambia as the findings reveal that an increase in current money supply and lagged money supply by 1 per cent will lead to a 1 per cent rise in the rate of inflation within two years. In this study, both current money supply changes and lagged money supply changes were found to be significant determinants of the inflationary process in Zambia for the period under study. Current nominal income and lagged nominal income, despite being monetary variables were found to be insignificant determinants of the inflationary process in Zambia. As regards the nominal exchange rate variables, the current nominal exchange rate was found to be a significant determinant of inflation in Zambia. Periods that exhibited huge nominal exchange rate-fluctuations also recorded high inflation rates. However, the lagged nominal exchange rate was found insignificant in contributing to inflationary causation. Despite enormous theoretical constructions that the expected rate of inflation plays a significant role in explaining inflation in Zambia, this variable was not found to be among the determinants of the inflationary

process in Zambia. This study could not attribute inflation causation in Zambia to cost-push theories as both current nominal wages and lagged nominal wages in the formal sector were found to be insignificant. The coefficients in the five models were significant throughout, and the explanatory power of the models was rather good and reasonable. This paper therefore provides strong evidence that monetarist variables substantially determine the inflation rate in Zambia.

The regression models particularly singled out money supply (M2) to be the main determinant of the inflationary process in Zambia. Orthodox monetary economics would recommend traditional monetarist instruments such as fiscal and monetary policies. However, such a recommendation should be implemented with care as it might bring unwarranted recession into the country as this is what has happened in Zambia. The monetary squeeze has badly affected all sectors of the economy without being inflation subsidizing (Andersson, et al, 1991). Consequently, the monetarists support for demand management policies could lead the economy to extreme levels of poor economic performance. While a cautious control of monetary growth should be in place, a complementary monetarist variable to consider is output growth. In other words, there must be emphasis on enhancing the supply side for overall growth in the economy. It must be acknowledged that almost all macroeconomic variables being pursued currently in Zambia pertain to structural adjustment programs. In the context of structural adjustment programs, emphasis should be placed on supply side

factors rather than demand management factors. A further factor to note about the significance of money supply is that sometimes, changes in money supply may emanate from either structuralist or cost-push variables particularly in a third world country like Zambia. For instance, the Bank of Zambia might be requested by the government through the Ministry of Finance to increase money supply in order to meet the wage bill in the formal sector. Hence, despite the findings that the inflation rate and changes in money supply were significantly correlated, these conclusions should be made with caution.

The case for non-monetarist variables show that they are less significant. If anything, they do not add appreciably to the explanation of the determinants of the inflationary process in Zambia except the current nominal exchange rate. Almost all the structural adjustment programs have used the nominal exchange as a centrepiece for adjustment. The potential inflationary effect of a structural adjustment program has always had a bearing on the nominal exchange rate adjustment. Periods of high nominal exchange rate fluctuations were also characterized by high inflation rates. This observation parallel the structuralist view of the inability of exports to realize revenues to match an increasing import demand. Consequently, the nominal exchange rate is a crucial determinant of the inflation rate in Zambia. The past levels of the nominal exchange rate did not account for inflation causation in Zambia. The opportunity cost of holding money variable as proxied by past inflation levels was also found to be insignificant in

explaining inflation in all equations that were estimated. The appropriateness of past inflation levels as a proxy for the opportunity cost of holding money was questioned for this result. In the same vein, in all the regressions that were estimated, current nominal wages and lagged nominal wages were statistically insignificant, implying that cost-push theories of union wage pressure as a determinant of inflation in Zambia could not hold. This result could be attributed to the smallness of the formal monetarised sector given that the informal sector in Zambia is larger than the formal sector. Hence, with regard to non-monetarist factors, there is need for concerted efforts to ensure that there is not just stability in the nominal exchange rate to contain inflation, but that the stability is sustained over a long period of time. It would not be enough to concentrate to relate policy formulation to the nominal exchange rate. More importantly, there is need to boost production in the export sector through various incentives to exporters not only through the exchange rate incentive. A broad spectrum of incentives would motivate exporters to increase their productivity thereby enhancing foreign exchange earnings. This would reduce "volatile" exchange rate fluctuations, and hence inflation relatively. This study does not take seriously the nominal wage variables as appropriate variables to address seriously in containing inflation in Zambia as there did not appear to be a close association between higher nominal wages and higher inflation rates.

Finally, there is also need for government's full commitment in its pursuit of IMF/World Bank supported structural adjustment programs since there does not seem to be an alternative to these programs. This is necessary as the "on and off" implementation of

structural adjustment programs of the 1980s affected the government's credibility among both local and private entrepreneurs. Andersson, et al (1991) has pointed out that private entrepreneurs will withhold their investments until policy stability and reform success is guaranteed. This recommendation is necessary as an enabling environment is an impetus for achieving increased output which subsequently dampens the inflationary pressures. This in fact support the view of a growth oriented structural adjustment program.

5.1 Limitations of the Study and Suggestions for Further Research

Other things remaining constant, this study could have made an investigation about the determinants of Zambian inflation dating as far back as 1964. However, owing mainly to difficulties in obtaining data from 1964 to 1971 on some variables, the study period was shortened. Furthermore, the Harberger model of 1963 on which the estimation procedure was based has been recommended for countries with inflation rates of more than 10 per cent. For the case of Zambia, the rates of inflation between 1964 and 1971 are well below 10 per cent. Consequently, a further inquiry about the availability of data on certain variables such as the wage variables would be highly recommended. There is also need to generate a model that would estimate the causes of inflation even in periods where inflation rates were as low as 2 per cent. Another data problem was that at the time this study was conceived, it was envisaged that the model would be tested both for annual

data and quarterly data. Nevertheless, this was not the case as quarterly data was unavailable on the nominal income variables and nominal wage variables. Probably, a generation of this data could be possible so that one can have more observations and an explanation of Zambian inflation that is applicable to short spans of time.

A methodological concern emanate from the discontinuations in policy orientation during the period understudy. It is quite evident that changes back and forth from a 'controlled' economy to a 'market' economy indicated lower rates of inflation and high rates of inflation in certain periods. In testing the model in this study, it might have been appropriate to include dummy variables so that they could have captured the structural breaks caused by changes in economic reform, or probably, other methodological techniques might have been used.

With regard to the results, the substantial significance of monetary variables, particularly money supply variables to the explanation of inflation in Zambia is a case for further research. As earlier mentioned, changes in money supply may emanate either from structuralist or cost-push variables. There is need for further research to investigate the variables upon which monetary growth depends in Zambia.

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