ADDIS ABABA UNIVERSITY
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THE CAUSES OF LOW INFLATION IN ETHIOPIA

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ABSTRACT

This paper tries to identify the determinants of inflation in general the causes of low inflation in particular in Ethiopia with a time series data covering the period 1962 to 1997. The analytic technique used involves estimations of a model that incorporates both monetarist and structuralist variables of inflation. The findings of the study suggests that, expectation of inflation, real income, per capita food production and money supply are found to be significant with their theoretically postulated sign.

Out of the variables included in the model, expectation of inflation and real income have substantial impact on the inflationary process of the country. Money supply is the next important variable, though its coefficient does not add up to unity as it argued by monetarist.

The study further attempted to look at the relation between inflation and degree of monetization of the economy (which could roughly be measured by broad money over GDP) . According to the investigation of the study, the degree of monetization has no any role to play in the inflation spiral of the country since the economy is not well monetized. Rather it more likely appear that the extent of degree of monetization of the economy has partly contributed to the prevalent of low inflation in the country. If the government has a low inflation target it should adopt a policy that can avoid the structural rigidities prevailing in the economy.

CHAPTER ONE

Introduction

1.1 Significance and Objective of the Study

Inflation has remained to be quite controversial issue. Among other things the controversy mainly arises from the different view regarding the causes, consequences and control of inflation . Inflation has a wide range impact on social economical and political system of a country. Kotwal (1987) explain this as: " Apart form a purely theoretical interest, the significance of inflation as an important area of economical and social research, arises from its impact on the distribution of income and wealth among different social groups , and individuals; on the rate of economic growth in a country; and on the stability of a given political and economic system " (Kotwal, 1987,p.4). Therefore it is essential to know the process that creates inflation , the way in which it perpetuates itself, the condition to which it leads, and the means by which it is managed so as to reduce the impact of inflation on the smooth operation of the economy.

Inflation in Ethiopia has been low relative to other countries over the last thirty years. It averaged about 7.3 percent during 1967 to 1997 , which is far below an average inflation rate of 10.3 percent 39.8 percent 13.4 percent 90.4 percent and 19 percent for Asia , Europe , Middle East, Western Hemisphere, and Africa, respectively. But it has been a bit higher compared to industrial countries which is about 6 percent

(Appendix 6). It is surprising to see a low of inflation in a very poor country like Ethiopia . This is the main motivation to undertake this study.

This study attempts to :

1) give insight regarding the determinants of inflation in Ethiopia .
2) propose the means by which to maintain low inflation in the context of market led economies.

In broad terms, the objective of the study is to identify the determinants of inflation in the county. The specific objectives are :

1) to measure the extent to which the structural and monetary factors explain the inflationary process in the country and ;
2) to find out the causes of low inflation in the country.

The study is structured into four chapters. This chapter presents a brief review of the Ethiopian economy and statement of the problems. Chapter two discusses the theoretical and empirical evidences regarding inflation. Chapter three deals with model specification, data sources estimation and interpretation of results. Finally, in chapter four, conclusion and policy implications are presented.

1.2 Review of the Ethiopian Economy

Ethiopia has faced serious economic problems since the 1970s. Low growth rate of GDP, negative growth of per capita income, balance of payment and budget deficits, and huge debt servicing are among the various macroeconomic problems that Ethiopia faced. The problems were pronounced in the agricultural sector which has experienced a low growth rate of output in general and food production in particular compared to population growth. This circumstance has enforced the country to resort to other food sources, i.e., to either import basic necessities or rely on external donation [Asmerom, 1997].

During 1967/68- 1972/73, real Gross Domestic Product (GDP) and per capita income registered an average growth rate of 3.1percent and 1.1 percent per annum, respectively (See Table 1). However, the economy plummeted to 1.4 percent in 1973/74 .The Low performance in 1973/74 is mainly ascribed to the revolutionary upheaval, which created economic disruptions and uncertainties.

The agricultural sector has played a dominant role in the economy. It contributed a little more than 55% of GDP during 1967/68- 1973/74. But the sector grew at a mere 1.6 percent per annum. In per capita terms, the average growth rate was -0.7 percent per annum during the same period. The main factors behind this poor performance were the dominance of large subsistence sub-sector, extremely low productivity, backward agricultural practice, and drought (Eshetu and Makonnen, 1992,p.5).

Unlike the agriculture sector, the industrial sector relatively performed well. It depicted an average growth rate of 4.4 percent per annum during 1967/68- 1973/74. This is explained by accelerated growth in manufacturing, electricity, and water as well as small-scale industries and handicrafts (Eshetu and Makonnen, 1992,p.5).

During the period 1967/68- 1971/72 expenditure on GDP (Aggregate Demand) at market price revealed continuous increment ,its growth rate averaged around

6.7 percent per annum. Nevertheless, it sharply declined to 1.5 present in 1972/73, And then it culminated to 9.7 percent in 1973/74 (See Appendix 2).

Out of its components total consumption grew at about 6 percent during 1967/68 - 1971/72 . It is largely constituted by private consumption which accounted for about 79 percent of GDP . The share of public consumption remained at about 10 percent during the whole period (see Appendix 7). Owing much to the fiscal conservatism that the government pursued, the gap between the expenditure and revenue (budget deficit) was not much wide for the period 1967/68-1973/74. This brought about low level of deficit financing, which contributed to slow monetary expansion, and hence moderate increase in price. For instance the share of expenditure and revenue in GDP, on average, hovered around 13.7 percent and 10.3 percent respectively. As result the budget deficit maintained at about 3.4% of GDP.

Table 1: Growth Rate of GDP [At constant factor cost]

		1967/68-1971/72	1971/72	1972/73	1973/74
1	GDP	4.0	4.5	2.5	1.4
2	Per capita income	1.7	2.2	0.2	-0.9
3	Agriculture	2.2	3.5	0.7	-0.6
4	Per Capita Agriculture	-0.1	1.2	-1.6	-2.9
5	Industry	5.6	4.4	3.2	-0.7
6	Service	7.3	6.6	5.7	6.1

Source : MEDAC

In line with its ideology, to fulfill its political, social and economic intentions, the Military Government (Derge) nationalized all banks, insurance companies, industrial and commercial firms, and extra houses. In addition , it also launched a Land Reform Proclamation in March 1975.

As shown in table 2, the country had registered dismal performance in economic growth with significant fluctuations in the 'Derge' regime (1974/75-1990/91). Over the same period real GDP grew at an average growth rate of 1.9 percent per annum. This, seen against the population growth rate of 2.8 percent per annum during the same period indicates the striking impoverishment of the well being of the people.

A trend somewhat similar to the growth in the real GDP was repeated in agriculture, industry and service sectors. In general terms, growth in agriculture, industry and service sectors averaged 0.7 percent, 2.5 percent, and 3.5 percent per annum respectively during the Derge regime.

Although because of the development campaign and improvement of rains, the economy was able to record respectable growth rate in specific years, for most of the period under consideration the growth of output (GDP) was stagnant and declining. Among other things, this is attributed to the disappointing performance of the agricultural sector, drought, internal conflict, war and inappropriate government policies [Befekadu,1990].

Aggregate expenditure on GDP (aggregate demand) was continuously rising over the seventeen years under review. Thus, it increased from an average of about 5.5 percent in 1967/68-1973/74 to 8 percent in 1974/75-1990/91. This same trend was also held on total consumption. Out of the total consumption, private consumption consisted of the largest share, i.e., more than 71 percent. Public consumption consistently increased while private consumption sharply declined [see Appendix 8].

When we come to the revenue side of the economy, partly because of the introduction of new taxes and the increment of the existing rates, government revenue increased to unprecedent level [Befekadu, 1990,p.73]. It stepped up from birr 711.6 million in 1974/75 to birr 3520.2 million in 1988/89 (a 4.9 fold increase or a growth rate of 395 percent). As a share of GDP, revenue rose from 12.9 percent in 1967/68 to 30.1 percent in 1988/89, and then went down to 24.8 percent in 1989/90 [APPENDIX 3].

Like revenue, government expenditure had experienced a general increasing trend with tremendous jump in some years of the 1980s. It rose at about 6-fold or from birr 777.7 million in 1973/74 to birr 5,369.2 million form in 1989/90. Its share in GDP, due to considerable rise in government service, in particular defense expenditure, has sharply increased from 14 percent in 1973/74 to 30 percent in 1989/90.

As discussed above, expenditure grew more rapidly than revenue. Consequently, the fiscal balance was persistently deteriorating in the 1980s. As available information indicates, budget deficit has been escalating from 6.4 percent of the GDP in 1971/72 to 17.15 percent in 1989/90.

The deficit could be financed from two sources namely, external and domestic. The former financed, on average, about 59 percent of the deficit, reaching a peak of 86 percent in 1987/88 and reversed drastically to 35 percent in 1989/90 [Eshetu and Makonnen,1992,p. 19]. Domestic source of financing mainly comes from the banking system in the form of borrowing. Hence money supply (M1) and (M2) showed a 5.6 and 5.8 fold increase respectively from 1974/75 to 1989/90; in the aforementioned period their share in GDP rose form 14.9 percent to 39.7 percent and from 20.7 percent to 53.3 percent, respectively [Appendix 4].

During the period 1974/75- 1989/90, on average, GDP was growing at a very low rate of 2.2 percent, whereas the money supply was increasing by more than 12 percent. This has led to a consistent decline of the velocity of money from 4.8 percent in 1974/75 to 1.89 percent in 1989/90 [Appendix 1 and 4].

As it can be inferred from the economic performance of the past seventeen years, the 'Derge' could not succeed in doing what it had planed to do. From the second half of the 1970s to the 1980s, Ethiopia's economy suffered a marked deterioration which steamed from the effect of the prolonged civil war, recurrent drought and inappropriate government policy.

To get out of such deterioration and to embark on the road to high growth in an environment of stable prices and sustainable balance of payments, the Transitional Government of Ethiopia (TGE) adopted a policy package known as, i.e., Structural Adjustment Programs (SAPs) [Befekadu and Kebre, 1994,p. 61].

The important elements of this package include: [Ibid, 1994,p.62] Exchange Rate Policy (i.e. devaluation), Monetary Policy, Interest Rate, Fiscal Policy, Trade Liberalization , Price Deregulation , Privatization and Public Enterprise Proclamation, Investment Law, Labor Law, Transport Deregulation.

After dropping down to a rate of growth of -3.7 percent in the abnormal year of 1991/92 (i.e, a year of political destabilization), the overall trend in real GDP has showed significant improvement, except for the drought years of 1993/94 and 1997/98 , which experienced a growth rate of 1.6 percent and 0.5 percent, respectively, since the introduction of the economic reform program in 1992. The real GDP of the country has averaged 4.7 percent over the last seven years (1991/92-1997/98). Excluding the abnormal year of 1991/92, real GDP has recorded a remarkable average growth rate of 6.1 percent for the past six years. Hence, this brought about an average per capita GDP growth rate of over 3 percent (see Table 2). This can indeed be said a respectable performance compared to both the Imperial and 'Derge' regimes. It is important to realize that the overall trends in real GDP has been much influenced by what happens in the agriculture sector (see Appendix 1).

Among others, this good performance is attributable to the following factors (MEDaC,1997(August),p. 1).

- Improved weather condition and increased fertilizer utilization, which boosted agricultural output.
- Increased agricultural output, in turn facilitated industrial production by supplying raw materials and providing foreign exchange to be used for essential imports.
- Improved capacity utilization of industrial sector.
- The restoration of peace and stability
- Conductive macroeconomic policy environment.

Since the introduction of the economic reform program in 1992 various measures have been undertaken to enhance government revenue through widening the tax base and improving tax efficiency. Having been increasing for the period 1980/81-1987/88, government revenue depicted a general declining trend during the pre-reform period, i.e., 1988/90-1991/92. And then it was reversed in the post-reform, reaching a peak in 1995/96 and 1996/97. Government revenue, which was birr 3,898.9 million in 1988/89, had leaped to birr 7,781 million in 1996/97. It has grown, on average, at about 29.4 percent for the period 1992/93-1996/97. In the same period, the share of revenue in GDP averaged 15.8% per annum, which is lower than an average of 18.7 percent in the 1980s [Appendix 3].

Government expenditure has revealed a sharp rise, in absolute terms, from birr 5,305.6 million in 1992/93 to birr 10,290.6 million in 1996/97. Its average growth rate was 19.8 percent per annum for the period 1992/93-1996/97. But as percent of GDP, government expenditure dropped from an average of 30.72 percent per annum in the last 11 years of the 'Derge' regime to an average of 23.8 percent per annum in the last five post reform years.

Out of the components of government expenditure, the share of recurrent expenditure shrank from an average of 70.6 percent in 1980/81-1990/91 to an average of 64.2 percent in 1991/92-1996/97, but the share of capital expenditure expanded from an average of 29.4 percent between 1980/81-1990/91 to an average of 35.8 percent between 1991/92 - 1996/97. The increment observed in capital expenditure is caused by the intensive measure taken to rehabilitate and reconstruct the war and drought torn economy while the contraction exhibited in recurrent expenditure steamed from the significant reduction of defense spending and decline in administrative and general service.

Because of the fact that government revenue could not fully finance government expenditure, the budget deficit continued to deteriorate after the reform program even at a faster pace. The deficit in absolute terms moved from birr 2,114.4 in million in 1992/93 to birr 3,263.7 million in 1993/94 and then contracted in the following years. However the substantial and increasing flow of external grants significantly reduced the deficit amount to birr 1,648.3 million and birr 2,276.5 million for the above mentioned years [MEDaC,1997 Annexes, Table 1.3].

Financing budget deficit through domestic bank borrowing has been substantially curtailed in the past five years of reform program. As a percent of GDP, it fell from 4.2 percent in 1992/93 to -0.15 percent in 1995/96. This indicates that the domestic bank borrowing was stopped in 1995/96. In fact, the government has started repaying its debt to the banking system, implying that the budget deficit is largely financed through external borrowing and counter part fund [MEDAC, 1997, Annexes Table 1.6] .

The monetary policy of the reform period has been designed in a manner that can ensure money supply to grow at a rate consistent with targets of inflation, economic growth, and balance of payments, while allowing reasonable credit expansion for the private business which are engaged in productive sectors.

When we look at the money stock (broad money), which had been expanding quite rapidly in pre-reform years, has maintained its pace during the first period of the reform program. Its growth rate averaged 16.8 percent per annum which is a bit higher than 16.5 percent growth for the three years before the introduction of the reform program. Then after, it has grown at an average rate of 12.5 percent per annum during 1993/94-1997/98(Appendix 4)

As it can be seen from table 3 the Imperial period was characterized by very low inflation. But this situation was immediately changed after the Derge came to power. From the outset of the regime, the period between 1974/75 and 1977 / 78 the inflation rate substantially rose and reached a peak(22 percent) in 1976/ 77 which arises from excess demand for goods and raw materials which were in short supply during that time. For instance, the rate soared from 4.7 percent per annum in 1974/ 75 to 22 percent in 1976/77 . This was highly associated with significant increase in food price which constitutes 57.4 percent of the weight (Befekadu and Berhanu, 2000,p.311)

In fact, the inflation pressure did not keep on its pace, it was reduced during the period 1977/ 78 - 1983/ 84 in connection with the introduction of a system of price control on domestic goods and maximum profit margin for certain imported goods and a compulsory grain quota deliveries to the Agricultural Marketing Corporation at currently fixed price. The rate of inflation declined from 22.9 per cent in 1976/ 77 to 1.9 percent in 1980 / 81 and dropped further to -0.3 percent per annum in 1983/ 84 [Ibid, 2000,p. 311] .

A study conducted by the World Bank indicated that AMC's procurement prices even during the years of low international grain prices . For example. the farm gate price offered by AMC in 1985/86 which varied from 40 to 61 percent of import parity prices depending on the type of crop. The weighed average farm gate price for all cereals being 50 percent of import parity price (Gezahegn 1995,p. 165). Gezahegn, in his analysis of agricultural marketing policies and food security in Ethiopia, attempted to compare the AMC's price with an average open market price of eight crops in 1987/

88 in ten different markets located in surplus producing areas. In general, the study revealed that AMC's prices were found to be less than that of the open market prices. Gezahegn outlined the details of the comparison as follows. AMC's prices stood at : [Appednix 9 and Gezahegn; 1995,p. 165] ;85 percent , 60 percent and 43 percent of open market prices for teff in Debre Markos, Hossana and Nazareth respectively ; 91%,52 percent and 56 percent for wheat at Assella, Goba and Hossana; 79 percent and 69 percent for Maize at Nekempt and Shashemene ; 100 percent and 78 percent for Barely at Assella and Goba; 49 percent and 39 percent for horse beans at Nazareth and Gonder; 77 percent , 49 percent and 48 percent for Niger seed at Debre Markos , Gondar and Ambo.

Table 2 GDP Growth rates and Sectoral share to GDP [at constant factor cost]

	1967/68-1973/74		1974/ 75-1979/80		1980/81-1984/85		1985/86-1990/91		1991/92-1997/98		1974/75 1990/91	1967/68 1997/98
	GR	SGD	GR	SGD	GR	SGD	GR	SGD	GR	SGD	GR	GR
GDP	3.4%		2.1%		-0.9%		3.9%		4.7%		1.9%	2.9%
GDPa	1.6%	6.0	1.2%	52.1	-5.0%	54.4	7.3%	52.0	1.9%	51.4	1.5%	1.7%
GDPI	4.4%	5.3	2.9%	14.5	7.5%	12.3	-3.3%	12.1	8.7%	10.8	2.1%	4.1%
GDPs	6.9%	8.7	1.8%	33.4	3.6%	33.3	2.3%	35.9	7.6%	37.8	2.5%	4.6%
er Capita DP	1.1%		-0.4%		-3.8%		0.8%		1.6%		-1.0%	1.0%

Source: MEDAC
GDPa: Agricultural GDP at constant factor cost
GDPI : industrial GDP at constant factor cost
GDPs: Service GDP at constant factor cost
GR:- Growth Rate
SGD:- Share In GDP

In the 1980s, in most cases, the Ethiopian economy experienced a rate of inflation that is below 7.5 percent except for specific years at which a sudden shot in price were registered. The supply shock especially related to the agricultural sector, which determines food prices, was responsible for the spur in inflation particularly in 1984/ 85 during which a devastating famine took place in the country, during that year the rate of inflation surged to 18.4 percent. Despite such occasional upstage, therefore, inflation was not a serious problem in Ethiopia in the 1980s. Government policies which neutralized cost push inflation and suppressed demand were the most important factors that contributed to containing inflation at such low level. In this regard, strict control over prices with substantial subsidization and wage and salary freezing could be worth mentioning [MEDaC, 1997,p.6].In 1989/90 the government liberalized the agricultural marketing .

As shown in the wage index table, Ethiopia average growth rate of real average wage index was -2.3 during the period 1968 - 1982 [Appendix, 10]. This implies the existence of salary freezing during the aforementioned year. From this one can infer that the decline in real wage index may restrain the inflationary pressure that could have arisen had there been wage increment in the country. This may contribute to the prevalence of low inflation in the country.

Largely due to the limited investment opportunities and lack of consumption goods along with the pervasive price control in the system, members of the business sector and the household were being forced to increase their bank deposit (to save) or simply hoarded the money at home. " As large portions of such monetary savings have not been lent out to private investors ... or have not been fully recycled to the government (because the government mainly borrows from the central bank through the mechanism of currency emission) there has been a huge build up of liquidity.

(what you might call a" birr over hang") in the economy .[Tekle Birhan, 1990,p.17] . In actual fact, this was indeed inactive in the inflationary process of the country. The monetary overhang, which is defined as a ratio of money supply to GDP has been growing fast during the period 1966/ 67 to 1990/91. For instance, it significantly rose from 16.5 percent in 1973/ 74 to 41.5 percent in 1990/91[Appendix 11]. This money per unit at nominal GDP is high or alternatively the velocity of circulation of money [the ratio of GDP to money supply] is low. As a consequence of this the process by which money supply transformed into inflation might be detained.

Having maintained an inflation rate of below 7.5 percent for most of the years in the 1980s, the increase in financing of the government budget deficits through money creation and recurring supply shocks due to heightened civil war and periodic drought caused the rate of inflation to rise above 20 percent during 1990/ 91 and 1991/92 [MEDac, 1997,p 6].

Among others, the issue of price explosion raised serious debate among various economic analysts, when the TGE adopted economic reform program in 1992/ 93 . From the outset of the reform , most of the analysts forecast very high inflationary pressure. In actual fact, albeit the government devalued the currency and lift up the price control, the expected inflationary problems has not occurred. Rather inflation rate has consistently decreased during the period 1992/93- 1996/97, except for the years 1994/95 when the rate of inflation rose to 13.4 percent due mainly an expansionary monetary policy and the effect of bad harvest in 1993/94. This is largely attributed to a significant reduction in inflationary financing of budget deficit, good performance of supply side of the economy and deregulation of transport system and market integration [Ibid , 1997,p. 7].

Table 3: Rate of inflation

Years	rate of inflation		
	total	Food	Household Items
1967/68 - 1973/74	2.8	3.2	2.2
1974/75-1978/79	15.3	18.3	15.4
1979/80-1983/84	5.1	5.4	4.2
1984/85-1990/91	7.4	7.4	10.9
1991/92-1996/97	6.7	7.5	1.85
1974/75-1990/91	9.0	9.2	10.3
1967/68-1996/97	7.1	7.5	6.7

Source: CSA

A it is seen in Table 3, the rate of inflation in Ethiopia was much influenced by food price (inflation) which constitutes 57.4 percent of the weight .

As Measured by Addis Ababa Retail Price Index (AARPI), the average inflation rate of Ethiopia was 7.1 percent during the period 1966/67 to 1996/ 97. However, the rate varies between 22 and negative 9.5 percent. The country has experienced average inflation rate of 2.8 , 9.0 and 6.7 percent during the three regimes respectively for the period 1966/67 to 1996/97 . The rate has fluctuated for the period under study.
Generally, on average the rate of inflation has crepes upward during both regimes as compared to the imperial regime. Nevertheless, under a given condition of stagnant growth of GDP, persistent deterioration in budget deficit, steadily rising money supply and the significant reform (i.e., devaluation and lifting up of price control), the inflation rate of the country has been below 5.2 percent for most of the years under study.

From the definition that Dornbush and Fisher gave about low inflation, one can characterize the rate of inflation in Ethiopia as low. They defined low inflation as: "...there are costs of inflation lead naturally to conclusion that optimal inflation rate is zero where as the costs of a steady long run inflation rate any where between zero and 5 percent are probably quite similar. The strong emphasis that the central bank should keep the inflation rate low say in the 0-4 percent range is entirely appropriate" [Dornbush and Fisher, 1989,p. 528].

The problem area in which this study focused on is: what are the causes behind inflationary process in general and low inflation in particular for such a poorly performing economy ?

CHAPTER TWO

REVIEW OF THE LITERATURE

2.1 Review of Theories of Inflation

Inflation is a sustained general increment of prices or equivalently, of continuously falling value of money. [Laider and Parkin, 1975]. Inflation can be classified depending on the rate at which price increase, as follows: “(1) "Creeping inflation" that does not exceed 5 percent and may be temporary, (2) "Marching Inflation" which is expected to persist in 5-10 percent range and (3) " Galloping inflation" that exceeds 10 percent and is expected to accelerate" [Zijstra, 1991,p.545].

We find various theories of inflation in the literature. They can be classified based on their explanation about the causes and consequences of inflation in the economy. Among the theories, in this study, we will discuss the repressed inflation, monetarist and structuralist explanation of inflation because they are more related with the objectives of this study. The paper will also try to highlight some points on the unsettled debate between the monetarist and the structrualist regarding the cause of inflation.

2.1.1 Monetarist Explanation of Inflation

The new version of quantity theory of money, which is put forward by Friedman and his associates , is the basis for the monetarist theory of inflation. It is considered as a symptom of the re-emergence of the quantity theory of money.

Before we go through the monetarist explanation of inflation (i.e. the new version of the quantity theory), it is essential to point out the important distinguishing features of the new quantity theory vis-à-vis older versions.[Kotwal, 1987,p. 48].

1) One of the major differences observed between the old and the new version of the quantity theory of money is that the modern quantity theory of money is expressed as a theory of demand for money or as a theory of assets choice, which is expressed by optimum relation between the stock of money and the stock of other assets, while the old quantity theory is explained as a theory of price level or money income. The older quantity theory of money dealt with the stock of money and its flow, in the form of expenditure.
2) Unlike the old version, according to the quantity theory of the monetarists, velocity is not regarded as numerically constant. In fact, Milton Friedman considered velocity as a stable function of few variables such as income, wealth, rate of interest, expected changes in the price level and so on. The stability of velocity mainly arises from the fact that the changes in the variables are considered to be so small that they do not fully counteract the effect in the supply of money.
3) The old quantity theory argued that output is always at the level of full employment. But this may not be in the case of the new quantity theory of money. According to the monetarist, the increase in money supply may not result in a rise of prices, but also output and employment depending upon the degree of stock prevailing in the economy.
4) Monetarists believe that the crucial factors determining money supply have not any connection with factors influencing the demand for money. They are largely based on the assumption that nominal money supply is determined

exogenously, i.e., by the monetary authorities while the real quantity of money is determined by the people.

Milton Friedman and a number of his associates and followers undertook researches pertaining to the role of money in influencing economic activity. The main findings of these studies may be outlined as follows.

> *(1) The long and large price movements are traceable to monetary factors. In Milton Friedman's view, the relationship between changes in the stock of money per unit of output and changes in the price level, is an outstanding specimen of empirical regularity in economics. Inflation, therefore, is always and every where a monetary phenomenon. From this, however, it should not be inferred that the relationship between money and price is straight, rigid and mechanical....(4) There are long and variable time-lags with regard to the effects of changes in the rate of growth of money supply on price and output. The lag varies from 16 to 24 months in relation to peaks and from 6 to 12 months in relation to troughs [Kotwal, 1987,p. 49-50].*

The monetary impulses that consist of changes in the rate of growth of money stock constitute a major force behind cyclical changes in the level of prices, output and employment.

As pointed out earlier, the relationship between money and price is not straight, rigid and mechanical. Changes in output, and changes in the amount of money that the public desires to hold relative to its income, are the channel through which the relation between money supply and price (inflation) is explained (Friedman, 1969).

Unless changes in output are accompanied by changes in the stock of money, clearly one would expect a rise or a fall in prices of output. The amount of money that the public desires to hold depends on the cost of holding money. The cost of holding cash balance in turn depends on the rate of interest that can be earned from alternative assets and the ratio of changes of prices (Friedman, 1969, p.174).The demand for money depends on the following three factors :

a) the total wealth to be held in various forms (i.e., budget restraint)

b) the price of and return on this form of wealth and alternative forms; and

c) the taste and preference of wealth owning units

According to Friedman , the mechanism through which money supply transmits in to inflation may be summarized as follows when excess supply of money occurs in the money market (let us assume that money supply is increased through open market operation by central bank), the people will find themselves with more cash and less of other assets . As a consequence of this ,

> .... *Formally the situation represents equilibrium because people exchange securities for cash voluntarily owing to favorable price offers , but this equilibrium is short lived . Sonner or later , people with redundant cash try to purchase different types of financial assets involving differing of risks and returns. This raises their prices, which alternatively means a fall in the rates of interest. The process stimulates investment in durable producer goods. The expansionary effect is not only confined to capital goods, but also extends to durable consumption goods[Kotwal, 1987,p.50].*

The monetarist model of inflation can be described with the help of the familiar quantity of exchange identity, MV=PY, This may be written (using log) as follows:

$$m + v = p + y \quad \text{..........} \quad (1)$$

Where:

$m = \frac{dM}{M}$ the rate of change of money supply

$v = \frac{dV}{V}$ the rate of change of velocity.

$p = \frac{dP}{P}$ the rate of change of price

$y = \frac{dY}{Y}$ = the rate of change of out put.

By incorporating a subscript t, which denotes the same time period in equation (1) We may rewrite it in the following forms:

$$P_t = m_t + v_t - y_t \quad \text{(2)}$$

Since the money supply is exogenosly determined we can convert the identity in to an equation such as:

$$P_t = mo,_t + v_t - y_t$$

It should be noted that we put mo_t instead of m_t to indicate that m_t is a policy determined variable. In the long run the monetarist model of inflation can be explained as :

$$P^l_t = a + m^L o,t \quad (3)$$

Where:

L = Stands for long period

a = constant, representing the net contribution of changes of v and y to price changes,

When we bring the effect of the lags on prices into the above model, the equation can be modified as follows:

$$P^L_t = a + m^L o, t\text{-}n \quad \text{(4)}$$

Where:

n = the average value of some lag distribution

The above equation represents a highly simplified version of the monetarists model of inflation. To give a complete picture of the monetarist theory of inflation, we should add an important hypothesis of endogenous expectation to the model. The expectation of people regarding prices, wages, interest rate etc. are not exogenous but are formed on the basis of variables endogenous to the economy. The process by which expectation is formed depends up on past behavior of people. In the course of expectation formation, immediate past experience gets greater weight than the more remote past.

Monetarist attributed inflation to purely monetary phenomena. Expansionary monetary and fiscal policies, such as government deficit financing, expansionists credit policies and expansionary exchange rate operation of central bank are the channels through which inflation originates in and is sustained [Barungi, 1997,p 3]

Kallon argues that unless and otherwise the monetary authorities ratify it with money supply, increases in inflationary process caused by non-monetary variables can not be sustainable:

> *This is so because the negative real balance effect that ensues from the rising price level would ultimately reduce aggregate demand thereby lowering the general price level. Thus demand pull and / or cost push factors should have no independent influence on the inflation rate in the long - run . Finally because inflation is a strictly monetary phenomenon, a given change in the money stock should generate an equi-proportionate inflation (deflation) after full adjustment suggesting that the sum of the coefficients of the lagged money terms* (ΣB_{1i}) *must be equal to unity [Kallon 1994,p. 210].*

"Secular inflation cannot persist without a corresponding increase in money supply over and above the growth in real output and it can not be controlled without limiting the expansion of money" [Taslim ,1982,p. 40]

2.1.2 The Structuralist Explanation of Inflation

The emergence of the structuralist explanation of inflation is associated with the inflationary situation of the Latian America countries in post war period. It has emerged in the late 1950s and early 1960s. The hypotheses were originally developed by most prominent economists; Juan Moyola, Osvaldo Sunkel, and Raul Pre Bisch. The approach has evolved in reaction to the ultra-orthodox policies of curing inflation and economic underdevelopment arising from the newly emerging school of monetarism. Structrualism, therefore, right from the very outset, got engaged in acute controversy with monetarism. In connection with the controversy, structuralist have added new dimensions and refinements to its arguments [Kotwal, 1987,p. 106-107].

According to the structuralists view, inflation is caused because of the structural limitations or bottlenecks inherent in the socioeconomic system and cumulative inflationary processes. The structural bottlenecks are manifested through the inability of some sectors of an economy to respond to the changes in the level and composition of aggregate demand. On the other hand, the cumulative inflationary pressures arise from price distortions and misallocation of investment funds.

The basic structural bottlenecks commonly observed in developing countries are usually taken to be:-

1) The stagnation of food supply in the face of expanding demand. (i.e. agricultural bottleneck)
2) Instability and inelasticity in the earnings from exports (i.e. foreign trade bottleneck)
3) Constraints in the supply of social overhead capital and skilled labour, and
4) Structural deficiencies in the tax system.

Agricultural bottleneck is often regarded as a consequence of institutional defects. In most less developed Countries (LDCs) a rapidly growing demand for food, which arises from a fast growth rate of the population, has not been accompanied by a corresponding rise in food production. This situation is more often attached to the backward sector of the economy, i.e., agriculture, which is dominated by either subsistence farmers or absentee land lords, none of whom respond to market signals. Pressures of increased demand is then manifested not in increase in production but increasing price of food -stuff [Taslim, 1982,p.26] .

In most developing countries, export receipts tends to increase slowly while import demand grows rapidly. This often leads to import or foreign exchange bottleneck and persistent balance of payment deficit. To tackle this problem, the government is forced to take remedial measures. As a short-term cure of the balance of payment problem, import controls could be imposed and currency devalued. The introduction of import controls will increase the price of the controlled items in the domestic market. Whether or not it eases balance of payments crisis, devaluation will almost certainly impose an upward push to domestic prices of importable goods if unaccompanied by trade liberalization. [Taslim, 1982,p.26-27]

In short, structuralists ascribe inflation to the structural rigidities of an economy , i.e., inelastic food supply, foreign exchange constraints and budget constraints including skilled man power that prevailed in the less developed countries [Burungi, 1997, Kotwal, 1987].

In contrast to the structuralists, monetarists contend that inflation and stagnation have been produced not by an inadequate structure, but by erroneous policies such as price control, foreign trade, and fiscal policies, i.e., the fault lies not in the structure, but the value taken by the policy variable [Lioi, 1974].

The causes of inflation, structural and cumulative, need to be supported by a propagation mechanism for inflation to surface. The mechanism can be illustrated as follows:

> *Firstly, there is a continuous struggle among the different economic groups to improve their share in total income. This manifests itself in the struggle between wage-earners and profit-earners. Secondly there is the struggle between the private and public sector to increase their share of real resources. This works through the level of the government expenditure and revenues and the way the government deficit is financed [Lioi, 1974,p. 7].*

If the government finances its deficit by borrowing from the central bank, which is commonly practiced in the absence of well developed financial market, the money supply will increase to an extent of giving the spiral a twist. To the structuralist, therefore, budget deficit and the consequent increase in money supply is not autonomous.

Barungi explained briefly the structuralists view regarding the mechanism by which inflation is manifested as .

> *To the structuralist, however, the increase in the supply of money is a permissive factor that allows the inflationary spiral to manifest itself and becomes cumulative. It is a symptom of the structural rigidities that give rise to inflation itself. An increase in the money supply is thus a necessary condition for the rise in the overall level of prices but it is not a sufficient condition [Barungi, 1997,*p *.3]*

Inflation, therefore, arises due to structural factors such as food prices and wage or exchange rate changes, and sustained by propagating mechanism including increase in money supply [Barungi, 1997].

Structuralists further contend that because of the underlying structural rigidities an increase in money supply is not likely to get a production response that is commensurate with credit expansion. This results in inflation [Takle Birhan, 1990,p.14]. From this the structuralist generally argued that money supply's coefficient, even if it could be highly significant to the model of inflation, is just an indication but can not be the sole causes of inflation.

Conversely to the monetarist, without monetary accommodation, the inflationary process stalls. "Cost push factors such as food price, wages or exchange rate change can only cause a shift in the price level but can not explain how it translates into sustained inflation" [Chibber, 1989,p.3].

According to the monetarist, so as to control inflation, money supply should be controlled. But for the structuralist, to control inflation one should overcome the structural rigidities prevailing in the economy.

2.1.3. Repressed Inflation

According to the working of the market mechanism, inflation can be categorized as open or repressed inflation. The former prevails in market led economies whereas the latter is often observed in highly regulated economies. Repressed inflation refers to a situation in which an upward movement of the price level would come into view if maximum limits fixed by law for prices, wages, rents and the like were removed. It manifested itself through factors such as long queues of shoppers, sale at controlled price, black market and government subsidies.

In a situation where there is price control, the recorded inflation often greatly under estimates the true (unrecorded) inflation in the economy. The existence of such kind of circumstance can bring at least two effects:

1. Inflation spill-over into parallel market
2. It may bring about unmet demand which appears in the form of usually large monetary balance (monetary overhang)

Exchange rate premium is more often taken as a systematic basis to indicate the existence of true inflation because data on unrecorded inflation in parallel markets are not available systematically. However, it can not fully indicate the unrecorded inflation, because the exchange premium reflects a greater risk on illegal exchange transaction [Chibber,1991].

Monetary overhang is measured by (m/p)-(m/pu) where pu is the true price level and p is the observed price level [Chibber, 1991]. It is not an easy task to measure the extent to which monetary overhang is exhibited in an economy. However one can do this in two ways: as a ratio of real money supply to real GDP and as a ratio of real money supply to individual components of real GDP such as consumption. The existence of a parallel market implies that the measure of money supply to official GDP may be misleading. This can be corrected by adding estimates of the parallel market output to official GDP [Chibber, 1991].

In many centrally planned economies, due to the existence of a system of price control, changes in money supply are not accompanied by a change in domestic price. This may lead to repressed market demand. To say it differently, the prices sufficiently lag behind money growth so as to create excess nominal demand for goods. Consequently, the income is not transformed into consumption, the consumers may be forced to save or to hold their income (money) in the form of quasi-money (Feltenstein and ha 1993).

A repressed market demand most likely indicates the existence of a repressed inflation, which is not expected to prevail in the absence of price control. As a result, two categories of price (inflation) come in to view: official (observed) or recorded and true (unobserved) or unrecorded.

The studies that have been undertaken by Fltenstein and Ha.J, on China and three transition economies (i.e. Poland, Romania, and Czechoslovakia) are the few notable works on this area. The result of the studies show that, except in Czechoslovakia, there had been repressed inflation in China, Romania and Poland. That is to say, significant differences were observed between true (unrecorded) and official (recorded) inflation.

2.2 Empirical Review

Several empirical works have been done across developed and developing countries to test the monetarists and structuralist explanation of inflation. It is not possible to outline all of them here. So in this study, we will try to mention precisely and briefly some of the works that are considered to be important,.

The works of Abebayhu (1989), London (1989), Kallons (1994), Saini (1982), Taslim (1982) and Hossin (1985) Moser(1995), Odesokum(1995) , Aksoy(1982) Barunyg (1997), Kwakye and Sowa (1993) and Chow (1987) are among notable empirical researches undertaken based on the monetarist and structuralist model of inflation in the developing countries of Africa and Asia.

To identify the determinants of inflation in six African countries, Abebayehu used monetarist model of inflation. The model adequately explains the inflationary process in the countries examined. In most of these African countries,(though factors influencing the inflation process differ from country to country) money supply, real income and world inflation rates are found to be important variables in explaining the process. The sum cofficeints of all the explantory variables have the correct sign and significantly differ from zero at the five percent level of significance. But foreign interest rate and exchange rate were insignificant. London (1989) also conducted a study by incorporating the official and parallel exchange rate into the model. His empirical finding indicates that the monetarist model of inflation appears to hold (the coefficient of money supply is around one) when tested in cross -section equations covering several countries and averaged over years. But in general , this does not hold for individual countries in time series analysis or in cross- section studies covering short time periods. "In fact , the result of the analysis strongly suggests that factors other than the rate of monetary expansion have played an important role in determining short -run inflation trends in Africa" [London; 1989,p.87].

Kallon (1994), based on both a reduced form equation which is derived from a simple open-economy IS-LM model and a monetarist model, in his econometric analysis of inflation in Sieraleone , come up with an empirical finding that money supply affects inflation rate proportionately in the long-run but not in the short-run. According to the result of Kallons, world inflation and inflationary expectation have been identified as important variables affecting inflation.

Many studies that had been done on highly inflationary Latin American countries support the monetarist explanation of inflation. But when the monetarist's explanation is tested using data for countries with moderate inflation and the results have been far from conclusive (Saini 1982,p. 871)

Based on the augmented monetarist equation, Saini (1982) undertook a study on the monetarist explanation of inflation in six Asian countries. The inflation rats of these countries range from low to high. The model includes variables such as money supply, income, and expected price and import prices. Saini's estimated regression results do not heavily support the monetarists explanation of inflation in the six Asian countries. She pointed out that about 50% of the variation in prices can be explained by monetarist model in five out of six countries. The growth of money income also become significant only in one of the six countries.

Taslim (1982) tested the monetarist and structualist model of inflation for Bangladesh, in his study of reexamination of the structuralist-monetarist controversy in Bangladesh. In the first regression equation, the lagged impacts of money supply(m_{-1}) is much stronger than the current impact. The coefficient of M_{-1} is significant at 5% level but M becomes insignificant even at 10% level. In the second regression M_{-1} could capture the wrong signs and all the monetarist variables such as money supply, money income and acceleration of inflation become insignificant. In the third regression when the wage variable (w) is introduced, the coefficient of all other variables lose their significance. But the coefficient of W is significant at 1% level and the explanatory power improve considerably.

Hossian (1985) attempted to modify and extend Cagan's (1956) inflation model to make it more appropriate for quantitative analysis of inflation in developing countries. He used this modified version to examine the inflationary process of eight developing ESCAP (Economic and Social Commission of Asia and the Pacific) countries. The results of the model showed that the model works relatively well for Bangladesh, Pakistan, India and Malaysia. But it performs badly for Sir- Lanka, Thailand, Korea and Philippines. The model encompasses six variables: nominal money growth, the real cash balance, world inflation, real income, price expectation and the acceleration of inflation. Its estimated regression results showed that real cash balance, world inflation and real income have a significant impact on inflation but the effect of nominal money growth is negligible in most of the countries.

Chow (1987) undertook a study to investigate how the ratio of money supply to GDP(M/Y) explain the process of price level in China for the period 1952-1983 . He found out that (M/Y) significantly explain the process though the elasticity is below unit , suggesting that velocity is not constant.

Moser (1995) pursued a study to trace the major determinants of inflation in Nigeria during 1963-1993. The model that he used incorporates both the monetary and structural variables such as broad money supply, real income, exchange rate and rain fall. The estimated result of the regression verified that the variables in the model are statistically significant and could explain 69% of the variation in inflation. Besides, the findings of the error correction model also provide an evidence that money supply, devaluation of the currency (Naira) and rain fall are the key determinants of inflation in the country.

Odesokun (1995) conducted a study to identify the causes of inflation in sub-Sahara African countries from 1971 to 1990. The findings of the study suggest that monetary growth, the rate of growth domestic currency depreciation, the expectation of inflation, per capita food production and economic growth are identified as important determinants of inflation in Sub-Sharan African countries. From this we can deduce that both structural and monetarist variables significantly affect the inflation process in the country. The study is not able to detect the expected impact of fiscal deficit, foreign inflation, and growth of import price on the domestic inflation rate.

Taslim (1982) tried to examine the structuralist model of inflation in Bangladesh. To this end, he considered both the structuralist and monetarist variables in his analysis. The model consists of agricultural and foreign exchange bottleneck proxies, wage, and monentary growth. Out of these two proxies of foreign exchange bottlenecke, (i.e. rate of depreciation of currency) and agricultural bottlenecke (i.e. the ratio of total food import to total food availability) and monetary growth are distinguished as essential factors in the inflationary process of the country. But, including wage all other variables are insignificant in most cases of the regression analysis. Out of a series regression in about ¾ ,the variables are able to explain more than 75% of the variation in inflation. The study ends up with the rejection of the structural position that money supply has no autonomous influence on the rate of inflation.

Among others, Aksoy's (1982) empirical analysis on structuralist approach to Turkish inflation tried to capture the relative sectoral difference in responses and the effect of relative price changes on inflation rate. The results of the study indicate that the non-agricultural sector is more responsive to changes in money supply than that of the agricultural sector, even though this may not entirely be attributed to the structural factors. However, Aksoy's study on the Turkish inflation completely corroborated with the structuralist explanation of inflation in the developing countries.

According to Barungi's results, the short-run changes in the value of nominal money supply have significant and positive effects on the consumer price index. By contrast, the real exchange rate has negative sign, indicating that a real appreciation of the domestic currency is not inflationary in the short-term. As a long-run phenomena, however, there is not much significant difference between the impact of out put and the impact of money.

The OLS regression result of Sowa and Kwakye indicates that supply constraint is the strongest force behind Ghana's inflationary push. For instance a 1percent slump in production, keeping all other variables constant, leads to a 1.17 percent increase in the rate of inflation. It is also further observed that lag effects of slumps in production, though significant, are not very pronounced. Monetary pressures are the next strongest forces behind Ghana's inflation. One year's lag in monetary expansion appear to have a greater effect on prices than two years lag. The exchange rate devaluations appears to have significant effect on inflation whereas price expectation, though significant, carries the wrong sign and seem to exert little pressure on inflation. Having said this much about the developing countries, we now turn to the case of Ethiopia.

Tekel Birhan (1990) by considering variables such as broad money supply, import unit value index, government tax revenue, real GDP, annual rain fall and velocity of money in his descriptive analysis, identified the growth of money supply as an important causes of inflation in the economy .He also revealed that the occurrence of severe drought in the country has also contributed to the acceleration of inflationary pressure with some lags. The method, i.e., the descriptive way of analysis he employed is not enough to identify the long run relationship among variables. The study covers the period 1973/74-1989/90.

Mistry (1991)clearly indicates that the cost of food, housing, and energy are critical determinants of inflation in the country. Transport costs and (bottlenecks) also play a key role in determining retail prices.

Miriam (1996) looked at the relationship between money supply and inflation based on quarterly data for the period 1991 to 1995. She pointed out that the relationship is found to be extremely weak, except in few instances .

Shibeshi (1994) tried to examine the relation between fiscal deficit, money supply, and inflation. To this end he regressed CPI(Addis Ababa consumer price index) on its one year lagged value and fiscal deficit lagged similarly . The result of the study showed that the lagged fiscal deficit became insignificant while lagged value of CPI is significant.

Semu's study (1994) is the other empirical work which was designed to identify the interaction between government deficit, money supply and inflation during 1967-1992. To analyse the inflation situation in the country he constructed a model which consists of explanatory variables such as money supply, income, inflation expectation and real money supply.

The estimated regression result tells us that the monetarist model fails to explain the inflation situation in the country and it is found out that money growth variable is statistically insignificant and its coefficient takes the wrong sign

Among other things, the thesis has failed to encompass the following points

- To incorporate the lag of some important variables in the model
- To employ a method that can help us understand the time series properties of the variables.

A study which was undertaken by World Bank (1996) based on quarterly data for the period 1966-1995 provide strong evidence that money supply and lagged values of prices (and especially the first lag) are significant determinates of current prices (both results are significant at the 1 percent level). Particularly the first lag of money supply turned out to be positive and highly significant. The study further investigated that rainfall is a highly statistically significant factor in affecting consumer prices.

Ministry of Planning and Economic Development (MOPED, 1994) attempted to examine the monetarist model of inflation in Ethiopia for the period 1973/74 - 1992/93. Its OLS regression result indicates that the contemporaneous and one year lagged money supply do not affect prices. Their sign is as expected but they are too small and are not statistically significant. But, output, i.e, real GDP has the expected sign and it is statistically highly significant.

Zewdue (1997), has also made an analysis using both augmented and structural model of inflation in his study. He took the period 1967-1994 for the analysis. The estimated regression result of the augmented long-run model shows that, particularly, real income has statistically meaningful long-run adverse effect on the inflationary process of the country, but the impact of broad money supply becomes relatively minimum, (i.e, 0.095 coefficient) though it is statistically significant. From this we can infer that the monetary instrument does not explain the inflationary process in the country in a way the monetarists explain it.

Broad money supply was found to be statistically significant only in long-run static model of inflation whereas real income and import price index became significant both in long run static model and short run dynamic analysis of inflation .It however takes the wrong sign and becomes statistically insignificant in the short run. The monetarist model of inflation can explain to the maximum of 67% of the variation in the inflationary pressure in the country.

Zewdue has conducted further analysis by inserting structural variables such as government deficit level, rain fall and real effective exchange rate in the augmented monetarist equation (model).The result of the study shows that the real income variable, import price index and the structural variable-government deficit-and the impulse dummy became statistically significant in the long-run model. But all the other variables in the model are insignificant out of which two variables (i.e, rain fall and expected inflation) took wrong signs. The variables can explaine 60% of the variation in inflation.

The empirical analysis indicated that in the short-run some structural factors such as rain fall, government deficit and real exchange rate are equally or even more important determinants of inflation in the country. Moreover, Zewdue also undertook a sectoral analysis of inflation for the agricultural and non-agricultural sectors.

The result of the study revealed the existence of sectoral difference in response to change in some macrovariables. For instance while the non-agricultural sector responds to changes in money supply, the agricultural sector remains passive in the short-run. While the former is responsive to changes in price expectation, the latter does not respond. But both sectors react to changes in real income.

Studies undertaken thus far attempted to identify the determinants of inflation in Ethiopia. All the studies did not employ recent techniques of co-integration and error correction model, except the works of Zewedu. Zewedu's study looked at the dynamics of inflationary process in the country using 28 observations (i.e., for the period 1967-1994). This study, besides identifying the main determinants of inflation, will try to find out the causes of low inflation in the country for the period 1962 to 1997(i.e., 36 observations).

CHAPTER THREE

MODEL SPECIFICATION DATA AND ESTIMATION OF RESULTS

3.1 Model to be Estimated

In the preceding section, we have tried to assess the theoretical and empirical works with regard to the monetarist and structuralist explanation of inflation. To test how these theories explain the inflationary situation in Ethiopia we adopt a model which incorporates a widely used monetarist and structural variables . The model will be as follows

$P_t = b_o + b_1\, M2_t + b_2 Y_t + b_3\, PE_t + b_4\, PM_t + b_5 W_t + b_6\, REER_t + b_7\, GDFN_t + b_8 F_t + b_9$ $(M2/GDP)\, t + U_t$ .... (1)

Where :-

P_t : inflation

Y_t = real income (GDP)

$M2_t$ = money supply (broad money)

PE = Price expectation (noted by lagged inflation)

PM_t = import unit value index.

W_t = world inflation

$REER_t$ = Real effective exchange rate

$GDFN_t$ = Government deficit level as a ratio of GDP

F_t = Pre capital food production

U_t= Error term

M2/GDP = broad money supply over GDP

All these variables are in log forms. This long run model of inflation is expected to vary positively with all variables except per capita food production and real GDP.

When we allow some lags on the explanatory variables, we can express the model in a general auto-regressive form as follows.

$$Pt = b_o + \sum_{i=0}^{K} bi_1\, M2_{t-i} + \sum_{i=0}^{K} b_{2i}\, Y_{t-i} \sum_{i=1}^{K} b_{3i}\, PE_{t-i} + \sum_{i=0}^{K} b_{4i}\, PM_{t-i} + \sum_{i=0}^{K} b_{5i}\, W_t + \sum_{i=0}^{K}$$

$$b_{6i}\, REER_{t-i} + \sum_{i=0}^{K} b_{7i} GDFN_{t-i} + \sum_{i=0}^{K} b_{8i}\, F_{t-i} + \sum_{i=0}^{K} b_{9i}\, (M2/GDP)$$

$$_{t-i} + U_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

If the variables in equation (2) are co-integrated, an error correction model presents the most efficient estimation. We there fore, reparameterize equation (2) into an error correction forms as :

$$\Delta P = B_o + \sum_{i=0}^{K} B_{1i}\, \Delta\, M2_{t-i} + \sum_{i=0}^{K} B_{2i}\, \Delta Y_{t-i} + \sum_{i=0}^{K} B_{3i}\, \Delta PE_{t-i} + \sum_{i=0}^{K} B_{4i}\, \Delta PM$$

$$_{t-i} + \sum_{i=0}^{K} B_{5i} \Delta W_{t-i} + \sum_{i=0}^{K} B_{6i} \Delta REER_{t-i} + \sum_{i=0}^{K} b_{7i} \Delta GDFN_{t-i} + \sum_{i=0}^{K} B_{8i} \Delta F_{t-i} + \sum_{i=0}^{K} B_{9i}\, \Delta$$

$$(M2/GDP)_{t-i} + ECM_{t\,i} + U_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(3)$$

ECM_{t-1} = The error correction factor.

U_t = is a serially uncorrelated disturbance term.

To be clear with the model, we should clearly define the variable

- We use the Addis Ababa retail price index to calculate the inflation rate in the country .
- real income (GDP) is taken from GDP measured at 1980 constant factor cost. We incorporate this variable in the model since it is theoretically argued that economic growth reduce the inflationary pressure in a country.
- We consider lagged value of the dependent variable (inflation) as a proxy for price expectation (cost of holding money) .
- per capita food production is calculated by taking major food production (i.e. cereals, oil seeds, pulses) and population of the country. It is included in the model for reason that it is expected to play a dampening role in the inflationary process of a country.
- import price index captures the imported inflation to the country .
- The inflationary impact of a deficit level depends on the way it is financed. To look at this effect we included the ratio of deficit level to GDP in our model.
- With regard to money supply we use broad money supply to examine its effect on inflation.
- Inflation can also be affected by the degree of monetization of economy. To see how it can affect the inflation process of a country, we bring the ratio of broad money supply to GDP into the model.
- Devaluation or depreciation of a currency can have significant impact on the inflationary situation of a country. This can take place at a time when the country involves in the international trade (i.e import and export of goods and services). As

it is known Ethiopia exchange rate was fixed for a long period of time ; so to see the real effect of the exchange rate on inflation we calculated the real effective exchange rate based on the following formulas.

$$REER = E \frac{WPIw}{CPId}$$

Where

E= nominal exchange rate (birr/ foreign currency)

WPIw= the whole sale price index of 10 major trading partner of the country (i.e Italy, Netherlands, UK, USA, Japan, France, Germany , China, Kenya and Sudi Arebia).

CPI_d= Addis Ababa retai1 price index.

Addis Ababa retail price index (AARPI) has been used as the only measure of inflation in the country for about the last three decades. Since there is no price index at the country level, the Addis Ababa index comes out as the only indicator of inflation for the country. The general retail price index of Addis built up by individual components such as food item. Household items, clothing, transportation, medical care, personal care, reading and recreation, and other goods and service

Although it has been the only measure of inflation in the country, the Addis Ababa retail price index was fraught with various flaws and limitations . These short comings are associated with problems of coverage and classification and sheer obsolescence to represent current consumption pattern in the country (MEDaC, 1999, p. 52). Mistry (1991, p. 56-57) outlined the drawbacks of the index as follows.

> *a)The base year has not been changed or updated to reflect current consumption patterns and realities ; (b) the composition, weights and number of items measures has remained exactly the same for 28 years during which there has been substantial erosion in standards of living, composition of households and in consumption items as well as patterns; (c) quality changes in items have not been accounted for in price measurements nor have new items, which have emerged since 1963 and which now account for significant aspects of consumption;(d) there are very wide interregional differences in prices for the same item which makes the AARPI unrepresentative form the economy wide perspective ; (e) rural household consumption is totally different from urban household consumption in genera and from Addis in particular yet it accounts for about half of total consumption in the economy (though the rural population accounts for 90% of the population).*

Because of the above mentioned facts, the adequacy of AARPI as a representative measure of inflation is seriously doubted. Nonetheless the AARPI is the only available index and is therefore indispensable in any assessment of inflation, however weak that assessment might be because of inadequate measurement.

3.2 Data Source

This study covers the period 1962-1997. For the purpose of this study, the necessary data are collected from the National Banks of Ethiopia,(NBE), Ministry of Finance, Ministry of Economic development and Cooperation, (MEDaC),Central Statistical Authority (CSA) International Financial Statistics (IFS), International Monetary Fund (IMF), Food Aid Organization (FAO), United Nation (UN) and World Bank publication.

3.3 Estimation Techniques

In order to estimate a more specific relationship between inflation and its determinates we first carry out a test to ensure that the data series are stationary or non stationary (random walk). If the data series are found to be non-stationary most of the classical assumptions for econometric estimation and forecasting are violated. In such instances econometric results may not be ideal for policy making because regressing one non-stationary (random walk) variable against other random walk variable can give us spurious regression results. This is due to the fact that a random walk does not have a constant means and finite variance, which implies OLS will not give consistent estimator. [Sowa, 1996,p.9].

Some of the method available to evaluate the time series characteristics of variables are Dickey Fuller (DF) and Augmented Dickey Fuller (ADF) tests. These tests are basically required to ascertain the number of times a variable has to be differenced (order of integration) to arrive at stationary. A series is said to be integrated of order K if it becomes stationarity after differencing it K times. Economic variables that are stationary are called I (0) series and that have to be differenced once obtain stationary is called I(1) series (see kennedy, 1992) . In this study we use ADF to identify the existence of the unit root and the order of integration of a variable for reasons that "if a simple AR(1) DF model is used when in fact Y_t follows an AR(p) process , then the error term will be a autocorrelated to compensate for the mis-specification of the dynamic structure of Y_t. Autocorrelated errors will invalidate the use of the DF distributions, which are based on the assumptions that U_t is white - noise" [Harris, 1995,p.34] .ADF test can be written as follows:

$$\Delta Y_t = \psi^* Y_{t-1} + \sum_{i=1}^{p-1} \psi^* \Delta Y_{t-1} + \mu + r_t + U_t$$

Here we have to realize that there is a possibility to regress a non stationary variables against other non stationary variables in levels, iff they are co- integrated. This will help us to utilize the long run information embodied in the integrated variables.

The co-integration test will be carried out using Engle - Granger two step procedure. The procedure is done as follows . First, we will run a bivariate OLS regression in level and then we save the residual and test whether it is unit root based on ADF test. If the error term is stationary, then we say that the integrated variables are co-integrated.

Once it is asserted that the variables are co-integrated the error term of this relationship will be used to construct a dynamic error correction model which captures the long- run as well us short - run dynamics of the models. This enables us to analyze the impulse response of inflation to a stimulus in the explanatory variables in a dynamic setting [Moser, 1995,p. 280].

We employed Augmented Dickey Fulley (ADF) test to assess the time series properties of the variables considered in this study . As shown in table 4 all the variables are stationary at first difference.

As it is stated above for co-integration to exist the residual has to be integrated of order zero (stationary). Table 5 shows that the residuals for the model is found to be stationary I(o).

Table 4: Augmented Dickey fuller test for Unit Root

		Test on levels			Test on their first difference		
		0	1	2	0	1	2
LP	C	-0.1	-0.2	0.01	-3.74**	-3.45*	-2.3
	TC	-1.95	-2.9	-2.7	-3.70**	-3.40*	-2.3
LY	C	-0.23	0.25	-0.33	-5.23**	-6.01**	-2.8
	TC	-2.63	-3.33	-2.29	-5.1**	-5.9**	-2.63
LM2	C	0.36	0.22	0.31	-4.53**	-3.53*	-3.3*
	TC	-2.85	-3.25	-3.2	-4.50**	-3.5	-3.3
LF	C	-2.1	-2.0	-1.6	-5.64**	-5.00**	-3.7**
	TC	-2.4	-2.96	-2.34	-5.7**	-5.0**	-3.7*
LGDFN	C	-2.8	-2.0	-2.1	-5.7**	-5.1**	-3.1*
	TC	-3.1	-1.6	-1.83	5.74**	-5.6**	-3.2
LREER	C	-0.74	-1.1	0.74	-4.76**	-4.14**	-2.7
	TC	-0.62	-0.8	-0.1	-5.1**	-4.7**	-3.2
LPM	C	-1.4	-1.41	-1.38	-3.22*	-3.05	-2.33
	TC	-0.49	-1.22	-0.9	-3.42	-3.2	-2.5
LW	C	2.2	2.1	0.83	-5.72**	-2.62	-1.59
	TC	-2.3	-2.28	-2.24	-4.86**	-2.4	-1.6
LPE	C	0.2	-0.21	-0.1	-3.9**	-3.5*	-2.3
	TC	-1.7	-2.4	-2.25	-3.97**	-3.5	-2.3
LM2/GDP	C	0.81	-0.80	-0.85	-5.51**	-2.87	-2.81
	TC	-1.29	-1.3	-2.1	-5.49**	-2.88	-2.82

Note :- TC and C indicate that the test is carried out with and without trend respectively.
Critical value: with trend 5% = -3.6 1% = - 4.3
: without trend 5% = -2.956 1 % = - 3.65
**,* denote level of significance at 1% and 5% respectively

Table 5: Co- integration test, ADF

Residual	Equation	lag	
		0	1
ECM	1	-4.2**	-3.68**
ECM1	2	-4.7**	-4.1**

3.4 Estimation of Results

Error- Correction Model

In an attempt to arrive at a more parsimonious equation, variables with low t-statistics in the over-parameterized regression were dropped using Hendry's general to specific approach. The regression results of the simplified error correction model with a relatively higher R^2 and economically interpretable variables are presented in table 6. The diagnostic test of the model exhibit that there is no autocorrelation, heteroscdasticity, functional form and normality problems in the model. The F-Statistic of the model indicates that the explanatory variables are jointly significant. All the variables capture theoretically postulated sign.

Among the variables one year lagged inflation showed very significant coefficient. So the behavior of the variable comply with the theory of inflation. Theoretically it is argued that, the process of formation of prices expectation is based on past behavior. In this process of expectation formation, immediate past experience gets greater weight than the more remote past. Inflation expectation thus are based on the actual past rate of inflation. (Kotwal, 1987, p. 52).

Similarly real income (GDP) plays substantial role in the inflationary spiral of the country. Its result is statistically very significant. "This suggest that economic growth reduce inflation either by reducing the gap between the growth of nominal money supply and the growth of real money demand (in line with the idea emanating from the monetary approach to inflation analysis) or, more likely by increasing the domestic supply of goods and services (in line with the supply side approach) or perhaps both (Odedokun 1995,p. 448). The latter, the supply approach will most likely explain the fact in the Ethiopian context-agrarian based economy. This means economic growth is very much depend on the performance of the agricultural sector.

Coefficient of money supply is found to be statistically significant. Generally the regression result does not support the monetarist assertion that a percentage change in the money supply leads to an equipropartinate change in inflation.

The real effective exchange rate and import index value provide statistically insignificant result. But the implication behind this result is not clearly identified. perhaps one possible explanation is that since most of the people mainly consume domestically produced material (i.e., they are not import dependent) the impact of imported inflation and depreciation or appreciation of a currency on inflation may not be seen.

Finally the lagged error correction term is significant at 5% level of significance and the speed of adjustment is about 58% from the actual inflation in the previous years to equilibrium (long run) inflation.

Table 6: Error Correction Model of Equation One

Dependent Variable = DLP= inflation	
Regressors	*Coefficients*
Constant	-0.018(-0.80)
DLP (-1)	0.78(4.4)***
DLM2	0.37(2.4)**
DLY	0.70(3.8)***
DLPM (-2)	0.16(1.5)
DLREER (-2)	0.10(1.5)
ECM (-1)	-0.58(-2.2)**
R^2	0.70
adj. R^2	0.60
F- Statistics	F(7, 24) = 8.6
Auto correlation (AR)	F(2,21) = 0.69
Heteroscdasticity (ARCH)	F(1,21) = 0.15
Function Form (RESET)	F(1,22) = 0.073
Normality	Chiy(2) = 0.86

Note : Figures in parentless are T- ratio ***, **, * denote significant at 1%, 5% and10% respectively. D denotes first difference.

In the second equation of the model we have tried to see the extent at which the degree of monetization of the economy, which could roughly be represented by the ratio of monetary base (M2) to GDP at current market price, can affect the inflationary spiral in the country. To this end we do regression analysis based on the equation that we constructed. The model passes the entire diagnostic test. The empirical results of the model exhibited very insignificant relation between the degree of monetization and inflation (See Table 7). Rather degree of monetization of the economy likely contribute to the existence of low inflation in the country. Mistry shares this point, in his analysis of inflation in Ethiopia. He further suggested that low inflation records is attributed to:

> *(i) tight fiscal management and budget control; (ii)vigorous revenue mobilization through a buoyant structure of taxes ; (iii)successful extraordinary revenue mobilization measures at items of crisis; (iv) continuous monetary deepening, i.e., an increasing ratio of broad money stock to GDP... with a steadily diminishing velocity of circulation and an increasing size of bank deposit and cash holdings by the private sector (both the private business community as well as households) which along with signorage, has provided non inflationary domestic financing to cover the fiscal deficit at a low cost: and ; (v) Private sector willingness to finance the public sector through the banking system in a non-inflationary manner (Mistry: 1991,p. 52).*

As shown in appendix 11 the monetary deepening has been continuously rising and reached to a peak 0.43 in 1991/1992. This implies that less than half of the annual production of goods and services goes through markets while the rest is generated and consumed at home. This mainly arises from the consumption pattern of rural households. As it is stated in the words of Mistry, " Rural households" spend " most on items which are largely self produced or subsistence goods (mainly food and fire wood) while coffee is self produced in confined regions " (Mistry , 1991,p.20) . This results in a high degree of insulation from inflation in rural area. According to Mistry's study , the average rural household produces (or barters on a non-cash basis) nearly two thirds of what it consumes and spends around 55% of its consumption expenditure on food . Hence " since a large part of rural incomes are" in kinds " their cash equivalents are often subject to considerable estimation error".

Manufactured items such as clothing, foot wear, households items, furnishings, toiletries (mainly soap) accounts for between 6-10% of rural household expenditure. So even for higher income rural household the degree of vulnerability to price rise in manufactured items is relatively low; much lower than in most African countries (Mistry, 1999,p. 20).

The insignificance of M2/GDP come about because a consistently rise of M2/ GDP tends to be offseted by continuously decline of velocity of money . Chow explains this fact as: "As long as an increase in (M/Y) is not completely offset by a proportion reduction in V, it will have a positive effect on p " (Chow , 1987,p. 321) . As it can be inferred from Table 8 in Ethiopia it more likely seems that velocity of money bounds to cancel the inflationary effect of (M2/ GDP). From this we can justify that a persistent reduction in velocity of money has significantly reduced the inflationary pressure in the country.

Friedman and other monetarists believe velocity of money to be almost constant in the long run. But this does not hold in the case of Ethiopia.

The result of the study indicates that in the short run per capita food production has statistically significant effect on the inflation process in the country. This is basically associated with rain feed nature of the agricultural sector. This implies that any reduction in rainfall below a certain level will greatly reduce the production of food. This in turn causes to a rise in price of food which constitutes 57 per cent of the weight of the consumer price index.

Table 7: Error Correction Mode of Equation Two

Dependent Variable = DLP= Inflation	
Regressors	*Coefficient*
Constant	-0.01(-0.463)
DLF(-1)	-0.08(-1.13)
DLF	-0.13(-2.1)**
DREER(-2)	0.18(2.1)**
DLP(-1)	0.99(3.14)***
ECM1(-1)	-0.78(-2.2)**
D(M2/GDP)(-2)	0.11(0.61)
R^2	0.50
adj. R^2	0.40
F- statistics	F(6,25)= 4.2
Autocorrelation	F(2,23)= 0.012
Function form	F(1,24) = 0.012
Normality	Chiy(2) = 0.93
Heteroscedasity	F(1,23) = 0.058

Note: Figures in Parenthesis are T- ratio . ***,**,* denote significance at 1% , 5% and 10% respectively. D denotes first difference.

Finally the lagged error correction term is significant at 5% level of significance and the speed of adjustment is about 78% form the actual inflation in the previous years to equilibrium (long - run) inflation.

An increased in food production (supply) has a dampening effect on inflation. In the past 18 years the country could get a large volume of food aid. The impact of this increasing aid on inflation should also be taken into account. (See Appendix 12).

As it is reported on appendix 12 real per capita consumption of the people consistently declined. This can indicate that the demand side is not likely to be the major driving force behind inflation (Mistry 1991). The substantial foreign financing with which the country partly covered its huge deficit could also avoid the inflationary pressure in the country. We should also consider the fact that in the Derge regime the government could impose on the population self- restrain on consumption. This could play a role in curbing the price level. Mistry does have a point to say on this ,"... household demand in Ethiopia has probably been over managed to the point where there is very little room left for further economic adjustment through even greater demand repression" (Mistry, 1991 ,p.30).

Apart from the factors outlined before, the technicalities construction of the index has to do with limitation of the indices for measuring inflation in Ethiopia.

Table 8: Growth rate of velocity of income

Year	Growth Rate		M2/GDP-GDP/M2
	M2/GDP	GDP / M2	
1966/67-1973/74	0.075	-0.062	0.013
1974/75-1990/91	0.093	-0.068	0.025
1991/92-1996/97	0.042	-0.074	-0.032

Source: Calculated from MEDaC and NBE

CHAPTER FOUR

CONCLUSION AND POLICY IMPLICATION

Ethiopia's economy has encountered with serious macro economic problems during most of the years under investigation. Stagnant growth of GDP, negative growth of per capital income, huge debt servicing persistent balance of payment and budget deficit and continuously rise money supply are among the various ways the problems revealed. However, under such circumstance, inflation did not go out of control in Ethiopia as it did in some Africa and Latin American countries. Rather it has been low as compared to other countries in the last three decades.

As measured by Addis Ababa retail price index (AARPI) the average inflation rate of Ethiopia was 7.1 percent during the period 1966/67 to 1996/97. The county has experienced average inflation rate of 2.8, 9.5 and 6.7 percent during the three regimes respectively for the period 1966/ 67 to 1996/97. The rate shifted upward in the Derge regime and a bit decline in this regime but the rate registered in both regime is higher than that of the imperial regime.

Having briefly discussed the overall economic and inflation situation of the country, a logical questions that we are supposed to raise in this study is what are the causes behind the inflationary situation in the country and are the means by which to manage inflation to a level that is not harmful to the economy. To give a precise answer to these question we have tried to identify a more specific relationship between inflation and its determinants by employing econometric techniques of co- integration and error correction mode. And then we interpreted and analyzed the result obtained from the regression analysis.

The findings of the study suggest that growth of GDP, per capita food production price expectation and money supply have significant impact in the inflationary process of the country.

Out of all the variables included in the model, price expectation is found to be strongest forces behind the inflationary situation in the country. Real income(GDP) is the next strongest forces behind Ethiopia's inflation. The study further indicate that money supply and per capita food production are also verified to be significant.

The coefficient of M2/ GDP (broad money over GDP) is very insignificant. This implies that the economy is not well monetized,, i.e., a great portion of the output produced in the economy does not go through the market or it is generated and consumed at home. This is particularly true in the agriculture sector of the economy which is largely dominated by the subsistence sector where producers still retain a large part of their output for their domestic consumption. This has significantly reduced the inflationary pressure in the country. Given all these, we can conclude the following:

1) Out of the variables in the model, one year-lagged inflation is much more significant.
2) Structural factors (supply side) such as real income and food production are also

the major determinates of inflation in the country.

3) The monetarist variable money supply is significant ,though the coefficient does not add up to unity as it is argued by monetarists.
4) As stated above the Ethiopian economy is not well monetized . The regression result of the study indicate that the low degree of monetization has partly detained the inflationary process in the country.
5) Generally, the country registered low inflation most of the years under study. Especially during the Derge regime this was achieved not as a result of good performance of the economy but because of adopting polices which suppressed demand and cost increase on industrial production. Direct price control, limitation of private sectors participation and wage freezes in the civil service were some of the policies used to repress inflation.

Having all these in mind, if the government has a low inflation target, it should adopt policy that can enhance the real income (GDP) of the country. So due attention should be given to the agriculture sector. Particularly in the short run, the government is supposed to emphasis on especial policy areas that can boost food production. To do so the government is required to avoid the structural rigidities prevailing in the sector. In this instance, the government is expected to prepare conducive environment that enable the farmer to get modern farm techniques and agriculture inputs, and extension service. And equipping the sector with irrigation and other agricultural mechanization system.

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Appendix 1: Growth rate of GDP (at constant factor cost)

Year	GDP	GDPa	GDPi	GDPs
1963/64	4.8	2.3	10.4	9.6
1964/65	6.8	3.9	9.3	14.0
1965/66	4.0	0.8	13.0	8.0
1966/67	4.1	3.2	10.4	3.2
1967/68	3.7	0.9	5.9	9.5
1968/69	4.0	2.1	6.3	7.2
1969/70	3.6	2.3	2.7	7.0
1970/71	4.1	2.0	8.9	6.0
1971/72	4.5	3.5	4.4	6.6
1972/73	2.5	0.7	3.2	5.7
1973/74	1.4	-0.6	-0.7	6.1
1974/75	-0.01	-1.8	-1.5	3.7
1975/76	1.7	3.0	-5.3	2.9
1976/77	1.1	0.1	2.9	-8.0
1977/78	-1.7	-1.5	-3.3	-4.1
1978/79	6.6	2.4	15.5	10.0
1979/80	5.1	4.9	9.6	3.4
1980/81	0.8	-1.6	12.7	3.3
1981/82	0.5	-3.6	8.5	5.5
1982/83	10.1	13.6	5.9	5.3
1983/84	-6.3	-12.5	5.7	1.0
1984/85	9.7	-20.9	4.5	2.9
1985/86	9.9	16.0	6.6	3.7
1986/87	14.0	18.8	8.0	10.0
1987/88	-0.1	-2.8	-3.0	5.4
1988/89	0.3	1.0	-6.6	2.0
1989/90	4.1	5.3	-4.7	5.2
1990/91	-4.2	5.2	-19.1	-12.7
1991/92	-3.7	-2.7	-7.1	-4.2
1992/93	12.0	6.1	28.4	17.4
1993/94	1.6	-3.7	7.0	7.9
1994/95	6.2	3.4	8.1	6.8
1995/96	10.7	14.7	5.6	9.5
1996/97	0.5	3.4	7.9	7.8
1997/98	5.6	-7.6	11.0	8.0

Source : MEDAC

Appendix 2 :

Growth rate of Expenditure Components GCF

[at current market price]

Year	GDE	Consumption Expenditure			GFCF	GDS	GDP
		Total	Private	Government			
1963/64	8.7	7.9	7.6	10.6	14	21.3	9.4
1964/65	8.4	8.3	7.0	18.8	9.3	13.0	8.8
1965/66	10.3	9.7	9.3	12.0	14.4	-7.1	7.6
1966/67	5.0	4.6	5.0	2.2	7.6	16.8	6.0
1967/68	5.7	5.9	6.0	5.0	4.1	10.3	6.4
1968/69	6.1	6.9	7.6	2.0	11.0	-2.0	6.0
1969/70	7.8	9.8	10.0	7.8	-5.6	9.0	9.7
1970/71	7.2	7.1	7.4	4.0	-7.9	-6.2	5.6
1971/72	0.7	-0.3	-1.6	10.0	8.8	10.4	0.7
1972/73	-1.5	2.5	2.1	5.9	-5.6	30.1	5.5
1973/74	9.7	11.4	12.0	9.0	-3.6	7.5	11.0
1974/75	5.7	5.8	3.0	25.0	5.6	-42	-0.4
1975/76	5.9	8.0	6.2	18.6	12.0	8.7	8.0
1976/77	16.8	17.4	17.9	15.9	10.0	-23.7	14.3
1977/78	8.3	9.3	6.4	25.3	2.8	-70	5.8
1978/79	11	9.6	10.5	5.4	28.0	95	11.3
1979/80	6.9	5.5	6.1	2.4	22.0	14.7	5.8
1980/81	1.5	8.0	-0.4	7.2	7.9	36.0	2.1
1981/82	7.3	7.4	6.2	14.1	6.7	-17.4	5.5
1982/83	9.6	11.3	9.4	21.0	-0.2	2.2	10.7
1983/84	-5.0	9.3	-10.5	-3.4	27.3	38.1	-6.7
1984/85	17.6	25.4	30.0	4.8	-24.5	-59	18.6
1985/86	4.0	-2.0	-3.8	7.3	60.0	218	4.2
1986/87	6.2	7.2	7.6	5.5	0.9	-6.7	6.0
1987/88	4.0	-1.5	-5.8	19.7	40	71	4.0
1988/89	2.8	9.5	8.5	13.0	-25	-25	5.2
1989/90	5.	11.0	8.7	5.6	7.4	-4.6	7.0
1990/91	16.7	16.7	25.4	-2.0	5.0	-50.1	14.1
1991/92	7.5	8.8	17.5	-33.0	4.3	-5.3	8.3
1992/93	31.2	24.8	23.8	34	98	139	28.3
1993/94	7.7	6.9	6.2	12	13	-4.5	6.2
1994/95	19.2	17.5	17.7	16.5	30	59.0	19.6
1995/96	14.8	12.1	12.0	13.0	30	9.7	12.0
1996/97	7.6	7.3	6.9	10.3	9.3	38.2	9.3
1997/98	9.4	8.2	7.8	11.4	15.3	18.0	9.0

Source: MEDaC

Appendix 3:

Revenue, Expenditure and Budget Deficit

(at current market Price)

Year	Revenue (R)	Expenditure (E)	Budget Deficit (B)	R as % of GDP	Growth rate of R.	E as% of GDP	Growth rate of E	B as % of GDP
1963/64	362.1	364.9	2.8	12.4	65. 5	10.8	20	0.1
1964/65	297.7	400.7	-103.0	19.17	-17.8	10.9	11.6	2.8
1965/66	330.2	407.60	-77.40	9.6	11.0	11.9	18.4	2.3
1966/67	369.9	493.30	-123.40	10,2	39.7	13.6	21.0	3.4
1967/68	385.8	542.20	-156.40	10.0	4.3	14.0	10.0	4.0
1968/69	405.4	531.60	-126.20	10.0	5.1	13.0	-2.0	3.0
1969/70	429.1	585.20	-156.10	9.6	5.8	13.1	10.1	3.5
1970/71	466.0	631.50	-165.50	9.8	8.6	13.3	8.0	3.5
1971/72	494.7	671.70	-177.00	10.5	6.1	14.1	6.3	3.6
1972/73	556.2	716.20	-160.00	11.1	12.4	14.2	6.6	3.1
1973/74	618.1	777.70	-159.60	11.1	11.1	14.0	8.6	2.9
1974/75	711.6	1048.80	-337.20	12.8	15.1	18.9	34.9	6.1
1975/76	781.0	1200.70	-419.70	13.0	10.0	20.0	14.5	7.0
1976/77	1011.2	1344.30	-333.10	14.8	29.5	19.6	12.0	4.8
1977/78	1108.0	1696.60	-588.60	15.2	9.7	23.3	26.2	8.1
1978/79	1335.4	1846.10	-510.70	16.7	20.5	23.0	8.8	6.3
1979/80	1567.5	2137.90	-570.40	18.4	17.4	25.1	15.8	6.7
1980/81	1756.4	2296.40	-540.00	17.4	12.1	22.8	7.4	5.4
1981/82	1876.7	2649.60	-772.90	17.6	6.8	25.0	15.4	7.3
1982/83	2174.4	3807.70	-1633.36	18.5	16.0	32.3	44.0	14.0
1983/84	2293.9	3198.00	-904.1	20.1	6.0	29.1	-16.0	8.2
1984/85	2289.1	3924.60	1635.5	17.6	-0.2	30.1	22.7	12.6
1985/86	2620.3	4131.20	-1510.9	19.3	14.5	30.4	5.3	11.1
1986/87	2815.2	4137.10	-1321.9	19.6	7.4	28.7	0.1	9.2
1987/88	3324.2	5058.00	-1733.8	22.2	18.1	34.0	22.2	12
1988/89	3520.5	5912.30	-2391.8	22.4	6.0	38	16.9	15.2
1989/90	3142.3	5369.20	-2226.9	18.7	-10.7	32	-9.2	13.2
1990/91	2706.3	4913.00	-2206.7	14.1	-14.0	25.6	8.5	11.5
1991/92	2208.0	4256.90	-2048.9	10.6	-18.4	20.5	-13.4	10.0
1992/93	3191.2	5305.6	-2114.4	12.0	44.5	20.0	24.6	8.0
1993/94	3938.9	7202.6	-3263.7	13.9	22.4	25.4	35.8	11.5
1994/95	5839.0	8799.7	-2960.7	17.2	48.2	26.0	22.2	8.7
1995/96	6839.8	9109.5	-2769.7	18.1	9.4	24.0	3.5	6.0
1996/97	7781.0	10290.6	-2509.6	18.8	13.8	24.8	13.0	6.0

Source: Ministry of Finance and MEDaC

Appendix 4:

Growth rate of Broad and Narrow Money Supply

No	Year	growth rate of money supply	
		Narrow	Broad
1	1963/64	16.5	21.2
2	1964/65	15.5	13.2
3.	1965/66	8	10.2
4.	1966/67	-1.6	1.7
5.	1967/68	3.6	7.8
6.	1968/69	3.9	7.3
7.	1969/70	10.4	14.5
8.	1970/71	-6.1	0.6
9.	1971/72	-1.8	4.6
10.	1972/73	20.4	22.7
11.	1973/74	31.8	32.0
12.	1974/75	26.3	8.0
13.	1975/76	31.2	23.5
14.	1976/77	-8.8	3.2
15.	1977/78	19.2	14.6
16.	1978/79	16.4	12.2
17.	1979/80	8.4	12.0
18.	1980/81	14.5	13.0
19.	1981/82	10.3	11.2
20.	1982/83	15.2	15.0
21.	1983/84	9.1	11.3
22.	1984/85	10.5	13.8
23.	1985/86	21.0	15.6
24.	1986/87	12.1	8
25.	1987/88	9.5	8.8
26.	1988/89	6.9	9.0
27.	1989/90	19.5	17.5
28.	1990/91	22.9	18.6
29.	1991/92	11.6	13.2
30.	1992/93	12.7	16.8
31.	1993/94	8.6	10.2
32.	1994/95	18.3	20.7
33.	1995/96	-3.5	9.3
34.	1996/97	5.4	8.5

Source: NBE

Appendix 5:

Annual rate of Inflation

No	Year	Rate of inflation
1.	1963/64	1
2.	1964/65	14.4
3.	1965/66	10.8
4.	1966/67	1.43
5.	1967/68	-0.11
6.	1968/69	-0.43
7.	1969/70	7.24
8.	1970/71	6.72
9.	1971/72	-5.16
10.	1972/73	0.97
11.	1973/74	10.66
12.	1974/75	4.68
13.	1975/76	18.89
14.	1976/77	21.91
15.	1977/78	18.55
16.	1978/79	12.95
17.	1979/80	14.43
18.	1980/81	1.94
19.	1981/82	7.3
20.	1982/83	3.84
21.	1983/84	-0.32
22.	1984/85	18.45
23.	1985/86	4.63
24.	1986/87	-9.46
25.	1987/88	2.16
26.	1988/89	9.6
27.	1989/90	5.16
28.	1990/91	20.87
29.	1991/92	21.02
30.	1992/93	10.00
31.	1993/94	1.2
32.	1994/95	13.4
33.	1995/96	0.9
34.	1996/97	-6.4

Source: Calculated from NBE

APPENDIX 6:

Inflation in industrial developing and selected Sub-Saharan Africa countries (Average Annual)

No	Countries	1967-72	1973-78	1979-84	1985-90	1991-96	1967-96
1.	World	5.6	12.8	15.7	17.1	16.4	13.5
2.	Industrial countries	4.5	9.6	8.4	3.9	2.9	5.9
3.	Developing countries	9.7	19.9	31.6	45.0	41.0	29.4
4.	Asia	10.7	13.2	10.7	7.2	9.7	10.3
5.	Europe	-	9.4	24	65.9	59.6	39.8
6.	Middle East	3.6	14.0	20.0	16.3	13.2	13.4
7.	Western hemisphere	14.1	37.8	71.3	173.5	155.4	90.4
8.	Africa	4.8	15.6	17.3	17.6	39.5	19.0
9.	Ethiopia	1.2	13.9	6.7	4.5	10.4	7.3
10	Burkin Faso	1.0	10.8	10.0	0.8	6.7	5.9
11	Cameroon		13.1	11.4	5.1	8.4*	9.5
12	Niger	3.9	13.5	9.7	-2.6	6.4	6.2
13	Rwanda*	1.6	17.5	9	2.2	18*	9.4
14	Senegal	3.4	12.6	10.9	2.3	6.8	7.3
15	Togo*	3.8	11.5	9.4	0.4	10.6*	7.0
16	Nigeria	6.6	18.6	18.8	22.8	45.7	22.5
17	Kenya	2.3	14.9	12.7	10.9	22.8	12.7
18	Ghana	4.9	51.9	67.7	28.1	31.1	36.7
19	Sudan**	5.4	17.2	28.6	44.4	144.2*	33.9
20	Uganda***			56.2*	134.9	18.7	71.7

Source: Calculated From IFS

*For this countries average are for five years during the period 1991-1996

**For these countries average are for three years only for the period 1991-1996

***For these country average are for years for the period 1979-1984

Appendix 7:
Percentage Distribution of GDP (At Market price)

		1967/68-1971/72	1972/73	1973/74
1	Total Consumption	89.0	86.7	87.1
	- Private	78.8	76.0	76.6
	- Public	10.2	10.7	10.5
2	Gross fixed capital formation	12.6	11.3	9.8
3	Domestic Saving	11.0	13.3	12.9
4	Resource Balance	-1.6	2.0	3.1
5	Export of goods and non-factor services	10.3	13.0	14.8
6	Import of goods and non factor services	11.9	11.0	11.7

Source : MEDAC

Appendix 8:
GDS , GFCF , Resource GAP and Consumption

Year	GDS AS % of GP	GFCF as % of GDP	resource Gap as % of GDP	Public consumption as % of GDP	Private consumption as % of GDP	Total consumption as % of GDP
1974/75-1979/80	4.9	9.0	-4.1	15.2	80	95.2
1980/81-1984/85	6.0	13.4	-7.4	15.8	78.2	94.0
1985/86-1990/91	8.2	15.0	-6.8	17.5	74.4	91.9
1991/92-1997/98	6.3	16.2	-9.9	11.6	82.8	94.4
1974/75-1990/91	6.4	12.4	-6.0	16.2	77.5	93.7
1967/68-1997/98	7.5	13.2	-5.7	13.8	78.8	92.6

Source : MEDAC
GDS: Gross domestic saving
GFCF: Gross fixed capital formation

Appendix 9 :

Comparison of AMC Farm Gate Prices and Open Market Prices in Major Towns for the year 1987/88 (Jul. 1987 to June 1988) (Birr/ Quintal).

Towns	*Teff Mixed*	*Wheat Mixed*	*Maize*	*Sorghum*	*Barely*	*Horse Beans*	*Field Peas*	*Niger Seed*
Addis Ababa	112	54	44	53	50	86	81	136
Ambo	93	63	33	31	38	72	83	101
Assella	81	35	26	-	28	53	63	-
D/ Markos	48	41	38	34	36	52	67	62
Goba	63	62	37	-	36	65	79	104
Gondar	110	73	55	53	60	70	84	98
Hossana	68	57	36	23	33	85	81	-
Metu	62	42	20	22	43	86	108	-
Nazareth	95	55	47	50	52	55	89	-
Nekempt	62	48	28	36	43	96	120	133
Shashemene	86	39	32	-	35	62	74	-
AMC	41	32	22	25	28	27	35	48

Source : Gezahegn

Appendix 10:

Average monthly Wage sin the Manufacturing Sector (1967= 100)

Year	*Average wage Index*		*Real Wage Index*	
	Index Percent	*Growth Rate*	*Index Percent*	*Growth Rate*
1967	100	-	100.00	-
1968	113.7	13.7	95.7	-4.3
1969	122.9	8.1	84.8	-11.4
1970	125.8	2.4	73.2	-13.6
1971	132.1	5.0	68.1	-7
1972	141.4	7.0	64.8	-4.8
1973	146.9	3.3	65.6	1.2
1974	149.4	2.3	62.6	-4.6
1975	160.7	7.6	64.8	3.5
1976	161.4	0.4	65.3	0.8
1977	174.4	8.1	59.6	-8.7
1978	177.4	1.7	57.9	-2.9
1979	189.9	7.0	68.5	18.3
1980	199	4.8	70.5	2.5
1981	208.6	4.8	6.2	-4.3
1982	218.6	4.8	67.0	-0.3

Source :- Eshetu Chole and Mekonen Manyazewal (26,5)

Appendix 11:

The ratio of broad money supply to GDP and private consumption

Year	*M/GDP*	*M/ PC*
1963/64	0.110124	0.140834
1964/65	0.11453	0.148958
1965/66	0.117272	0.150201
1966/67	0.112644	0.145517
1967/68	0.114134	0.14797
1968/69	0.115641	0.147532
1969/70	0.120635	0.13527
1970/71	0.11498	0.53427
1971/72	0.119398	0.152831
1972/73	0.138972	0.183812
1973/74	0.165371	0.216521
1974/75	0.179385	0.226957
1975/76	0.205175	0.264005
1976/77	0.185294	0.231187
1977/78	0.200685	0.249001
1978/79	0.201666	0.251983
1979/80	0.213642	0.266246
1980/81	0.235896	0.301477
1981/82	0.248566	0.315669
1982/83	0.258208	0.332012
1983/84	0.307956	0.413034
1984/85	0.295472	0.361029
1985/86	0.327673	0.433506
1986/87	0.334146	0.435725
1987/88	0.349467	0.503237
1988/89	0.362404	0.505713
1989/90	0.398688	0.547242
1990/91	0.414642	0.517867
1991/92	0.433383	0.49897
1992/93	0.394505	0.470604
1993/94	0.40943	0.488418
1994/95	0.413245	0.50144
1995/96	0.403452	0.489155
1996/97	0.400479	0.496597

Source :- NBE and MEDaC
Note:- M = Broad Money Supply
PC = Private Consumption (Nominal)
GDP= Gross Domestic Production (Nominal)

Appendix 12: Food Aid, per capita demand, consumption and food production

Year	Food Aid in Thousand tons	Per Capita Consumption	Growth rate	
			Pre capita demand	per capita food production
1974/75	54.1	251.8	5.4	-9.9
1975/76	86.5	249.9	-2.7	15.6
1976/77	74.7	258.3	2.9	-20.6
1977/78	76	255.5	-1.9	-8.7
1978/79	162.3	262.5	4.0	-5.3
1979/80	11.3	264.5	2.1	55.7
1980/81	227.9	254	-3.3	-14.6
1981/82	189.7	253	-0.5	-7.1
1982/83	356.3	265.7	3.5	20.6
1983/84	171.9	243.5	-3.9	-20.7
1984/85	868.9	221.8	-14.5	-32.2
1985/86	799.2	223.5	7	9.0
1986/87	570.3	250.8	11.2	22.4
1987/88	823.8	232.1	-2.2	4.8
1988/89	572.7	235.5	-5.0	-8.5
1989/90	537.5	238	-0.7	4.8
1990/91	890.9	231	-5.3	-2.5
1991/92	1000.9	212	-9.0	-19.9
1992/93	519.3	228	12.8	0.84
1993/94	917.9	231	2.1	-4.42
1994/95	643.6	232.9	2.1	15.1
1995/96	111.1	251.1	10.2	47.5

Source : FAO, CSA and MEDaC

Appendix 13:

An Over -parameterized ECM Model of Equation 1

Dependent Variable = DLP= inflation	
Regressors	*Coefficients*
Constant	-0.4(-0.7)
DLP (-1)	1.1(2.9)***
DLP(-2)	-0.02(-0.1)
DLGDFN	0.66(0.97)
DLGDFN (-1)	0.50(0.5)
DLGDFN (-2)	-0.35(-0.4)
DLREER	-0.12(-0.9)
DLREER (-1)	-0.1(0.7)
DLREER (-2)	0.1(0.6)
DLpm	0.2(0.9)
DLpm (-1)	-0.2(-1.13)
DLpm (-2)	0.2(1.2)
DLY	-0.3(-0.76)
DLY (-1)	0.1(0.2)
DLY (-2)	0.4(0.9)
ECM (-1)	-0.82(-2.0)**
DLM2	0.5(2.2)**
DLM2 (-1)	-0.24(-0.79)
DLM2 (-2)	0.004(0.022)
R^2	0.83
F- Statistics	F(18,11) = 3.0
Auto correlation	F(2.9) = 0.17
Heteroscdasticity	F(1,9) = 0.10
Function Form	F(1,10) = 0.07
Normality	Chiy(2) = 4.8

Note : Figures in parentless are T- ratio ***, **, * denote significant at 1%, 5% and 10% respectively. D denotes first difference.

Appendix 14:

An Over -parameterized ECM Model of Equation 2

Dependent Variable = DLP= inflation	
Regressors	*Coefficients*
Constant	-0.0072789(-0.25)
DLF (-1)	-0.070455(-0.77)
DLF(-2)	0.12414 (1.3)
DLF	-0.054902 (-0.7)
DLP (-1)	1.0947 (2.4)**
DLP (-2)	0.025781 (0.12)
DLGDFN	-0.11666 (-0.55)
DLGDFN (-1)	-0.86595 (-0.81)
DLGDFN (-2)	-0.73532 (-0.86)
DLREER	-0.014748 (-0.12)
DLREER (-1)	-0.091105(-0.77)
DLREER (-2)	0.18916 (1.8)*
DLpm	0.17881 (1.1)
DLpm (-1)	0.015049 (0.1)
DLpm (-2)	0.027194 (0.13)
DLM2/ GDP	-0.28847 (-1.13)
DLM2/ GDP(-1)	-0.093299 (-0.31)
DLM2/ GDP(-2)	0.0062515 (0.027)
ECM1(-1)	-0.92095 (-1.75)*
R^2	0.75
F- Statistics	F(18,13) = 2.13
Auto correlation	F(2,11) = 1.3
Heteroscdasticity	(1,11) = 0.15
Function Form	(1,12)= 0.018
Normality	hiy(2) 0.054

Note : Figures in parentless are T- ratio ***, **, * denote significant at 1%, 5% and 10% respectively. D denotes first difference.

DECLARATION

I, the undersigned, declare that this thesis is my original work and has not been presented for a degree in any others university. All sources of material used for this thesis have been fully acknowledged.

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