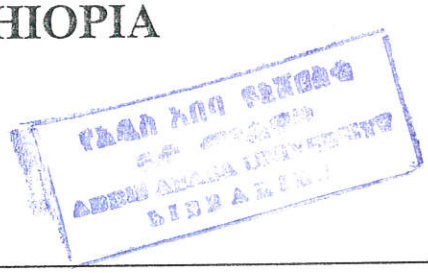
ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

THE DYNAMICS OF INFLATIONARY PROCESS IN ETHIOPIA



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ABSTRACT

This paper made an attempt to explain, among other things, the dynamics of inflationary process and, hence, give insights as to how to manage the inflationary process in the country. To investigate this issue we employ both statistical as well as econometric methods. To look at the specific determinants of inflation we model the country's inflation process from the monetarist as well as the structuralist view. Moreover, to capture the relative sectoral differences in response to changes in some of the important macroeconomic variables, we classify the economy into the agricultural and non agricultural sectors and model the respective sectors accordingly.

Based on this procedures we found out that inflation in the country is generally a supply rather than a demand side phenomenon. In addition to this, we notice that the monetarist argument that inflation has a one- to - one correspondence to changes in broad money supply does not hold in our case. What we notice is that even under steady state equilibrium situation, the impact of broad money supply on the inflationary process in the country is very minimal. We proceed and apply the structuralist model and found out that the lion's share of the variation in the inflationary process in the country is explained by this model. Here, we found out that, on top of the monetarist variables, especially income, the variation in inflation is influenced by structural as well as institutional factors. Specifically, we observe that the long run inflationary process is found to be determined by real income, import prices and government deficit level. In the short run, on the other hand, in addition to the above variations in broad money supply and rain fall play an important role in the inflationary process of the country.In line with the structuralists' argument we also found out that there are, indeed, sectoral differences in response to changes in some of the macro economic variables.

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CHAPTER ONE: INTRODUCTION

1.1 Background of The Study: Macroeconomic Performance of The Ethiopian Economy

Ethiopia is one of the lowest income countries in the poorest region of the world- sub- Saharan Africa. The reasons why the country is doomed poor may be enormous. But, basically, we can mention the most vivid facts that the country has been prone to repeated and severe internal as well as external shocks in the period under discussion. A distorted investment environment, which discourages the private sector considerably, devastating war and droughts can be considered as major internal shocks to the economy. External shocks such as volatile primary products' prices, the 1973 and 1978/79 oil crises,and fluctuations of non-oil commodity prices affect the economy considerably, for the economy is structurally dependent on exports of primary products and imports of intermediate as well as final consumer and capital goods[Naude,1993][1]. Because of this, the economy's growth rate was very dismal for the last three decades.

Table 1: GDP AND SECTORAL GROWTH RATES [at constant factor cost]

	1968-1973	1974-1979	1980-1984	1985-1990	1991-1995	1974-1990	1965-1995
GDP	3.8	1.5	0.2	3.6	2.5	1.9	2.5
GDPa	1.4	-1.2	-5.0	7.2	0.1	1.5	1.3
GDPi	3.5	2.8	5.3	-4.0	6.6	1.2	2.6
GDPs	8.07	7.00	4.21	2.05	5.58	4.43	5.69
GDPds	5.3	1.4	2.6	-0.9	5.6	0.9	2.8
GDPos	5.7	5.5	4.7	4.1	-22.1	4.8	1.2

GDPa= agricultural GDP at constant factor cost
GDPi= industrial GDP at constant factor cost
GDPs= service GDP at constant factor cost
GDPos & dis represent GDP of other and distributive services,respectively.

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[1]. The rapid expansion and recent set back of ODA are also considered as factors that contribute to the poor performance of the economy.

Table 2: PERIODIC SECTORAL CONTRIBUTION TO GDP [1965- 1995]

SECTORAL SHARE	1965-1969	1970-1973	1974-1979	1980-1984	1985-1990	1991-1995	1965-1973	1974-1990	1965-1995
AGRI.	0.62	0.58	0.57	0.51	0.49	0.52	0.61	0.53	
INDUSTRY	0.11	0.12	0.11	0.14	0.13	0.10	0.12	0.13	
SERVICES	0.26	0.30	0.32	0.35	0.38	0.37	0.28	0.35	

Source: MEDaC

As it can be seen from table 1 and 2, in the period 1965-1973, the economy was fairly stable and witnessed a sustainable positive growth rate. Major sectors grew at meaningful rates i.e., the agricultural sector was growing at an average rate of 1.4% while the industrial and the service sectors grew by 3.5 and 8.07 percents respectively, leading the economy to grow at an average growth rate of 3.8% per annum.

After 1973, however, the newly established government began to take radical economic as well as political measures which had far-reaching implications in the period to follow. The private sector virtually collapsed [i.e., private ownership in major economic activities prohibited] and the economy became under a centrally command administration.

In particular, during the first four years of the Derg regime, the country faced major political, social and economic instabilities. It was also involved in war with neighbouring Somalia and weather was not that much good. These factors altogether reduce the relative performance of the sectors down in that the economy was growing at an average rate of 1.5% per annum during the period 1974-1979.

In the first half of the 1980s the country was struck by intense and devastating droughts. The performance of the agricultural sector crippled so badly that it began to grow at an average rate of 5.0% below zero. Compared to the previous periods, the performance of the service as well as the industrial sectors also fell to grow so that the whole economy was growing at a rate tantamount to 0.2% per annum only in the period under discussion.

In the second half of the 1980s, however, the economy began to grow at a positive rate though the pace of the economy was very much influenced by the poor performance of the industrial sector. Starting from 1987, the performance of the industrial sector got worse but it virtually shrank down in size beginning 1989, for the major industrial zone in the country, Asmara, began to be in a big turmoil and ceased to be part of the country in 1991. Because of this, among other things, the industrial sector fell to grow by -4.5 and -22.8 percents in 1989 and 1990, respectively. Though this sector was falling by an average rate of 4.01% per annum, this fall was attenuated by a rise in the agricultural sector[7.2%] and the service sector, leading the economy to grow by 3.6% per annum in the period 1985- 1990.

In 1991, the new government took power and the centrally administered economic regime changed into market-led economic regime. Though the economy was virtually 'stopped' during the year, from 1992 on wards, the economy began to grow at a remarkable rate except in 1993[2] as the size of cultivated land increased and the idle capacity in the manufacturing sector began to be utilized[Abebe Shimeles,p.1].

In general, Ethiopia witnessed an average growth rate of 3.82, 1.9 and 2.5 percents in the Imperial, Derg and EPRDF regimes, respectively. All in all,the economy's growth rate in the last three decades (2.5%) remain very low in that an average Ethiopian income in the 1990s remain below that of the 1960s level.

When we come to the expenditure side of the economy, evidences show that, in the last 30 years alone, the country was spending from 88 to 115% of its income for consumption purposes only. The share of total consumption expenditure in GDP has been increasing consistently from an average rate of 87.2% in 1965 - 73, to 94.3 and 94.8 percents in the Derg and the EPRDF

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[2]. In 1993, drought hit the country again. Agriculture fell by -3.7%. but the industrial as well as the service sectors grew by 7 and 8.1 percents respectively so that the overall performance of the economy remains positive (1.7%).

regimes, respectively. Out of which the lion share of spending was on private consumption[78.6%].[3]

On the other hand, though the growth rates of domestic savings fluctuate frequently, the share of savings in GDP has been declining steadily. During the last three decades, for instance, its share has declined from 15.9% in 1965 to 7.3% in 1995/96. The ever increasing public spending which has never been backed by an increase in private savings is one of the causes for the fall of domestic savings in the country [Eshetu and Mekonnon,1992].

Though we know that savings should be the most important source of investment in the country, it is only in the Imperial era that investment was fully financed by domestic savings. Thereafter, domestic savings not only remain far short of the investment level but the gap between them also widened. As it can be seen from the table the resource gap has been increasing from -1.74 in 1970-73 to 7.03 in 1980-1984 and 9.04 percents in 1991-1995. This implies that the ever increasing saving-investment gap entails the country to depend on external financing.

The country's balance of payments position was also worsening for a long period of time. One of the several excuses that can be provided in this regard is the structure of the economy. Basically the country's economy can be said a " 3-commodity economy" in the sense that its foreign trade heavily relies on a few primary products. From 1970-1990 alone more than 90% of its export earnings comes from exports of the primary products. To be specific, 67.2% of its foreign exchange emanates solely from one commodity i.e., coffee.

On the other hand, the economy is structurally dependent on imports for production and investment[Naude,1995]. In the period under investigation the country's export has been able to cover only 64% of its imports. Because of this the terms of trade is usually not in favour of the country.

3. For detail discussion, see chapter 4.

When we see the fiscal and the monetary sector, we find similar gloomy picture. The fiscal deficit was persistently deteriorating for the last two decades. According to the information we have, current account deficit has been escalating from a surplus of 0.7% of the GDP in 1996 or a deficit level of 1.7% in 1967 to a deficit level of 26.7% of the GDP in 1992. This happens because of the ever expanding recurrent expenditure over that of the revenue. This reflected in the overall government balance in that a persistent increment in total government expenditure over that of total revenue leading to an overall deficit of a persistent nature[see Appedix 5].

In 1970s, for instance, government deficit was about 4.7% of the GDP. In 1980s it reached to 9.25%. But in the years after 1991 the deficit level shows a decline[4].
Along with government deficit the broad money supply was steadily increasing over this period. If we take the same period for comparison, in 1980s the average broad money supply reached Birr 5016.2 million while it was Birr 1287.5 million in 1970s.

While the money supply rises by more than 13.27% in the period 1967 to 1994 the country's GDP was growing at a very slow pace[2.45%]. Because of this the velocity of money declines steadily.[the velocity of money,for instance, declines from 4.8 in 1975 to 1.5 in 1992 [Shibeshi,p.48].

From the above discussion one can deduce that the ever increasing money supply along with the effect of the 1993 devaluation and the worsening budget deficit can be attributed to the ever increasing inflation rate in the country. However, we can easily notice that the continuously declining velocity of money obviously eased the inflationary impact of the budget deficit in the country[5].

Though compared to other countries Ethiopia's inflation rate is considered as less than moderate,its effect can not be considered as harmless. In the decades, while the wage rate was

4. Detail discussion of the budget deficit along with the inflation rate is given in chapter 4.
5. for detail discussion of the inflationary process and its interaction with the macroeconomic performance of the country , see chapter 4.

stagnant and the growth rate of output (i.e.GDP) was negligible, the inflation rate was growing at an average rate of 7.82%

At the beginning of 1990s, specifically in Sept.1992, the country accepted or designed packages of development programs-similar to the structural adjustment programs(SAPs)-with the help of the IMF and the World Bank[Befekadu and Kibre,1994]. In these packages, among other things,

- reducing the budget deficit by curtailing government expenditure and raising government revenue collection by reforming the tax system was targeted;
- devaluation of the national currency was perceived as a motivation for producers to raise the supply of tradeable goods, to curtail imports and thereby to correct trade balances[Ibid pp. 62-63].

Then the Birr was devalued by 142%. The exchange rate system changed from fixed to managed -floating exchange rate system. Since devaluation is inherently inflationary, the inflation rate in the country has never been in a declining trend in the period under discussion.

So, what will be the causes for the escalation of inflation rate in the country? Or how can we explain the dynamics of the inflationary process in the country?

1.2. Statement of the Problems

In the background of the study we try to show, in brief, the trend of the inflationary process in the country along with some important factors which have to be seen together. We stated that:

- government budget has been deteriorating ;
- money supply has been persistently increasing;
- income i.e.,GDP has almost been stagnant;
- the velocity of money has been decelerating;
- the country has repeatedly been bitten by draught.

In addition to this the dictating economic thinking of the country has shifted from the centrally command economic regime to that of market economy. Under the former regime where prices were under control, the prevailing prices can not be market clearing prices. This in turn implies that the country's CPI can not show the true price level of the country. And if the inflation rate was indeed a repressed one, this will have a real implication on the level of inflation in the country.

In addition to the change in the economic regime per se, the country adopted a structural adjustment program. Associated with this program, important changes have been made on the various components of the economy. Among other things the exchange rate regime has been changed from fixed to managed floating exchange rate regime; devaluation of the country's currency took place; measures have been taken to curtail government deficit; changes have been observed on wages and salaries after several years; various market liberalizing measures have been employed.

Given all these facts,then:

- how can we empirically explain the dynamic inflationary process in the country? Or what are the real causes of inflation in the country?
- what measures can be taken to control the inflationary process in the country?

1.3. Objective of the Study

The study is designed to explain:

1. The dynamics of inflationary process in the country and identify the real causes of inflation in the country. We do try to explain this point from the monetarists' as well as the structuralists' point of view, for these views have their own implication with respect to policies designed concerning inflation. The study will cover the period ranging from 1967 - 1994.

2. Identify whether there is/are sectoral differences in relative prices on the inflationary process

3. whether the Ethiopian inflationary process was a repressed one or not. This rather will be accomplished using statistical tools and by assessing the pricing policies in the country than by modelling it , for it is extremely difficult to find the required data to model and calculate the true inflation rate in the country.

4. provide a framework as to how to control the inflationary process in the country.

1.4. Significance of the Study

Since the ultimate purpose of this paper is to analyze the dynamic inflationary process in the country, it is expected to:

- give helpful insights as to the true nature of inflation in the country;
- provide suggestions as to how to control the inflationary process in the country.
- In addition the results may become useful bases for further research on this and other monetary and fiscal economics issues.

CHAPTER TWO: LITERATURE REVIEW

2.1. Definition of Inflation

In most literatures people jump into the discussion or analyses of inflation without any attempt to explain what it is. But when one tries to explain it, the first problem that he/she encounters is the very definition of inflation. Some give a sort of general coverage to their definition[Beckerman(1993); Laider and Parkin(1963); Laliwala(1984)] while others take some aspect of the matter only[e.g. Bronfenbrenner and Holthmann(1963)].

According to Laider and Parkin, inflation is a general escalation of prices," or equivalently, of continuously falling value of money."[P.741]. According to this definition any short run increase in prices can not be taken as inflation. Rather, to take the upward movement of prices as inflation,first, it should be general i.e. it should not be price of individual commodities; and second, the escalation should be irreversible.

On the other hand, Bronfenbrenner and Holthmann give some four definitions. Some of these definitions are causal, some are system-based (as Laider & Parkin definition) while the other emphasizes external developments in the general price level. Their causal definition states inflation as " A condition of generalised excess demand in which 'too much money chases too few goods'". They also define inflation as a rise of money stock or money income, either total or per capita.

The latter definition of inflation gets popularity in the monetarist world since it considers inflation basically as a monetary phenomenon. However, defining inflation by taking the causal aspect of it only is not a good way of defining it, for the dispute as to the cause(s) of inflation is not a settled one.

Thus, despite all these differences in defining inflation, we take Laider and Parkin definition for our purpose.[6]

2.1. Theories of Inflation

Inflation has been the concern of both the developed as well as the developing world for a long period of time. To understand and control this problem various inflation theories have been formulated at different points in time. In this section we will try to survey some of the well known inflation models or theories by classifying them in two main categories. The first category deals with what we call the traditional theories of inflation. This includes the quantity theory of money, the inflation- gap model, Bent Hansen double inflationary gap model and the demand-pull & cost push inflation theories of inflation. The second part discusses the monetarist and the structuralist theories of inflation. The reasons why we identify and discuss the latter separately are two-fold. First the models are distinct and still under progress. Secondly, and more importantly, these theories play an important role in explaining the inflationary process in the developing world.

2.1.1. TRADITIONAL THEORIES OF INFLATION

2.1.1.1 The Quantity Theory of Money

For a long period of time, several economists believe in that the quantity theory of money can give a crude explanation of inflation[7]. Basically, the quantity theory of money is presented in two forms: in I.Fisher's transaction equation representation forms, and in Cambridge school cash- balance equation representation form.

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6. Laliwala also defines inflation in similar fashion. But, he argued, when we take this definition we should not overlook the qualifications or reservations it needs. First of all, we have to admit that the definition excludes general price of labour. With economic development wages and salaries rise. This, however, is not a case of inflation; rather it is a clear case of economic development. Secondly, he said, a general increase in the price level of an economy which is emerging out of depression can not be considered as inflation, rather it may be called as reflation, for it is not a problem. Thirdly, when we compute the price index, the open rather than controlled prices should be taken into account. Fourthly, asset prices are not included in the calculation of the index. But, he said the price of gold should be incorporated with proper weight,for this may suffice for the purpose of measuring the extent of inflation in an economy[pp. 1-2]

But in our definition we include the first and the third qualifications only. And we take the latter,for it is difficult to capture the true inflation existing in each period. The rest of his comments should not be taken because, despite the situation under which it takes place,the definition should emphasize on the sustainability of general price rise only.

7 Among these economists D. Hume and other classical economists, A.C. Pigou, A. Marshall and other neoclassical economists can be cited in this regard. For detail discussion see Frisch pp.218 - 249. For its application, see G.C. Chow[1957,1987]. The ideas in this sub part are taken mainly from these authors.

Irving Fischer formulates the transaction equation with the level and the money supply. To do so, he codifies the relationship between money supply(M), the velocity of money(V), the volume of transaction(T) and the price level(P); as,

$$PT = MV \ldots\ldots\ldots (1)$$

This is, in fact, an identity,for the value of all sells equals the value of all purchases which in turn equals the existing supply of money times the velocity of money[Frisch,p.219]. But, here, it is assumed that the velocity of money is constant in the short run $(V=\bar{V})$ and the volume of transaction is fixed at a predetermined level $(T=\bar{T})$. Hence, the general price level can now be expressed as,

$$P = \left(\frac{\bar{V}}{\bar{T}}\right) M \ldots\ldots\ldots (2)$$

i.e., the general price level is a constant proportion of the money supply.

The Cambridge school, on the other hand, formulates their equation in a slightly different form by assuming that economic agents do not change the relationship among their wealth, volume of transaction and their income level in the short run . This simplified assumption enables them to express their income version of the transaction equation in the form of growth rates,as

$$\frac{\delta M}{M} = \frac{\delta P}{P} + \frac{\delta X}{X} \ldots (3)$$

where, X = real national product; and income velocity of money is assumed to be constant. From this assumption it follows that "the elasticity of the general price

level with respect to a change in the supply of money equals unity."[Frisch p.221]. This forms the basis of the monetarists explanation of inflation.[We will see this explanation in section 2.2 in detail]

2.1.1.2. The Inflation-Gap Model

The inflation gap model was first developed by J.M. Keynes in 1939 in his article entitled ' How to Pay for the War.' And this theory is one aspect of a broader theory which examines the possible relationship that exists among inflation, taxation and distribution of income if there occurs an unanticipated change in the non-consumption expenditures. It is that aspect of his analyses which discusses about inflation become to be known as the inflation gap model [Frisch, p.227]

By assuming a full employment economy and a temporal lag in wage adjustments to changes in non-consumption or exogenous variables raise the general price level by creating an excess aggregate demand in a full employment economy. This paves the way that income will transfer from workers, who are believed in to have low marginal propensity to save, to entrepreneurs who have a relatively higher marginal propensity to save. The real wage rate of the workers shrinks, and hence,after a certain time lag workers will react to this situation to keep their income from falling. This process will raise the money wage of the workers and hence the wage-price inflationary spiral sets in. This is the essence of the theory in brief.

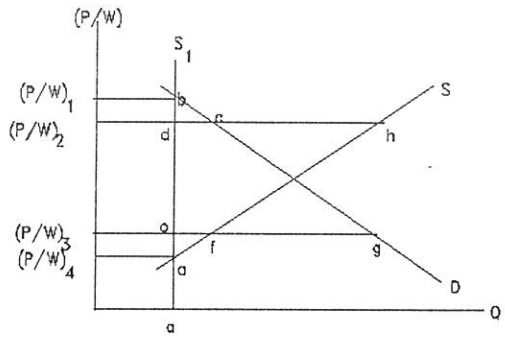
Looking in this way, some authors criticize the model from two grounds. The first criticism is delivered by Laliwala[1984]. He argues that Keynes' inflation-gap model is a variant of demand-pull inflation, for it is the prevailing excess demand that generates the inflationary spiral first. The second criticism, on the other hand questions the conditionality of the model. People argue that the inflation gap model is critically based on the standard Keynesian or neokenysian assumption of the relative differences between entrepreneurs and wage earners with regard to savings. They assume that entrepreneurs have a higher marginal propensity to save than others. But, if this assumption is violated, i.e., if the profit earners spend rather than save their windfall

profit, the inflationary prices will be aggravated rather than eliminated though it can be controlled by moderate taxation[Frisch, p. 228]. Anyway, despite these criticisms the theory contributes to he understanding of inflation process and its impact on distribution of income among economic agents.

2.1.1.3 Bent Hansen's Double Inflation Gap Model

Basically, Bent Hansen's double inflation gap model is considered as an extension of the Keynesian inflation gap model [Laliwala,p.]. But, unlike Keynes and his followers, he took both the goods as well as the labour market into account,i.e., he considers both the goods gap and factors gap in his analysis. To this end he assumed that the economy he considers is at full employment level and prices and wages are completely flexible.

To express his view, he considers the interaction between price-wage ratio and the demand for and the supply of output as follows.



D=demand curve as a function of price-wage ratio

S= supply function

Q_1=full capacity output level

In this graph, the horizontal difference between S^1 and S represents the factor gap while the gap between S^1 and D designates the goods gap.[8]

Now consider point B. At this point there is no goods gap while the factor gap is extremely large. This induces wages to rise, leading the price-wage ratio to decline to $(p/w)_2$. At $(p/w)_2$ the small goods gap, dc, raises the price level by small magnitude while the bigger factor gap,dh, increases the nominal wage level by a larger magnitude. Since the two rates of changes are not equal the price-wage ratio will still go further down. At $(p/w)_3$, however, the factor gap gets narrower while the goods gap gets wider to ef and, eg respectively. Since these changes produce a faster increment in prices and a slower rise in wages, the net effect induces the wage-price ratio to go upwards. At $(p/w)_4$, too, the ratio will go up, for the factor gap vanishes while the goods gap gets wider. The situation will leave the wage rate stable while the price level escalated. The price-wage ratio, therefore, moves upwards. This process will, thus, lead to a conclusion that between $(p/w)_1$ and $(p/w)_4$ there must be a 'quasi equilibrium' point where the rise of prices and the fall of wages, or vice versa, balance each other.

This model, however, has its own limitations. As it is stated by Frisch, first of all, the model doesn't take the role of expectation into account. Secondly, if the specification of the demand function in the model were changed in the way Patikin sets it,i.e.,$D=D(p/w,M/p)$, the model may not reach into quasi equilibrium point unless and otherwise the nominal money supply would change as the same rate as that of the inflation rate.

2.1.1.4. Cost Push Versus Demand Pull Inflation

Another well known theoretical frameworks in explaining inflationary processes are cost push and demand pull inflation theories. An inflationary process is usually distinguished as cost push or demand pull by determining the causes of inflation which is already under way. For instance, an inflationary process is said to be cost push if the initial cause of the process is believed to be a rise in the cost of labour or other factors of production. On the other hand, the process is

8. In other words, these differences indirectly measure the demand for and the supply of labour, respectively. This means that the rate of changes in prices is a function of goods gap while the rate of changes in wage rate is determined by factors gap.

considered as demand pull when the initiation emanates from an increase in the aggregate demand. Let us see the essence of these theories graphically.

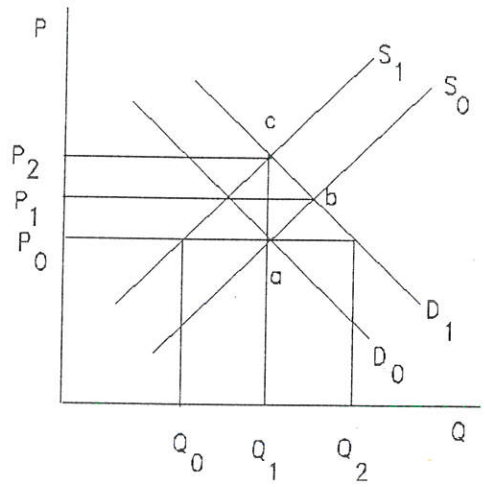
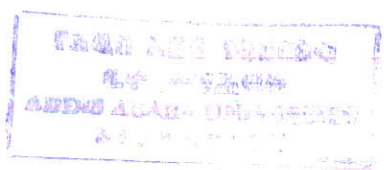


Fig. 3

Let us represent aggregate demand and aggregate supply of an economy by D and S, respectively. Each point at these curves or functions represent equilibrium points at different price levels in that: any point on the demand curve depicts an equilibrium situation in the goods as well as money markets; similarly any point on the aggregate supply curve denotes the level of supply at a particular price level assuming that the labour market is in equilibrium. The intersection of the two curves thus represent a general equilibrium point for the entire economy.

Let us also assume that there occurs an increase in the government expenditure, or in private investment or in money supply or in exports. This will shift the aggregate demand function from D_0 to D_2. This shift in aggregate demand results in an excess demand or a positive demand gap equal to Q_1Q_2. This consequently pushes the price level upwards. The increase in the price level in turn raises the output (or supply level in the direction of AB. Point B, however, cannot



be an equilibrium point for the economy as a whole, for at P_1, workers will start to ask for a higher nominal wage rate so as to keep their real income from falling. This raises the cost of production and,hence, shifts the aggregate supply curve back to the left. Equilibrium will be attained at C, the real wages will be the same as that of point A, but the general price level will be higher now than before.

When we come to the cost push inflation theory, on the other hand, it is argued that the standard cost push inflation emanates from a disproportionate increase in factor prices over the required productivity level. For instance, an increase in the wage level over the equivalent level of labour productivity will raise the cost of production and thereby shift the aggregate supply curve from S_0 to S_1. Other things being the same, the general price level will escalate from P_0 to P_1. This in turn reduces real money balances, increases interest rate and causes a crowding out effect on the level of private investment and other interest sensitive expenditures. The first effect of such cost push factors is thus a reduction in the output & employment level and a rise in the general price level. This situation, however, will not last longer, for the reduction in the production - employment level- and a rise in the general price level will force the government to take action. Thus, if the Central Bank, for instance, increase the stock of money supply available in the economy, this will shift the aggregate demand curve from D_1 to D_2. This encourages production - a movement across the S_1 curve from E to F - and the economy reaches to the general equilibrium level at point F. This movement, however, raises, the general price level to P_2. This is the cost push theory of inflation in brief.

These theories, however, have serious shortcomings. First, it is very difficult to empirically identify a case of inflation as cost-push or demand pull inflation; and secondly, these theories are inherently static in that it can't help to explain a continuous rise in the general price level,i.e.inflation.[Frisch,p 248].

2.2.2. The Monetarist Versus The Structuralist Approaches with Special Reference To The Developing Economies

If we take a simple small open economy with fixed exchange rate, at least some four different views can be provided as to how, say, foreign prices can affect domestic inflation level. The cost-push view, for instance, emphasizes the impact of imported commodities prices on domestic price formation. The demand-push view, on the other hand, argues inflation is attributed to excess aggregate demand in world economy created by excessive monetary expansion beyond the supply capacity of the world economy. Monetarists can say that inflow of foreign exchange can lead to an increase in money supply, create disequilibrium in the money market and then inflation, unless it is sterilized by taking appropriate measures. And, finally, others can provide institutional and non market explanation in addition to what is stated above.

From this simple example one can observe that there are important differences among scholars as to the sources or causes of inflation in an economy. And depending on their approach, their analyses will have different impact and will require different inflation controlling techniques.

But, when we see studies under taken on LDCs, the important and well-known dichotomy in approach lies between what we call the monetarists and the structuralist[Aksoy,1982].

The monetarists' approach is the first and one of the well known inflation theories in economic literature. In 1963, A.Harberger formulated his popular monetarist model- what is now termed as the naive monetarist model[9]- to explain the dynamics of inflation in Chile. After that he and other scholars have tested the model in various Latin American countries; and the result shows that there is almost a one-to-one correspondence between the growth rate of money supply and that of inflation rate in these countries. This success story in explaining the inflationary process in the Latin American countries led to the formation of "a crude form of monetarism"[Aksoy,p.2]. However, much earlier from this period, there were attempts to

9 The original Harberger model takes inflation as a function of money supply, income and cost of holding money.

explain inflation based on the quantity theory of money[10] as it is explained in the previous section.

Though various authors have different approaches in explaining inflation in the same framework, monetarists generally hypothesized that inflation is essentially a monetary phenomenon. This, in short, means that a disproportionate increase in money supply - disproportionate compared to money demand - leads to inflation. The process can be summarized as follows: when there is excess supply in the money market, there will be excess demand in the goods market, for there will be a spill over of excess liquidity in the goods market which inflates the nominal value of demand. This raises prices. But, the "excess demand (in the goods market) can not have any long- run inflationary impact unless they are accommodated by money creation. This is because they will lead to unemployment, which in turn lead to moderate demand."[Tadesse,p.4]. Kallon[1994] explains this stand of the monetarists in a slightly different but explicit way. He argues that unless and otherwise the monetary authorities ratify it with money supply, increases inflationary process that is caused by non-monetary variables can not be sustainable, for "the negative real balance effect that ensues from the rising price level would ultimately reduce aggregate demand, lowering the general price level."[Kallon,p.210].

From this it follows that inflation process in a country can be best analyzed using a money demand/ money supply framework. This bespeaks, therefore, that all other factors that can determine the inflation level in a country influence the inflationary process in a country through the underlying money demand - money supply relationship[Alemayehu,p.6].

In other words, monetarists believe in that the rate and pace of inflation can be explained by the growth rate and pace of money supply. The implication of this argument is, thus, since inflation is an excess of money supply over the growth of output money supply is an important policy variable to control inflation, for the strong correlation between money supply and inflation rate

10 See G.C. Chow[1957]. For theoretical discussion see Frisch[1990]

makes the cost of monetary stabilization policies relatively minimum [Greene(1983);Frisch(1990);Tadesse(1994)].

On the other hand, structuralist oppose this argument and provide alternative explanations to the inflationary process in the developing countries. The work of Fitspatrick and Nixon[1976] is one of the earliest attempts in this regard. According to these economists, in particular, and the structuralist in general, institutional and structural factors are considered to be responsible for inflation. For instance, in most developing countries where there are potential economic resources for development, utilization of resources could not be realized due to little technical know-how, poor infrastructural facilities, etc. Because of this, "When you increase money supply you are not likely to get a production response that is commensurate with credit expansion (thus results in inflation) because of these underlying structural rigidities."[Tekle Birhan,p.14]. From this the structuralist generally argue that, although the coefficient of money supply could be highly significant in the model of inflation, it is just an indication but can not be the sole cause of inflation. But, even at this point, the monetarist Friedman tries to give a propounding clarification to the monetarists stand by identifying the role and limitations of other variables. He argues that "cost-push factors such as food prices, wages or exchange rate changes can only cause a shift in the price level but can not explain how it translates into sustained inflation. For this to happen, one needs monetary accommodation, with out which the inflationary process stalls."[Chibber et al p.3]. According to the monetarist theory, thus, non-monetary variables such as cost push or demand pull factors will not have independent effect on the rate of inflation in the long-run.[Kallon,p.210]. But Chibber and others still pinpoint the fact that, while money supply is a proximate cause of inflation, cost-push factors can put inflation into motion directly or indirectly

> *" by bringing about changes in the rate of monetisation and the velocity of circulation of money . The latter process works through the impact of exchange rate and wage and in administered food and public service prices (a common feature in most developing countries), which affects the size of fiscal deficits which in turn gets monetized and leads to inflation."*(Ibid.,p.3).

Hence, while monetarists consider controlling of money supply as the best policy prescription for managing inflation, structuralist focus on removing supply and other structural rigidities as the policy target.

In addition to what is stated above, structuralist still criticize monetarists in at least one ground:[11] the monetarist model doesn't take into account and analyze the sectoral differences in responses and the effect of relative prices changes on the inflation rate[Aksoy,p.55].

Consider, for instance, that there is an excess supply of money in a country. This will obviously need to an increase in demand for goods and services. This increment in real demand will be satisfied partly by price increases and partly by positive supply response. But the degree of the supply response will vary from sector to sector. The agricultural sector may not respond to changes in money supply while the industrial sector partially responds by increasing output. The output expansion requires an increase in employment and hence a rise in demand for foodstuffs. The rise in demand for food stuffs leads to a higher demand for wages by the workers and then high prices for industrial outputs.[12] At this moment, monetary deflation cannot be taken as a stabilization policy. Because reduction in money supply can reduce the output growth rate, but it can not reduce the inflation rate. In LDCs, where alternative financial assets are absent, a reduction in money supply makes credit more expensive. This will reduce output (but not the price level) by creating shortages of working capital. In fact this view can be specifically levelled as the Latin American structuralist view. [Canavese,p 524].

2.3. EMPIRICAL EVIDENCES

2.3.1. The Experience of Other Countries

Leaving the theoretical debate at this point and starting investigating what empirical evidences show up, we get enormous empirical evidences in both sides of the debate.[Along this, we try

11 In fact they are two. The first criticism was that the naive monetarists model does not include the response of output to changes in money supply. However, the neomonetarists solve this problem by modifying the Harberger-type inflation model. By doing so, they show that there is not only a strong relationship between money supply and output but also the fact that output responds not to money supply as such but to unexpected changes in money supply.

12 Importing food stuffs from abroad may not help, for it limits foreign exchange necessary to import intermediate and capital goods for industrial output.

to observe what the common determinants of inflation are across the developing countries, for it is one of the major objectives of the paper.]

In the monetarist way of modelling inflation, other things being the same, the rate of inflation is expected to vary positively with respect to changes in the money supply and negatively with that of real income. Furthermore, the coefficients of money supply should add up to unity.

One of the works in support of the monetarists' view is Abebayehu's work[1989]. He used single equation monetarist model to investigate the determinants of inflation in six African countries[13]using a quarterly data for the period 1960 to 1983. Using the appropriate estimating procedures he found that, on average, about 95% of the changes in the inflation rate in all countries is explained by the money supply, real income, inflation expectation and the world inflation rate. While the constant term in the model was expected to be around zero, for the velocity of money is assumed to be constant in the monetarist approach, in three out of the six countries it becomes statistically not different from zero at 5% significant level. The influence of world inflation on the variation of domestic inflation was also found to be statistically significant in four of the six countries. Specifically, he showed that inflation is highly responsive to changes in money supply and real income.

Thus in his conclusion he underscores that "The empirical results taken together do not reject the monetarists view of inflation."[p.].In his study, he noticed that though factors influencing the inflation process in these African countries differ from country to country, in most of these countries, money supply, real income and world inflation rates are important variables in explaining the process. However, in none of these countries foreign interest rate and exchange rate was significant.

Furthermore, London[1989] undertook a study that takes both the official and the parallel exchange rates into account. The study was carried out on sub-period basis,and his findings

13 These countries are Egypt, China, Morocco,Nigeria, the Sudan, and Tanzania.

show that the coefficient of money supply around one. Hence, he concluded that the results strongly confirms with the monetarists' idea.

K.M.Kallons[1994] also tried to observe the validity of the monetarists assertion, among other things, in his econometric analysis of inflation in Siera Leone. He developed both a reduced-form equation which is derived from a simple open-economy IS-LM model; and a monetarist model. Using quarterly data for the period 1967 to 1987. He discovered that ,though it is not hold in the short run, the monetarist proposition that the change in the money supply growth will affect inflation rate equiproportionately holds in the long run. However, the velocity of money did not remain constant in the period under discussion. Moreover, the second monetarist proposition which states that the effects of the growth rates of non-monetary variables are insignificant didn't hold in the Siera Leone's case. The results of Kallon indicate that inflationary expectation and world inflation(i.e., imported inflation) have an important effect on the rate of change of inflation in the country. In addition to these works, several studies undertaken on Latin American countries,i.e., highly inflationary countries also support the monetarists' view[Harberger(1963);Seehey(1979),etc.]

Contrary to the above findings, several works especially those undertaken on moderate inflation countries, reached to results which are far from the above conclusions[Saini,1982].

Among these works, a study pursued by Chow[1987] on China was consistent with this argument. In his analysis of money and price determination in China, he used a quantity theory of money to model the relationship. By regressing the ratio of the stock of money to real national income (M/Y) against the price level in the country (P)- and consequently employing an error correction representation- he showed that the ratio of money supply and national income explain a good proportion of the changes in the price level of the country. However, unlike the monetarists' premise that the coefficient of ln(M/Y) was found to be far less than unity.[14]

14 Of course, possible explanation can be given to this result. Chow argued that this can happen if (M/Y) is negatively related to income velocity of money(V). For instance, if (M/Y) increases, part of the effect of this change can be absorbed by a decline in V and, hence, it is only part of the (M/Y) change that increases P.

Another unpublished study of Tadesse Abadi[1994] also shows similar result.[15] He employed the Harberger-type model to explain inflation in Ethiopia. And, in his conclusion he confirms that "The argument that there is an almost one-to-one correspondence between the growth of money supply and the rate of inflation does not hold in Ethiopia."[p.10]

Similarly, Saini[1982] undertook a study on the monetarist explanation of six Asian countries[16] which experience from low to high inflation;and from moderate to high inflation growth rate. He built up an augmented monetarist equation which took money supply, income, expected prices and import prices into account; and using a step-wise regression he indicated that " in 5 out of 6 countries examined the monetarist model is able to account 50% of the variations in prices."[p.879]. Besides, the coefficients of money supply add up to unity in only two out of the six countries under investigation. The growth of money income was also insignificant in 5 of the 6 countries. Thus, based on these results, Saini concluded that regression results for the six Asian countries do not lend strong support to the monetarist explanation of inflation[p.880] He further suggested that the monetarist model may not be good in modelling the inflationary process in developing countries where the structural and institutional changes may take part of the money supply endogenous.

Up to this point all the studies we have assessed basically employed the monetarist approach in explaining the inflationary process in various developing countries. But there are also some studies which took and tested structural factors as explanatory variables in their studies.

One of such studies in this regard is the work of Moser[1995]. Through time analysis, he tried to identify the major determinants of inflation in Nigeria. He took both monetary and structural variables such as broad money supply(M_2), exchange rate, real income and agroclimatic conditions[17] - represented by amount of rainfall - for the period 1963 - 1993. Based on the standard OLS estimation techniques, he found out that all factors introduced in the model are

15The paper will be discussed in detail in section 2.

16 These are India, Philippines, South Korea, Sri Lanka, Taiwan and Thailand.

17 He observed that food prices and hence factors which influence food prices dominate the movement of CPI in the period he studied. These factors include agroclimatic conditions, wages, domestic inputs and import prices and rainfall. here, he took rainfall as an additional explanatory variables in his dynamic model.

statistically significant with the appropriate signs; and he also noted that they explained about 69% of the variation in the inflation rate. Also, a 100% increase in money supply causes a 69% in the inflation rate in the long run while 100% increase in rainfall decreases the inflationary rate by 34% a year. However, devaluation of the Naira (Nigerian currency) leads to only 25% increment in the inflation rate in the long run. Hence, using an error correction representation he provided an evidence that monetary expansion, devaluation of the Naira and agroclimatic conditions are the key determinants of inflation in that country.

Another study conducted by Odesokun also shows similar results. Structural factors such as per capita food production, depreciation of domestic currency along with the monetarist variables such as money supply and economic growth(income) are important determinants of inflation in 35 sub-Saharan countries. However, the expected positive impact of import prices on domestic inflation was not detected in the sample countries.

But a more interesting and detailed structuralist approach has been followed and estimated by Aksoy[1982]. In his study, he tried to capture,among other things, the relative sectoral differences in responses and the effect of relative price changes on Turkish inflation rate. After a series of estimation of the relationship between money supply, output and prices in both the agricultural and non-agricultural sectors he reached to the following important conclusions. He notice that the foreign exchange market has an important role in the relationship between output and money supply in the sense that the money output relationship depends on the degree of availability of foreign currency[p.56][18]. Secondly, and more importantly, the responses of agricultural and non-agricultural sectors' prices and outputs to changes in the money supply are different. 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 the structural factors[19] [p.57].

18 Furthermore, there is an indigenity of money supply in its relationship with prices

19 Part of the differences is attributed to changes in the government policies followed by the government of Turkey in the period under study.For more explanation, see Aksoy[pp57 and 59].

However, the whole analysis of Aksoy on the Turkish inflation is entirely consistent with the structuralist explanation of inflation in the developing countries.

To conclude this section we can say the following: From what we have discussed so far it is a little bit difficult to conclude that the monetarist approach is right and the structuralist approach is wrong or vice versa in explaining inflation process in the developing world. What we can say is that when we take the developing countries where several structural bottlenecks are commonly observed, it is worth to consider the structural factors in one's analysis with out loosing sight of the monetarists' important variables- money supply and income.

2.3.2. The Ethiopian Case

From the various studies we have mentioned so far, we have noticed that monetary as well as structural factors can be considered as the true sources of inflation in the developing world though it can differ from country to country. With regard to Ethiopia, however, there are not much works to be cited.

One of the few works done on Ethiopia is that done by Tekle Birhan Gebire Michael{1990]. In his analysis of inflation for the period 1973/74 - 1989/90, he took broad money supply (M_2), import unit value index, government tax revenue, real GDP, annual rainfall and velocity of money in his analysis. By statistical way of looking at the data he concludes that the fast growing money supply is the leading and persistent causes of inflation in the country. According to him, the broad money supply was growing at an average rate of 13%. In addition to money supply he noticed that indirect taxation also boosts the inflationary process,though it can not be taken as source of inflation. He also indicated that the severe drought occurred in the country also have accelerated the inflationary pressure with some lag effect[Tekle Birhan,p.16].

However his work has some limitations. As it can easily be seen from his work he tries to identify major determinants of inflation in the country by taking a careful look at some of the

years and by examining the level of growth of different important variables in his time series data. But analyzing a time series data in this way may be risky because of the fact that:

- the results depend on the combination of years he takes for analysis.
- the method is not useful to identify the long run relationship among variables, if there exist, without analyzing the time series characteristics of the data.[20]

Another related work in this area is that done by Semu Kifle[1994]. In his master's degree thesis, he tries to identify the interaction among government deficit, money supply and inflation in Ethiopia.

In his analysis, he specified the model in the monetarist framework in such a way that inflation in the country is considered to be a function of money supply, income, inflation expectation(measured in adaptive expectation form), and real money balances. Even though the Granger non-causality test indicates that there is no causal relationship between inflation and income he specified the income function and run a regression on the reduced simultaneous equation model. Based on this procedure, he found out that:

- the monetarist model did not explain the nature of inflation in the country very well.[The maximum R^2 in found to be 0.60. In time series analysis this is a very low coefficient of determination;
- the money growth variable becomes statistically insignificant and its coefficient takes the wrong Sign;
- inflation expectation and real money balances show a statistically significant explanatory power;
- Despite the results of GNC test between price and income, the latter becomes consistently statistically significant.

20. Of course, the paper was not presented for purely professional purpose. Rather it is presented for non professional readers, too. Because of this we may a little bit overvalue the depth of the analysis more than it deserves.

From these results he argued that "events that can neutralize the effect of money supply on price level"(pp. 59 - 60) and underestimation of the macroeconomic variables such as output level in the country may be attributed to the failure of the modified Cagan model employed in the analysis.

Thus, he built another single equation model which took all the above mentioned variables plus the rate of changes of government deficit into account. The results still remains generally unsatisfactory,however.[21] The newly added variable was also remain insignificant.

Regarding the core of his analysis ,i.e., the interaction between money supply, government deficit and inflation, he argued that Ethiopia has not experienced high inflation rate in the face of high government deficit and money supply growth rate. Although he did not say much regarding the interaction between government deficit and inflation, he found out that there is no Granger causality between money supply and inflation. According to him, the reasons for this result lie on the degree of monetization of the economy, the impact of food aid, foreign exchange availability, tight monetary control, self-restraint on consumption and the size of the informal sector.[22]

This work, however, has some shortcomings:

1. The first problem of the paper is that it did not incorporate the lags of important variables such as income and money supply in to account. Because of this it does not allow us to see whether these variables have any possible lag effect on the inflation level of the country. (In other words, the author couldn't capture the full impact of these variables on the inflation rate).
2. The impact of some important variables such as the real exchange rate and other structural factors on the inflation of the country were not measured in the model. Even

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21. Out of the four equations estimated, the F- statistic show that two are not statistically significant, The maximum R2 is found to be 0.49.
22. vFor detail explanation, see Semu(1994).

though his main objective was not to analyze the dynamics of inflation process in the country, the inclusion of these variables could give some light in explaining the interaction that exists between money supply, government deficit and inflation rate in the country.

3. The last problem of the paper emanates from the methodology he pursued. As we all know, any researcher who bases his/her analysis on time series variables should study and understand the time series characteristics of the variables. Some of the variables may be nonstationary while others are not; and also some of them may not be normally distributed while others are. If any of the above situation occurs in our data, some sort of transformation has to be made before he/she proceeds to any further analysis.[23]This study also shares this problem. In the study we have not encountered such tests so that the result is very much dependent on the behaviour of the data.[24]

The last but not least study we have with respect to inflation in the country is that of Tadesse's work. In his unpublished work on the monetarist explanation of inflation in the country, he employed a Harberger-type monetarist model to survey factors that can explain the inflation process in the period 1970/71 - 1991/92. To do so, he expanded the Harberger model which commonly include income, money supply and the rate of changes in the cost of holding money by including the rate of changes in import prices into the model. Unlike Semu's work, he also included the lagged values of income, money supply and import prices to capture the full impact of these variables on the dependent variable,i.e.,inflation. After he formulated the model in this way, he ran a series of 8 estimations and found out that the monetary growth variable became statistically insignificant in all cases except one implying that monetary variable has no significant influence on inflation in Ethiopia in the period under discussion. On the other hand, variables such as real income, inflation expectation rate(or cost of holding money), and the rate of changes in import prices became statistically significant with proper signs.

23. We express the impact of such procedures in our methodology part.
24. For instance, the GNC test he undertook between income and prices showed that there is no causal relationship between the two variables. But, when he included this variable in the inflation equation, it turned out to be statistically significant. This indicates the existence of some sort of problem in the procedure he followed.

From this he concludes that" The monetarist explanation of inflation, in addition to its failure to adequately explain the inflationary process in Ethiopia. does not lead the general policy prescriptions monetarists forward to control inflation,"[p.9]

From what we have discussed so far, we may notice that factors such as income, inflation expectation and the rate of changes in import prices are found to be important determinants of inflation in the country. But the monetary variable becomes less important in controlling inflation in the country, perhaps, as Tadesse stated it, due to the structural regidities prevailing in the economy.

2.3. Some Points on Repressed and Hidden Inflation

Inflation can be classified in a number of ways depending on various criteria. For instance, it can be categorized as open or repressed (based on the workings of market mechanism); creeping, moderate, or galloping, hyper-inflation(based on the rate at which prices increase); anticipated or unanticipated(based on inflation expectation); and cost-push or demand-pull inflation(depending on sources of inflation) [Frisch,p.11].Among these types of inflation we concentrate on the first type of inflation i.e., open as opposed to repressed inflation.

Usually, in a market-led economies the change in the leverage of inflation is measured by the rate of changes of the consumer price index. But this measurement to be plausible first of all, the goods market should be in equilibrium and secondly the CPI should fairly represent transaction prices.

In highly regulated economies, however, these two presumptions are not likely to be satisfied. the reason is simple. The fact that these economies are ruled by a command system means that the official prices can not be market clearing prices. The existence of inexorable or rigid prices, exchange rates, wages and interest rates clearly show that equilibrium does not usually maintain in the goods, money and labour markets of these countries[Darbeck,p.4]. Since the officially recorded prices usually fail short of the implicit-market -clearing prices, the consumer price

indices are considered as poor indicators of the 'true' inflation rates in these countries.[Imai,p.130]

Contrary to what official CPIs indicate various studies conducted in highly regulated economies proved the coexistence of various types of inflation in these countries. One of them is repressed inflation.

Repressed inflation is a situation of the existence of unrecorded inflation which is suppressed by using various mechanisms such as price and wage controls; and there is a possibility of inflation increment if these controls are abolished.

The existence of repressed inflation,i.e., the presence of the above listed rigidities and their implication in the respective markets - excess demand in the goods market and monetary overhang in the money market - is usually expressed as searches for scarce goods and services, "forced" substitutions and force savings, long queuing, the existence of rationing systems, etc. These obviously lead to the emergence and expansion of parallel markets in the economy.

In addition to the repressed inflation there is also what we call hidden inflation. This type of inflation represent the existence of a deterioration of the quality of commodities without a corresponding drop in their prices. " As the quality of an item went down without a corresponding drop in prices," said Darbeck,"ceteris paribus, its implicit price increased (due to quality deterioration) although the explicit price remained unchanged. This downward price rigidity represent, in fact, an inflationary pressure"[p.4]. In fact, it is difficult to capture hidden inflation independently.[25]

25 In fact, this can be considered as repressed inflation, for the deterioration of the quality of the commodity or the supply of inferior quality goods is basically,under normal condition, a result of scarcity of that commodity in the market. If a standard quality commodity, even if it is scarce, is forbidden to be sold at higher prices, for the cost of holding is higher now than before, quality reduction can be considered as an alternative way of fetching the desired price.

CHAPTER 3: SPECIFICATION OF THE MODELS AND METHODS OF ESTIMATION

In this paper the dynamics of inflationary process in the country will be studied using time series analysis using data for the period 1967 -1994. Basically, we will construct an error correction model provided that the variables we use in the analysis are cointegrated.

To investigate the inflationary processes in the country, we will construct two independent models: one based on the monetarist theory of inflation and the other based on the stracturalists view. The latter encompasses additional models which help us to see the relative sectoral difference in response to changes in some of macroeconomic variables.

3.1. SPECIFICATION OF THE MODELS

3.2.1. The Monetarist Model

Since monetarists adhere to the idea that inflation is caused by excess money supply over the real demand for money, their models will best be explained under the money demand/money supply frame- work. Hence,we can state the model as

$$\log(P_t)=\log(M_{2t})-\log(\frac{M^d}{P_t})\text{.....(1)}$$

where P_t is the general price level, M_{2t} is nominal (broad) money supply and M^d/P_t is the real demand for money. But the real demand for money is basically a function of real income (GDP), inflation expectation and expected real interest rate.

$$\frac{M^d}{P_t}=f(y,p^e,r^e)\text{.....(2)}$$

where, y_t = real income or real GDP

p^e= a proxy for cost of holding money

r^e= expected interest rate.

According to the theory of demand for money, a rise in real income leads to an increase in demand for money. An increase in cost of holding money will lead to a decline in the demand while expected interest rate is expected to affect the demand for money negatively. But, since interest rate was institutionally determined for quite a long period of time and since the financial market is so underdeveloped in the last 30 years we omit r^e from the model.

Hence, Eq.(1) can be explicitly written as

$$\log(\frac{M^d}{P_t})=a_1\log(y_t)-a_2\log(P_t^e).....(3)$$

And based on adaptive expectation, the latter is equal to

$$P_t^e=P_t+\alpha(P_t-P_{t-1}).....(4)$$

Note that from now onwards, including Eq'n 5, every thing is expressed in logarithm forms. Substitute equation (3) in (2) and then equation (2) in (1). This will give us;

$$P_t=a_0+a_1M_{2t}+a_2y_t+a_3P_t^e+\epsilon_t.....(5)$$

Moreover, the monetarist model is usually augmented by including import price index so as to capture the effect of imported inflation in a country. Hence, adding import prices into the model will give us the augmented monetarist model for the country.

$$P_t=a_0+a_1M_{2t}+a_2y_t+a_3P_t^e+a_4P_m+\epsilon_t.....(6)$$

where P_m represents import price index.

Since we do not know the period of adjustment apriorily and since we should know the time profile of the explanatory variables effects on the inflation rate, we express the final model in a general autoregressive form.

$$P_t=a_{0t}+\sum_{i=0}^{m}a_{1i}M_{2_{t-i}}+\sum_{i=0}^{m}a_{2i}y_{t-i}+\sum_{i=1}^{m}a_{3i}P_{t-i}^e+\sum_{i=0}^{m}a_{4i}P_{m_{t-i}}+\epsilon_{ot}..(7)$$

where e_{0t} is a residual term.

If we assume that income velocity of money in the country is constant, then a=0, so that we can drop it.

In this long run model inflation is expected to vary positively with money supply, cost of holding money and import prices while real income is expected to affect inflation adversely.

3.2.2 The Structuralist Model

The structuralist argue that though money supply can be an important factor in explaining inflationary process in a country, there are other structural and institutional factors which are equally important in the analysis of inflation especially in the developing world. In addition to this they argue that money supply might explain the inflationary process; but money supply is explained by structural factors, causing money to expand without control from the central bank.

To construct a model which encompasses the structuralist idea, therefore, we should employ additional variables upon the monetarists' model. Hence, we add government deficit level, world inflation rate, real exchange rate and rainfall into the model.

We add rainfall in the model for the simple reason that -the effect of rainfall on food and food related consumer goods price index will be substantial. In addition to this, government deficit level can be a cause for inflation depending upon the way it is financed. Hence, the monetarists' model can be transformed as

$$P_t=a_0+\sum_{i=0}^{m}a_{1i}M_{t-i}+\sum_{i=0}^{m}a_{2i}y_{t-i}+\sum_{i=1}^{m}a_{3i}P^{e}_{t-i}+\sum_{i=0}^{m}a_{4i}P_{m_{t-i}}+\sum_{i=0}^{m}a_{5i}W_{t-i}s+\sum_{i=1}^{m}a_{6i}$$

$$+\sum_{i=0}^{m}a_{2i}RER_{t-i}+\sum_{i=0}^{m}a_{7i}R_{t-i}+\sum_{i=0}^{m}a_{8i}GDEF_{t-i}+\alpha \quad \text{.....(8)}$$

Where, GDEF= the government deficit level,

R_t = rainfall (by millimetre)

RER_t=real effective exchange rate W_t= world inflation rate and

α= the error term

But some researchers, such as Aksoy, argue that modifying the monetarist model by adding some structural factors up on the monetarist model does not do justice to the structuralist argument.Thus, it is at least essential to look at the behaviour, and hence, the impact of differences in relative prices on the inflationary processes of the country[Aksoy, p.9].

Hence, to capture the relative sectoral differences in responses and the effect of relative sectoral changes on the inflation rate in the country, we set up a sectoral price equation as follows:

$$P_a = a_0 + a_1 M_{2t} + a_2 Y_a + a_3 P^e + a_4 P_{m_a} + e \ldots\ldots\ldots (9)$$

where, P_a= agricultural GDP deflator

Y_a= real agricultural income

P_{ma}= agricultural import prices

α_0= the error term.

This is a price equation for the agricultural sector. Similarly, for the non-agricultural sectors the required equation is set up as,

$$P_n = b_0 + b_1 M_t + b_2 Y_n + b_3 P^e + b_4 P_{m_n} + e \ldots\ldots\ldots\ldots\ldots (10)$$

Finally, if the variables in our models cointegrate we reparameterize Eq'n (7),(8),(9)) and (10) into error correction forms. Hence, by adding, subtracting and rearranging terms appropriately, the monetarist model i.e. Eq'n (7) will be:

$$\Delta P_t = a_0 + \sum_{i=0}^{m} b_{1i} \Delta M(2)_{t-i} + \sum_{i=0}^{m} b_{2i} \Delta y_{t-i} + \sum_{i=0} b_{3i} \Delta P^e_{t-i} +$$

$$\sum_{i=0}^{m} \Delta + b_{8i} EC_{t-1} + \varepsilon_{0t} \ldots\ldots\ldots (11)$$

And the structuralist' model i.e. Eq'n (8) will be presented as:

$$\Delta P_t = a_0 + \sum_{i=0}^{m} b_{1i}\Delta m^s_{t-i} + \sum_{i=0}^{m} b_{2i}\Delta y_{t-i} + \sum_{i=0}^{m} b_{3i}\Delta P^e_{t-i} + \sum_{i=0} b_{4i}\Delta P_{m_{t-i}} +$$

$$\sum_{i=0}^{m} a_{5i}W_{t-i} + \sum_{i=0}^{m} a_{6i}RER_{t-i} + \sum_{i=0}^{m} a_{7i}R_{t-i} + \sum_{i=0}^{m} a_{8i}GDEF_{t-i} + b_9 EC_{t-1} + \mu_{0t} \ldots (12)$$

$$\Delta P_a = C_0 + \sum_{i=0}^{i=m} b_{1i}\Delta M^s + \sum +_{i=0}^{i=m} b_{2i}\Delta Y_a + \sum_{i=0}^{i=m} b_{3i}\Delta P^e + \sum_{i=0}^{i=m} b_{4i}\Delta P_{ma} +$$

$$+c5EC_{t-1} + \gamma_{0t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (13)$$

$$\Delta P_n = d_0 + \sum_{i=0}^{i=m} d_{i1}\Delta M^s + \sum_{i=0}^{i=m} d_{i2}\Delta Y_s + \sum_{i=0}^{i=m} d_{i3}\Delta P^e + \sum_{i=0}^{i=m} d_{i4}\Delta p_{ma} +$$

$$f_5 EC_{t-1} + \psi_{0t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (14)$$

In all equations EC_t represents the error correction terms. And it is calculated as

$$EC_t = P_t - \hat{P}_t$$

where P_t = actual value of the general price level, and

$\hat{P}_t$ = the fitted value estimated in equation (7), (8), (9) and (10) respectively

Expected Signs

In our model, money supply, expected price level, world inflation rate, government budget deficit, and real exchange rate are expected to affect the inflation rate positively while income and rainfall are believed in to have a dampening effect.

3.2 ESTIMATION TECHNIQUES

3.2.1 Tests of the Order of Integration and Cointegration

A. Test for Unit Roots

To estimate the models we will first test for stationarity on all variables in each model. That is, we test whether they follow a random walk or not. The point here is to look at whether the economic variables in the model will tend to come back to their long run trend if a certain shock occurs at a certain point in the series. This is important for a number of reasons. First, regressing one random walk variable against other random walk variables can lead us to spurious results. This is because of the fact that a random walk does not have a constant mean and a finite variance. This implies that OLS will not give consistent estimators. Secondly, the effect of temporary shocks on a variable may have a long run or short run memory. Depending on the effect, the policy implication of our analysis will vary [Pindyck &Robinfeld,p 460-67].

To test for unit root and the order of integration in a series, various methods are proposed in econometric literature. Among these DW- test, Dickey- Fuller and Augmented Dickey-Fuller (ADF) tests, Philip and perron's, KPSS test,Z- test, etc can be mentioned. But among these tests Dickey-Fuller (DF) and ADF are the most widely applicable tests in practical research. Here we use the ADF test[26] to identify the existence of unit root and the order of integration of a variable in our analyses. Generally the test can be represented as

$$y_t = a + bt + \rho y_{t-1} + \sum_{i=1}^{i=q} \theta_i \Delta y_{t-i} + e_t$$

where, y is a series and t represents a trend variable

26. In our test for unit roots, we do not use the DF test because of the risky assumption up on which the test is built. The test is established based on the assumption that the error term in the AR(1) process of a variable to be tested has to have no intercept (drift) and no time trend. If this assumption is violated, the test is no longer correct[Holden and Perman, p.57]. But the ADF test is consistent even if the above restrictions are violated.

B. Test for Cointegration

If some of our variables follow a random walk, however, we may difference them to convert them into stationarity before we use them in our regression. But this procedure has its own limitation. That is, "By analyzing only the differences of economic time series,all information about potential economic variables is lost..."[D.Hendry.p]

However, there is a possibility to regress a random variable against other random walk variables in levels iff they cointegrate. Thus, based on standard cointegration techniques we will test the existence of cointegrated relationship among the variables. And if they cointegrate this possibility will enable us to utilize the long run information embodied in the integrated variables.

Here, test for cointegration will be made using Engle- Granger two-step procedure and Johansen Vector Autoregressive (VAR) techniques.

The Engle - Granger two - step procedure is under taken as follows. First, we will run a bivariate OLS regression in level;as,

$$y_t = a_0 + bx_t + z_t \ldots\ldots (1)$$

where, z_t is the estimated residual.

Then save the residual, z_t, and test whether it is unit root using the ADF test mentioned above. If the error term is stationary, then we say that the integrated variables are cointegrated. But, " If the two variables are cointegrated and a third integrated variable, but not cointegrated with the other two, is added to the equation, the residual will still be a stationary process. This is so because OLS minimizes the sum of squares by setting the coefficient of the third non stationary... variable to zero,"[Boo Joo, p.11]. And this is a problem, for the test assumes the existence of only one cointegrating vector.

To overcome this limitation, therefore, we use another procedure called Johansen vector autoregressive procedure. This test is based up on the vector autoregressive error correction representation.

$$\Delta X_t=\mu+\Gamma_1\Delta X_{t-1}+\Gamma_2\Delta X_{t-2}+\ldots+\Gamma_{t-p}\Delta X_{t-p+1}+\Pi X_{t-p}BZ_t+U_t$$

where x_t is an m x 1 vector of an I(1) process while z_t is an s x 1 vector of I(0) variables. In this procedure, determining the lag length of the variable is essential so as to get a Gaussian residual.

However, one important point we should bear in mind is that the Johansen VAR procedure may not be applicable if we have variables with two or more than two order of integration unless that variable is somehow changed into an I(1) or I(0). This is so because of the fact that the standard Johansen procedure is designed for I(0) and I(1) variables[Harris,p80]. But this does not mean that the existence of an I(2) variable does preclude the possibility of having stationary relationship, i.e., cointegration, in the model[Ibid, p.80].

Finally, if the variables cointegrate the error term of this relationship will be used to construct a dynamic error correction model. This enables us to analyze the impulse response of inflation to a stimulus in the explanatory variables in a dynamic setting.[G.Moser,p.280]

C. Granger Non-causality Tests

The test for Granger causality will enable us to see whether a variable or variables Granger-cause another variable.[The whole concept of this test is to investigate whether a variable is not causing another variable.] This implies that a variable,say x_t, to cause another variable,y_t, its lags should predict y_t. This can,therefore, be tested using autoregressive distributive lag model of the variable; as,

$$y_t=\sum_{i=1}^{m}a_iy_{t-i}+\sum_{i=1}^{m}b_ix_{t-i}+\epsilon_t$$

where y_t is explained by lagged value of x_t and y_t. But, since our interest here is to see whether the lagged values of x_t predict y_t, we include the past values of the variables only. This will enable us to see the contribution of x_t in explaining y_t. So, using f statistic if the coefficient of x_t, i.e.b_i,is found to be significant, then we conclude that x_t Granger cause y_t. But we should note that the causal relationship can be from both direction.

3.3. Variable Definition

As we have mentioned earlier this study concentrates on explaining inflationary process in the country. To this end we use various variables that are supposed to explain the inflationary pressure in the country as arguments in our models. Thus, in this section we will define and justify why we use them in our models as follows.

When we come to the monetarist and the structuralist models, we use the Addis Ababa retail price index to calculate the inflation rate series in the country. Regarding the monetarist model we take real income, money supply and expected prices into account.

Real income is taken as GDP measured at 1980 constant factor cost. This is included in the model for it is expected to play a dampening role in the inflationary process of the country.

Expected price, on the other hand, is computed following adaptive expectation rule. But to compute it in a way it is specified in eq'n 4. We first derive ten expected price series[27] and select that coefficient which gives the highest R^2 as the one which generates the best expected price series.

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27. We first set the equation as follows.

$$P_t^e=\psi P_{t-1}+\psi(1-\psi)P_{t-1}+(1-\psi)\psi^2P_{t-2}+(1-\psi)\psi^2+(1-\psi)\psi^3+P_{t-3}+(1-\psi)\psi^4P_{t-4}+(1-\psi)\psi^5+P_{t-5}$$

When =1, then $P_{e_t}= P_{t-1}$; and when =0, $P^e_t=0$. Thus, in between we have a series of expectation when =0.1, 0.2, 0.3, ...,0.9. The we regress each series taking as dependent variable and select that which gives the highest R^2. In our case, we found that =1 gives the highest fit, . [We adopt this model following Aksoy(1982].

With respect to money supply we take the broad money supply, M_2, so as to capture the possible impact of inflation in the country. Why we include money supply into our model is already explained in chapter 1.

Other factors which we consider in the structuralist model are government deficit, real effective exchange rate, import prices and rainfall. Government deficit can create inflation in a country depending on the way it is financed. In our case, persistent government deficit was prevailing in almost every year of the period under discussion.

As it is explained in chapter 3, the reasons for this can be the level of economic development, government control over its expenditure, growth and/or instability of government revenue and the extent of the government participation in the economy. In our country, all these factors are considered as the source of persistent government deficit in the country. And the source of financing the deficit have been resorting from external sources to domestic (bank) borrowing. Thus, to see whether this structural factor is a possible cause of inflationary process in the country we include government deficit in the model as a ratio of GAP.

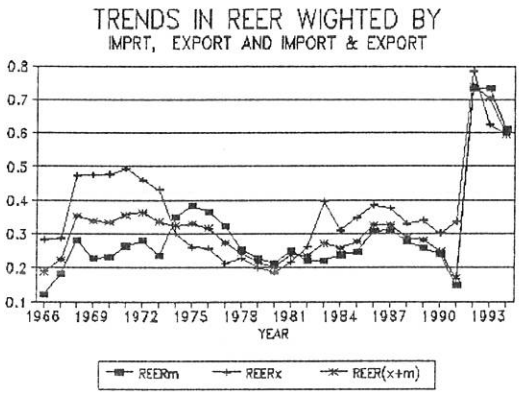
The movement of exchange rate can have a direct impact on inflation by affecting the terms of trade and the balance of payments position of the country. Devaluation or depreciation of a currency, for instance, can bring about a direct or/and indirect increases in prices by raising prices of imported as well as exportable goods consumed domestically, and by putting higher pressure on wages and thereby setting the wage - price spiral into motion. When we come to our case, though nominal exchange rate was fixed for quite a long period of time, the real exchange rate was fluctuating across the period. So, to capture the true effect of the exchange rate on the inflation rate, we compute the real effective exchange rate by weighing the nominal exchange rate by the ratio of foreign consumer price indices (CPIw) to domestic consumer price index (CPId). Both indices are weighted by the trade share of major trading partners of the country

$$REER = E\frac{CPI_w}{CPI_d}$$

where E= nominal exchange rate [Birr/foreign currency

CPIw= the CPI of the 10 major trading partners of the country[28].

We weigh the trade partners CPI using import share, export share and import and export taken together. After observing the trend we select that real effective exchange rate weighted by the latter. (see the figure)



We also take world inflation rate and import prices to capture the impact of the external world on the countries inflation process. Since the country is a small country it is expected to be influenced by the external world though it can not influence the world economy in turn.

Finally, we take average rainfall as a proxy to capture the impact of some structural factors on the inflation process. As we all know the country's economy is very much agrarian. And the latter is basically a rain-fed agriculture operating at a subsistence level. From this it follows that the amount of rainfall the country gets in a particular year directly affects to the performance of the agricultural sector and hence the level of inflation in the country. Thus, the availability of rainfall is expected to play a dampening role in the inflation process of this agrarian economy.

28. These countries are USA, UK, France, Italy, Netherlands, Germany, Japan, Djibouti, Kenya, S. Arabia, China

CHAPTER 4: TRENDS IN INFLATION AND PRICING POLICIES IN ETHIOPIA

4.1. Trends in Inflation

The rate of inflation in Ethiopia is usually calculated from Addis Ababa retail price index (AARPI) which takes the 1963 prices as base year prices. But, as it has been discussed in chapter 3, this index,in addition to its lack of coverage, can not be representative to the country as a whole. Thus, an alternative proxy for inflation rate in the country- GDP deflator- has been calculated. But this also creates inconsistency in our analysis since the country's GDP is constantly in revision. Because of this we go back and use the AARPI as a proxy for the country's retail price index.

Though various policies have been adopted to stabilise prices and to keep prices low[29], inflation rate in the country has been generally on the increase in the last three decades. To begin with, during the last seven years of the Imperial era, the rate of inflation was very low because of the low level of government deficit and the tight monetary policy the government was pursuing. But, even under such situation the rate of inflation escalated from 0.97% in 1972 to 10.67% in 1973 following the 1973 oil crisis.

During the Derg regime, on the other hand, the level of inflation rate in the country shifted upward though it was oscillating dramatically from year to year. Particularly, during the first five years of the regime, the rate of inflation grew to a two digit level. In the period between 1974-79 alone, the average inflation rate reached to 14.85%. This is, indeed, a very dramatic shift for the country when it is compared to the period average of 2.84% for the period 1967 to 1973.

Following the 1970's rise in the general prices, therefore, the new government (the Derg), took various radical measures so as to control the ever escalating but fluctuating inflation rate in the country. Various price control mechanisms had been laid to the extent of distributing essential

29. These policies will be reviewed in section 4.5.

goods through kebeles and peasant associations. Because of this the government was able to ease the inflationary pressure in the country.

However, in the 1980s, especially in 1981, 83, 85, and 1993, the inflation rate shifted enormously to a higher level. This usually happens because of the general increase in the food price level which accounts for a remarkable weight (58%) in the consumer price index. More or less similar situation has also happened after 1987/88 as a result of the severe foreign exchange shortage that were prevailing during the second half of the 1980's. During this period domestic industries were forced to operate below capacity because of shortages of raw materials and spare parts [TGE(2). p.3]. This situation created shortages in supply of domestically produced industrial goods in the government or public [30] distribution agents and thereby raised the general price level even though tight price controls were employed by the government to suppress the true inflation rate that would have prevailed in the country had there not been a price control.

After 1991/92, however, inflation rate in the country did show a declining trend because of good weather and radical measures that have been taken by the new government of the country. But in general inflation rate in the country has been escalating in the period under discussion. The logical question that should follow is thus: what are the possible causes of inflation in the country?

To answer this question one perhaps needs to look at the demand as well as the supply side of the economy. Thus in the next section we try to see which side of the economy is responsible to the movement of true inflationary process in the country.

30. For a detailed discussion, see section4.5 .

4.2. The Demand Side of the Economy as a Possible Source of Inflation.

Though aggregate demand in the country has been growing at an average rate of 3.5% in real terms, the growth rate of aggregate consumption expenditure by both the private sector and the government was growing at an average rate of only 1% per annum. This, from the outset, indicates that aggregate demand in the country was very low in the period under consideration. This point will be clear when we consider the real per capita demand and per capita consumption in the country.

As it can be seen from Tables 3 & 4 below, real per capita demand in the country has been growing at an average rate of only 0.5% per annum while per capita private as well as total consumption declined at a rate of 2% annually. From this one can deduce that the idea that the demand side of the economy can be a possible source of inflation in the country is unsubstantiated. But, before we reach to this conclusion, we perhaps need to see the consumption pattern of the population in some detail.

Table 3: **Periodic Average Growth Rate of Aggregate Demand and Some of its Components in real terms (1967-1994)**

	1967-1973	1974-1979	1980-1984	1985-1990	1991-1994	1974-1990	1967-1994
GDE	2.7	4.3	2.4	3.6	4.9	3.5	3.5
C	3.0	-5.0	3.0	1.0	4.0	-0.3	1.0
-P	3.0	-6.0	3.0	1.0	5.0	-1.0	1.0
-G	4.0	-1.0	2.0	3.0	-2.0	2.0	2.0
PCGDE	0.6	2.4	-3.7	0.3	3.1	-0.12	0.5
PCC	1.0	-7.0	-3.0	-2.0	2.0	-4.0	-2.0
PCP	1.0	-7.0	-3.0	-2.0	3.0	-4.0	-2.0
PCG	1.0	-1.0	-4.0	0	-4.0	-1.0	-1.0

Where GDE = Gross domestic expenditure
C = Consumption expenditure
P = Private consumption expenditure
G = Private consumption expenditure
PCGDE = Per Capita GDE
PCC = Per Capita Consumption expenditure
PCP = Per Capita Private Consumption expenditure
PCG = Per Capita Government Consumption expenditure

Source: MEDaC, 1996.

Table 4: The Periodic Percentage Distribution of Aggregate Domestic Expenditure in Ethiopia [1967-1994]

	1967-1973	1974-1979	1980-1984	1985-1990	1991-1994	1974-1990	1967-1994
GDE	100.42	104.04	107.4	106.8	108.5	106.00	104.96
CE	88.38	95.16	94.02	91.85	94.8	93.66	92.50
Govt	10.28	15.22	15.78	17.45	10.65	16.17	13.91
Private	78.1	79.94	78.24	74.40	84.15	77.49	78.59
Inv't	12.03	8.88	13.4	14.95	13.7	12.35	12.46
Export	11.30	12.50	9.56	7.98	9.65	10.04	10.36
Import	11.71	18.50	16.98	23.77	18.3	19.91	17.63
GDP	00	100	100	100	100	100	100

Table 5: Rural and Urban Consumption Expenditure Pattern [1981/82]

	Food	Bev & Tobacco	Clothing	Housing	House Hold equipment	Housing Exp.	Services	Other Consumption
Rural	54.58	7.13	5.92	14.90	1.33	0.55	5.45	4.00
Urban	37.9	5.8	6.7	11.5	(5.0)	13.5	15.1	9.1

Source: adopted from TGE, The impact of Liberalisation & Devaluation, May 1992., pp 9 & 16

From table 4, one can observe that the lion share of the aggregate demand in the country is accounted for consumption [93%]. Out of which more than 3/4th of the demand [79%] constitutes by private consumption demand. In a study undertaken to investigate the possible inflationary impact of liberalization and devaluation in the country [TGE (2) 1992], it has been shown that both the rural as well as the urban population in the country spends a significant proportion of their income on food [see table 5]. Specially, the rural population which represents more than 85% of the total population, allocates more than half of its expenditure on food items [54.6 %] followed by housing and beverage at 14.9 and 7.12 percent share, respectively.

On the other hand, the urban population's expenditure patterns indicate that it spends 38 % of its expenditure on food followed by services and housing expenditure. From this one can infer that the rural population is vulnerable to changes in food, housing and beverage prices while the urban dwellers are sensitive to changes in food, housing expenditure and beverage price [Ibid, p 10].

4.3. The Supply Side of the Economy as a Possible Source of Inflation.

In the previous section, we have argued that aggregate demand in the country was too low that it could not create inflationary pressures in the country. Here we try to investigate whether the supply side of the economy, was indeed, the source of inflationary pressures in the country.

4.3.1 Food Supply and Inflation

In the period under discussion food, especially cereal production, in the country has been fluctuating tremendously depending upon the climatic condition in the country, for agricultural yield in the country is very much dependent on rain. According to the information we have, out of the 28 Years we consider the growth rate of domestic cereal production was negative for about 50 % of the time. Because of this the government was trying to fill the gap by importing cereals and other food items throughout the period. But this does not seem help much. Because, even after importing food items from abroad, the availability of food items in the country has been growing at very slow pace [2 % per annum], which is by far less than the average population growth rate [2.9 - 3.2 % per annum]. This indicates that the general food price level should have grown tremendously (than what it reaches now) and thereby shift the general price index upward considerably.

Table 6: Food Availability and The Movement of Food Price Index in Ethiopia [Periodic Average]

	67-73	74-79	80-84	85-90	91-94	74-90	67-94
Availability of Food (in ton)	5317.3	4913.3	5775.9	5966.3	5360.7	5538.6	5457.9
Average Growth Rate	-3.0	10.0	-5.0	2.0	5.0	3.0	2.0
Food Price Index	139.77	253.22	389.79	569.43	657.29	404.99	421.67

However, the governments, especially the Derg administration, exerted efforts to control the general food price by installing various price controlling and stabilizing mechanism throughout the country. This further suppressed the production incentive in the country because of the very

low price set for their products. Thus food insecurity became one of the features of the country in the period under discussion.

4.4. The Relation between Some Macroeconomic Variables and Inflation in the Country.

Indeed, most of the variables that we are going to look at in this subsection are the by-products or reflections of the supply constraints that we discussed in the previous subsection. A declining per capita income, a stagnant export sector, declining foreign exchange availability, the balance of payment difficulties, chronic shortage of food in the country, etc.., are all associated with the performance of the economy in the field of production. Because of this, this subsection can basically be taken as an extension of the discussion we held in the previous sub-section.

4.4.1 Income, Money Supply and Inflation

As we have seen in section 1.1 the real income growth rate in the country has been sluggish for the last 28 years and hence per capita income has been declining. Rural income level in the country has remained low for almost three decades because of the subsistence level of production, discouraging price controls, and repeated droughts hitting the country in the period under discussion.

Wages and salaries have also been consistently declining because of the fixed nature of wages and salary structure[31] [Semu, pp 46-48]. Wages and salaries have been adjusted only twice during this period [1975/76 and 1993/94] and, hence, the generally increasing prices in the country obviously eroded the real value of wages and salaries. This tight wage policy, perhaps, detained the wage-price spiral from setting in motion the inflationary process in the country.

On the other hand, broad money supply has been galloping throughout the period at an average rate of 13.3 % per annum [see Table 7]. The general trend in money supply shows that broad

31. "The average wage increment for the civil servant was not more than 4%.."[Ibid,p 47]

as well as narrow money supply has been increasing steadily for the last thirty years. During this period broad money supply escalated from Birr 546 million in 1965 to Birr 14 billion in 1995.

According to the information we have, the difference between narrow and broad money supply, i.e, the level of quasi money, was indeed very insignificant. But, after 1974, this grew wider and wider. In addition to the increase in the quasi money, the share of domestic credit in the broad money became significant. According to Alemayehu Azeze, domestic credit became an important component of money supply in that from 1960 - 1992, the ratio of domestic credit to broad money amounted to 90% [Alemayehu ,p.41]. In addition he found out that while the share of private sector in the domestic credit was greater than that of the government before 1973, after 1973, especially during the Derg regime, the share of the government from domestic credit increased considerably. And this happened because of fiscal conservatism followed in the Imperial era and the high public sector expansion during the Derg regime.

Table 7: Growth Rate of Income, Money Supply and Inflation [1967-1994]

	1967-73	1974-79	1980-84	1985-90	1991-94	1974-90	1967-94
Y	3.82	1.52	0.21	3.61	2.49	1.87	2.45
M2	13.67	12.2	12.8	12.96	15.24	12.64	13.27
Inf	2.84	14.85	6.30	5.73	11.03	9.12	7.82
Y/M_2	8.49	5.15	4.00	2.94	2.43	4.03	5.04
Y_a/M_2	3.01	1.60	1.11	0.73	0.30	1.15	1.55
Y_nP/M_2	8.18	3.42	1.81	1.01	0.56	2.09	3.56

The high growth rate of money supply can, indeed, cause inflationary pressures in the country for the nature of the corresponding increase in credit does not allow for the expansion of output and thereby dampen its positive effect on the inflationary process in the country. However, the

continuously declining velocity of money obviously eased the inflationary impact of the ever-increasing money stock in the country. The income velocity of money has been declining from period to period and reached to a point of 2.43 in the period 1991 to 1994.

4.4.2. Government Deficit, Money Supply and Inflation.

Examining the budgetary situation in the country that Ethiopia was indulged in a persistent budget deficit for the last three decades[see appendix 5]. According to the information we have, current account deficit has been escalating from a surplus of 0.7% of the GDP in 1966 or a deficit level of 1.7% in 1967 to a deficit level of 26.7% of the GDP in 1992. During the last 8 years of the imperial era, the current account deficit was somewhat smaller [-0.37%of the period's GDP], compared to the Derg regime's [-1.69% of GDP], for the extent and pace of current revenue collected was not lagging behind that of the current expenditure.

But, after the 1974 revolution, recurrent expenditure began to grow at a faster rate than that of revenue such that current account deficit began to get wider. During 1967 - 75, for instance, government revenue was growing at an average rate of 5.41% while recurrent expenditure of the government was increasing at a rate of 5.73%, leaving the gap between the recurrent expenditure and that of revenue insignificant. During the Derg regime[1974- 1990] the current deficit level grew to more than 2% of the GDP for recurrent expenditure grew by a relatively higher rate (12.3%) than that of current revenue(9.71%) in the period under discussion.

The expansion of recurrent expenditure in the Derg regime is basically associated with the rise in defence expenditure[see Tadesse(2), p.30]. During the 1974 -1988 period alone, the share of defence expenditure out of the total recurrent expenditure grew from 17.63% in 1974 to more than 30% (i.e.30.58%) in 1988/89. In addition to this, the repeated droughts that occurred during that period also contributed to the expansion of recurrent expenditure in those years.

On the other hand, recurrent revenue was growing more or less consistently in the period under discussion. During the Imperial era the economy was relatively open so that the share of

indirect and foreign trade taxes were even greater than that of direct taxes. In the Derg regime, however, the relative importance of indirect taxes shrank while that of direct taxes expands. Generally speaking, the relative contribution of direct taxes to the total ordinary revenue increased while the relative importance of indirect taxes and foreign trade taxes declined though their share in the period of discussion was still important. The same is true in the EPRDF regime.

Thus, a persistent increment in total government expenditure over that of total revenue led to an overall deficit of a persistent nature.

During 1967-1973, government budget deficit in the country was very minimal and was also declining. But, after the 1974 revolution the extent of the deficit level increased steadily and reached all time high period average of 10.41% of the GDP in 1985 - 1990. After 1990, however, the deficit level tended to decline because of the emphasis given to the rationalization of government budget and its implementation by the structural adjustment programme(SAP) implemented in the country. The periodic average deficit level in the country was 2.18, 5.66, and 6.5 percents in 1967 - 73, 1974 - 90 and 1991 - 1993, respectively.

But the important question one should raise is the cause for and the major way of financing the steadily increasing budget deficit in the country.

Theoretically, it is argued that the level of economic development, the extent of control over expenditures and the extent of government participation in the economy are some of the structural factors that can determine the magnitude of budget deficit in a country [Tadesse(2), p.9].

The level of economic development in a country puts pressure on the government to carry out the burden of expanding essential infrastructures. This, along with the low level of tax revenue, which is the result of inefficient organisational structure, aggravates the level of budgetary deficit in a country.

In addition to this, a very slow growth rate of government revenue as compared to the rate of growth of government expenditure leads to the deterioration of government budgetary position in a country. If there is large revenue fluctuation in a country, the situation can lead to budgetary problem unless and otherwise there is tight fiscal discipline and wise budgetary administration by the government. For instance, a one time increase in revenue may tempt the government to spend excessively. But if the revenue level in the following years declines, cutting of budgetary expenditure may become difficult because of the nature of spending (such as unfinished investment[projects], some administration expenditure and wages), in that budgetary deficit would have increased.

Lastly, the extent of government participation in every activity of the economy may increase pressure on government expenditure irrespective of the revenue that the government can generate. Because of this, if the pressure forces the government to spend more than the rate of increase in revenue collection, this may lead to persistent budget deficits in the country.

Based on the above mentioned facts, when we see the structure of budget deficit in Ethiopia, we can say that the relatively higher level of government participation in the economy[32], the relatively low growth rate of revenue (as compared to government expenditure), and the low level of government control over expenditures are some of the factors that explain or determine the level and persistent nature of budget deficits in the country.

As we all know in most years of the period under discussion, i.e., 1974 - 1990, Ethiopia was a centrally commanded economy. Because of this the government's participation in the economy was so intense that there was a high pressure on the government to finance and subsidise inefficient enterprises, to stabilise prices, etc.[Tadesse,(2)].

In addition to this the government of Ethiopia was faced by intense and devastating droughts. This structural factor along with the above mentioned factors, therefore, reduced the degree of

32. This reasoning is applicable for the Derg regime only.

control of the governments on its expenditure. From this we can conclude that high government expenditure led the country into unsustainable budgetary crises in the period under discussion.

But, how was the deficit financed? Generally, we can say that the lion share of the deficit in the period under investigation was financed through external borrowing and external financing [see appendix]. However, when we see the trend of budget deficit, there is a tendency to resort to domestic borrowing. The impact or implication of this trend on the inflationary process in the country will be discussed later in this chapter.[33]

4.4.3 Exchange Rate Versus Inflation.

Starting from the first issuance of its post- war legal tender, July 1945, the Ethiopian currency was set to have a gold value of 0.357690 grams (of fine gold) to US$ 0.4025. This value remained unchanged for about a quarter of a century, 26 years, up to the time the US dollar was devalued two times in three years, 1971 and 1973 [Befekadu (2), p.3]. Because of this, the Birr was devalued by 7 and 11 percent respectively during those days [Ibid, p 3] After 1973, however, the birr remained pegged to US dollar at rate of 2.07 Birr per dollar for about 18 years (1973-1991) (IFS,1995). In 1992, the Birr was devalued by 142% and thereafter continued depreciating from 2.07 to 5.87 and then to 5.95 and 6.32 in 1992-1993, 1994 and 1995 respectively.

As it has been stated in section 3.3, though nominal exchange rate was fixed for quite a long period of time, 1973-1991, the real exchange rate of the domestic currency was fluctuating across the period. And this fluctuation had direct and indirect impacts on the inflationary process of the country.

For instance, in the last 7 years of the Imperial era, the exchange of the Birr was depreciating in nominal terms but appreciating in real terms and was higher compared to the Derg regime.

33.The way budget deficit is financed in the country has important implication on the inflation rate of the country. For instance, excessive domestic borrowing lead to monetary expansion as well as crowding out of private sector . These altogether can raise the general price level in the country.

Table 9: Nominal and Effective Exchange Rates Under the Three Regimes

	1967-1973	1974-1990	1991-1994
Nominal	2.11	2.07	4.51
REER	0.357	0.318	0.552
INF	2.84	9.12	11.03

Source: computed from IFS (1985) and NBE Various issues.

In this case, though the 1971 and 1973 devaluation of the currency made the value of the currency cheaper, its possible effect to raise the general price level by increasing the prices of imported as well as exportable goods consumed domestically had not been materialized as it is indicated by the trends in domestic inflation rates. Rather the real effective exchange rate appreciated in that it played a dampening role, ceteris paribus, than otherwise.

During the derg regime, on the other hand, the real effective exchange rate, generally depreciated till the beginning of the 1980's and then began to appreciate up to the last three years of the decade. Inflation rate generally followed the same trend. But it is difficult to attribute the increase in inflation upto the middle of the 1980s to the depreciation of exchange rate in real terms. Because, during those years the foreign sector was subject to quantity restriction (with respect to export) and foreign exchange allocation (predominantly to the state). In addition to this, major items such as inputs, fuel, capital goods and durable consumer goods were basically imported and distributed by public enterprises[TGE(2),p.42].

In 1992,the currency was devalued by 142% and consequently, various supportive measures such as liberalization policies took place. These measures, along with more or less good weather condition enabled the country to ease the inflationary pressure in recent years.

From the above discussion, therefore, one can infer that the fluctuating real effective exchange rate in the country could have a direct impact on the inflationary process in the country, But the pricing control scheme employed in the country and the generally appreciating domestic currency minimized the inflationary impact of the exchange rate in the period under discussion.

4.5. Pricing Policy in Ethiopia

Ethiopia has had some form of pricing and price control mechanisms since the beginning of the 1940s. Studies show that governments used to determine prices of domestically produced as well as imported goods and services since 1942/43.[ONCCP,p.144]. However the nature of pricing policies that the three governments Ethiopia have experienced in the last three and half decades were different, for such a policy is very much dependent on the political as well as economic philosophy a particular government is pursuing. Let us consider those periods in detail.

4.5.1. Pre-1974 Pricing Policy

The pre-1974 Ethiopian government can be characterised as a monarchical government which took a market philosophy as its economic doctrine. That is, prices of goods and services in the country were by- and- large determined by market forces. According to studies undertaken by the Ministry of Trade and the then Ministry of Planning, agricultural prices were more or less determined by the interaction of market forces though the prevailing prices were usually influenced by powerful wholesale traders in the major terminal markets of the country. Since such monopolistic trend would affect the proper functioning of the market, the government set up the Ethiopian Grain association and the Ethiopian Grain Board so as to stabilize the agricultural prices and ensure the normal functioning of the market.

The functioning of these institutions, especially the Grain Board, were designed to be carried out by buying grains competing with private traders and storing it to use in cases of scarcity [MOTAI, p.39]. But, these institutions were unable to compete and influence the agricultural

product markets, for private traders were strong enough(in capital) to keep the lion-share of the market in their hands. Because of this, these institutions fell to carry out their objectives.

Similarly, pricing and price control mechanisms were applied in the industrial as well as foreign trade sector. Imported goods as well as domestically produced industrial goods were subject to price control whenever there was scarcity and whenever the government believed that there were unfair trading activities in these markets. However, since there were few industries in the country at that time, the price control determination processes were usually enacted on imported industrial products only.

The most interesting thing in this regard is the formula that the government was employing in determining the prices of imported goods. In its pricing process, the government used to apply a cost-plus formula in that trading agents usually inflate the cost of their commodities by over invoicing and other mechanisms so as to get 'unfair' profits. Because of this,the government was not able to prevent or at least minimize the rate of imported inflation in the period under discussion.

To summarize, it can be said that:

1. though the government was intervening in the market through the board and the association, to remove the obstacles on the free operation of the market and to stabilize prices, its role was not successful due to lack of the required support to those institutions.

2. with respect to imported commodities, first, price control was enacted on small proportion of these commodities only; and secondly, even for these commodities, prices were determined using a cost-plus approach so that importers were usually inflating their costs(invoices). Because of this the price stabilisation and control system was not in a position to prevent or minimise the imported inflation in the country[,p.147]

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4.5.2. Pricing Policy During The Derg Regime

After the 1974 revolution, the political as well as economic principles that the government followed had been changed and it begun to follow an entirely different path. Right from the outset, the new revolutionary government began to take radical measures that paved way to the pricing policies it later applied.

- To control the fluctuating but generally increasing prices that were prevailing before and after the revolution, the government declared a price freeze in 1975 on all domestically produced industrial goods[MOTAI,P 37;ONCCP, p.118].

- In that same year, the government nationalized all production as well as distribution enterprises operating in the country. This gave the government essential power to control the production units in the country. [Befekadu, P.67]

- Basic urban and rural dwellers' association were also established to effect its controlling price policy throughout the country. In the words of Befkadu,

> "Basic urban and rural dwellers' shops, the agricultural service cooperatives, and state retail outlets were established as the nucleus of the official market. The free market is tolerated and operates parallel to the official market, not so much for its inherent benefits but because ... it serves to satisfy essential needs that cannot be provided by the state. In the long run, however, the government's declared objectives is to replace the market with the residential and state retail enterprises and thus crowd out private traders."[p.66]

Since the 1975 price control on all agricultural products became very problematic, the price control was made to be limited to the grain markets only. Grain prices were determined by taking their average prices in the period 1972-1974. And these prices were set different for different seasons (especially in Winter and summer) and also for different suppliers,i.e., retailers, wholesalers and farmers.

But, to effect its objective of stabilizing commodity prices in the sector, the government established

- Agricultural Marketing Corporation (AMC)
- Ethiopian Domestic Distribution Corporation (EDDC)- a government whole sale enterprise, and,
- ETIMEX- an institution which exports and imports goods on behalf of EDDC and public enterprises, and
- Ethiopian Retail Trade Corporation(ERTC)-to distribute essential products through neighbourhood association and farm cooperation,

AMC was established to stabilise agricultural prices by providing cereals to urban consumers[34] . To carry out its responsibility, AMC was assigned to be the sole purchaser of agricultural products from state farms and independent farms. Private traders were also forced to sell half of their purchases to the corporation at fixed prices. In the same manner, farmers had also to agree to deliver a portion of their products , usually levied as quota, to the corporation at a price which is lower than the market price[TGE,p.22; Befekadu,p.65]. To fulfil their obligation, farmers who were not able to sell from their stores were obliged to use their 'savings' or sell their assets to buy from the free market where prices are very high and sell to AMC at a lower price.

Befekadu[1990] took three crops and try to show the extent of the cost as well as price inequality that were prevailing between state farms and individual peasant farms, on the one hand, and between the respective official prices, on the other hand.

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[34]. It was also providing oilseeds and pulses to the Ethiopian oilseeds and pulses export corporation, fertilizers and improved seeds to farmers until the latter was taken over by the Ministry of Agriculture.(Befekadu,P.65)

Table 11: **COMPARATIVE COST OF PRODUCTION, STATE PRICES, AND FREE MARKET PRICES FOR SELECTED AGRICULTURAL PRODUCTS 1985-86.**

Crop Type	Cost of production		Official Prices		Peas-ant off.price as % farm off. prices	Free market whole sale prices	Official prices as % of free market prices		Official price- cost ratio	
	state farms	peasant farms	state farms	peasant farms			state farms		peasant farms	
Wheat	73.0	36.0	47.0	31.0	66.0	106.0	44.3	29.2	64.4	86.1
Maize	59.0	29.0	31.0	20.0	64.5	81.0	38.3	24.7	52.5	69.0
Barley	82.0	41.0	40.0	27.0	67.5	109.0	36.7	24.8	48.8	65.9
Average price	71.3	35.3	39.3	26.0	66.0	98.7	39.8	26.2	55.2	73.7

SOURCE: Adopted from Befkadu Degefe," Profile of The Ethiopian Economy, WB,1990

As it can be seen from table 11, the official prices that were given to both the state and peasant farms were far below the cost of producing the crops. Even though peasants were considered to be twice as efficient as the state farms,[35]they were on average receiving 66% of the price given to the state farms.

These prices were also very much incomparable with the free market prices of the same products . According to the information we have, peasants, on average, received 26.2% of the prices that they would have received had they sold their products in the free market. The state farms were also receiving discouraging prices(about 40% of the market prices). From this one can infer that such low and discriminating prices(Befekadu,p.67) that what the peasants, received were enough to discourage them, and even to force them to migrate to urban centres in search of jobs.

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[35]. This is an assumption. WE couldn't verify the validity of this assumption by tangible research results.

On the other hand, private traders who were forced to sell 50%[36] of their stock to AMC might contributed to the inflated market prices of grains so as to cover the losses they incurred in the official market. This, together with the scarcity of agricultural products that frequently occurred due to drought , and other human factors- contributed positively to the true inflation rate in the country.

Regarding industrial products, on the other hand, a policy of price freeze was imposed in 1975 on domestically produced industrial products' factory prices so as to stabilize the then ever-increasing commodity prices in the country. However, since the policy was not covering wholesale and retail traders, the latter were able to sell the same products at a higher market prices[ONCCP,p.152].

On the other hand, only a few imported goods were subject to price controls. These products were:trucks, spare parts, pharmaceuticals, bags and 18 types of grocery goods only. And strictly speaking,even then products were not under price control; rather the emphasis was on the system of calculating their expenditure and the profit of the distributers. Because of this importers were increasing the prices of these products by overinvoicing and by importing the most expensive commodities[Ibid,p.154].

Those products which were not under price control, however, were imported by ETMEX to the EDDC and public enterprises. The latter would distribute these products to the final consumers through Kebeles(neighbourhood associations) and farmers' associations. Those who endured the queues benefited from the controlled prices; and those who couldn't, could purchase these products at higher prices in the free market. "In this way price control helped various institutions and low income groups and kept the rate of inflation relatively low".[TGE,p.22].

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[36]. In 1979, the trades were obliged to deliver 30% of their stock to the AMC. But, after two years the rate had been raised to 50%. In addition, the prices that they were paid were adjusted several times because of the fluctuation in the AMCs purchasing and distribution expenditure.[,p150].

With regard to services, tariffs were determined to transport, electricity and transit services only. But other services were determined as follows: services provided by the private sector were determined by the market. And if services were provided by government organizations, price (tariffs) were determined by themselves or higher body of the enterprises. The problem is the deterioration of the quality of products provided for the same level of the tariffs[ONCCP,p.155].

As stated in chapter 2, this is a situation which occurs whenever there is scarcity of these services.

But how was the price control undertaken? As we put it above as a passing point, various institutions such as the Ministry of Industry, Ministry of trade, the then Ministry of Planning and the Council of Minsters were involved in the identification and decision making processes of the prices of various products. And the price control and supervision works were usually undertaken by various departments of the Ministry of Trade. This included inspection and announcing of the prices of various commodities under control.

To summarize, from 1974 - 1990, there were dual markets to both agricultural and industrial products. Traders as well as peasants were forced to sell part of their products to the AMC at lower prices than what the market was dictating. AMC distributed its stock to the public through kebeles and farm cooperatives. Domestically produced industrial products were also purchased by EDDC. The corporation then distribute to the public through official and open markets. It sold its products to ERTC, kebeles and farm cooperatives. With respect to imported commodities most of the commodities were imported by ETIMEX on behalf of EDDC and public enterprises. The remaining small portion of imported products were provided by the private sector[TGE,pp.22 - 23].

From what we have discussed so far we can explain the price structure of the country as follows. From the market structure, we can observe that there were three types of prices in the period under discussion. The first was controlled or planned prices. This consisted of prices

of essential industrial commodities which were produced in the country as well as imported goods that were sold through kebeles and farmers' cooperatives. The second type of prices that were existing during the period were, of course, free market prices. These were prices of goods and services that were determined by market forces. Usually free market prices were by far greater than that of official prices as it has been demonstrated on table 11.

Of course, we can identify a third type of prices, and that is what we call floating prices. These were prices that were set by the government (purchasing) units through negotiation with the suppliers. In this regard, AMC, after the farmers and traders were fulfilling their objective, was negotiating with these economic agents to buy their commodities by making an increment up to a certain price per unit.

When we evaluate the whole pricing policy in this period we notice the following. Since the official prices for grain (agricultural products) were much lower than the cost of production the farmers were providing low quality products to the AMC. Apart from that it was a very discouraging phenomenon for the peasants since the prices they got from selling the products were not even comparable to the industrial and other products they needed to buy. The private traders who were obliged to submit 50% of their stock were also given a very low price as the farmers. To compensate their loss in the first 50% of their stock they were inflating the price of their remaining stock in the free market. This obviously exaggerated the free market prices of agricultural products.

In addition to this, since the price determination mechanism followed a cost plus approach, various producing as well as distributing enterprises deliberately inflated their expenses so as to raise their commodity prices. Because of this approach, the pricing policy was not in a position to minimize the extent of imported inflation and hence the general prices increases created by traders through overinvoicing, but importing the most expensive commodities, by using the most expensive transport system, etc. The quality deterioration that has been witnessed in the service sector was also a cause for the existence of hidden inflation in the country.

4.5.3 Recent Period (1991-)

The country terminated the command economy regime and started to pursue a market clearing economic regime. Restrictions on trade have been lifted. Measures on correcting export tariffs on most of the export items have been undertaken and price control mechanisms employed during the Derg regime have been dismantled step by step. Price controls and subsidies on agricultural products, pharmaceuticals, transport services and fertilizers have been eradicated from the scene consecutively. Prices of state owned enterprises' products are also allowed to be determined by market forces. In line with reducing the participation or interference of the government in the economy, privatization of the public enterprises have been pursued. All these measures surely narrow the gap that was existing between the official and parallel (goods and financial) markets.

Generally, we can say that various price control mechanisms that were employed during the Derg regime have been dismantled and replaced by policies that allow prices to be determined by the interaction of market forces. This helps to narrow the gaps that were existing between official and parallel markets in the economy.

CHAPTER 5: ECONOMETRIC ANALYSIS OF INFLATION IN ETHIOPIA

In this chapter we estimate a series of equations to identify the major determinants of inflation in the country based on the monetarist as well as the structuralist approaches. We employ error correction models to determine the short run as well as long run determinants of inflation in the country and identify those variables that can be policy target to control inflation in the country.

In this subsection we present our results as follows. First, we discuss the time series properties of all the variables employed in the analysis. Then we present the monetarist model followed by the structuralist approach. The latter encompasses three models: one general and two sectoral equations which enable us to investigate the sectoral differences in response to change in some macro economic variables.

5.1.Results from the Order of Integration and Cointegration Analysis

The order of integration of each variable that is going to be used in our models is determined using augmented Dickey-Fuller test for unit root against an alternative hypothesis of stationarity. The test for the possible existence of unit root in our variable shows that the hypothesis of one unit root can not be rejected to all the variables except the import price index variable which gives us a mixed result in that it is an I(1) or I(2)[see appendix 1].

Regarding cointegration, we basically apply a bivariate and trivariate Engle-Granger two-Step procedure. In this test we include a dummy for regime changes and a trend element as the need arises so as to motivate cointegration among the variables. Based on these procedures, real income, government deficit, import price index and expected inflation are found to be cointegrated with domestic inflation series individually. The money supply variable which can not cointegrate with the inflation rate in the bivariate case cointegrated with the latter when it was combined and tested with inflation expectation [see appendix 2].

We proceed and apply the Johansen VAR test in some of our models. We said in "some of our models" because, as it has been stated in chapter 3, the standard Johansen procedures can not be applicable if there are variables which are a higher order than one. In other words, it is applicable only when the variables to be tested are integrated of order one or zero. [For detailed discussion, see Harris, 1995].

Taking care of these variables, therefore, we applied the VAR test on two of the four models to be estimated in this paper. These are the monetarist model and the agricultural sector inflation model. We failed to apply the same procedure on the remaining to models for the simple reason that: first, we could not apply the standard Johansen VAR procedure on the structuralist model, for the model contains an I(2) variable, the government deficit variable, and second, even the Engle- Granger two step procedure tell us that the nonagricultural sector inflation model variables do not cointegrate at all. This test can be considered satisfactory when the case involves rejection of the existence of cointegration in a model.[37]

Taking care of all the above stated points, therefore, we applied the procedure on the monetarist model. We took inflation, income, money supply and import price index-which is an I(1) or (2) variable and based on both the trace as well as the maximal eigenvalue test we find that there are two cointegration vectors in the model:

Table 12: The Normalized Value of Cointegrating Vectors in the Monetarist Model

	vector 1	vector 2
inf	-1.00	-1.00
LPM	0.087	0.13
LM^2	0.175	0.08
LY_2	-0.86	-0.467

37. The problem of this test is in accepting the existence of cointegration while there is no cointegration in multivariate analysis case. Its limitations are discussed in chapter 3.

We further analyzed the above tested vectors by looking at the stationarity of the vectors' residuals in both the linear trend and non trend cases. Based on this test we select the second vector as a proper cointegrating vector in the model. The long run models of the monetarist theory is, therefore,

$$\mathbf{Inf = 0.131\ Lpm + 0.08\ Lm_2 - 0.467\ LY_2}$$

Similarly, we applied the same procedure on the agricultural sector inflation model and found out that there are only one cointegrating vector in the stated model. Thus the long run model becomes

$$\mathbf{P_a = 5.04lm_2 - 5.08Y_a - 7.5\ lpm + 0.299\ duY_a + D_1}$$

Finally, we employ the Bivariate Granger causality test to examine whether there is/ are possible simultaneity in our models. The results show that while real income, rainfall and expected inflation Granger cause inflation individually, the latter does not Granger cause any of the explanatory variables[see Appendix 3(a)].

In the sectoral models, too we find no indication of possible endogeniety in the models[see Appendix 3(b)].

All these results indicate that we can employ simple OLS regression method in all of our models.

5.2 EMPIRICAL RESULTS

5.2.1 The Monetarist Model

The Long Run Model

We started our analysis by regressing the long run augmented monetarist model. We included an impulse dummy for years: 1977, 1987,and 1992; and we got the following long run model[1]

$$\text{Inf} = 3.768 + 0.095\,LM_2 - 0.54LY_2 + 0.11LPM - 0.001PE + 0.01du$$
$$(3.33) \quad (2.08) \quad (-3.35) \quad (2.24) \quad (-0.72) \quad (2.6)$$

Numbers in brackets are t-ratios.

$$\text{adj } R^2 = 0.57,\ F(5,21) = 7.95,$$

$$\text{AR } F(1.20) = 0.26,\ \text{RESET } F(1,20) = 1.47,\ \text{Normality } X_{(2)} = 1.97,\ \text{ARCH } F(1,25) = 0.42$$

In this model all the explanatory variables were significant and with proper signs except the price expectation term, PE. And the diagnostic tests showed that there was no autocorrelation, heteroscedasticity, normality, or functional form problem in the model.

The inclusion of the real income variable in this long run model shows that real income has a statistically meaningful long run adverse effect on the inflation process of the country. And, among all the variables included in the model, it is income that plays an influential role in the determination of the country's inflation rate in the long run. This is true specially when we consider the structure of the economy and the way inflation rate is computed.

As we stated it in the previous chapter the Ethiopian economy is basically an agricultural economy and is at a subsistence level. Thus any fluctuation in agricultural production affects the real income of the population and thereby the general price level.

In addition to real income, broad money supply, which is the most important variable in the monetarist policy framework, becomes statistically significant in the above stated long run model.However, the impact of this variable on the steady state inflationary situation is relatively minimum (see the coefficient) implying that the impact of monetary instrument on the long run inflationary process of the country is not remarkable. This is, perhaps, due to the structural and institutional rigidities prevailing in the economy. So, for the monetary variable to be more reliable instrument in managing the long run inflation process in the country, it may be necessary to avoid or reduce those structural regidities prevailing in the economy.

The model also justifies the argument that fluctuation in import prices had a direct and positive impact on the inflationary situation of the country. This result is, indeed, acceptable especially when we consider the structurally import dependent nature of the economy and its smallness in the international market. As has been stated in chapter one, the country is structurally dependent on imported consumer goods and intermediate inputs. This, along with its smallness in the international market, on the one hand, and the generally rising nature of import prices on the other, makes import prices to have a statistically meaningful effect on the inflationary situation of the country.

However, unlike the variables we have mentioned above, the expected inflation variable takes a wrong sign and becomes statistically insignificant. This deters the road to see whether changes in price expectation can cause a demand pull inflation in the country or not.

This is the long run model of inflation under the monetarist framework, in brief. Now lest us go straight to the error correction model.

The Error Correction Model

Since the error term in the above long run model becomes stationary[1], we can specify our monetarist model to explain both the long run as well as short run dynamics of the inflationary process in the country.

Using Hendry's general-to-specific approach we model the error correction model with two lags to each variable[38]. In every step we undertake a variable deletion test to drop a variable and thereby simplify the overparameterized error correction model. This process continues up to the point where we get the simplified model with a relatively higher R^2, a smaller standard error and economically interpretable variables.

38The ADF test on the error term, e, after two lags shows that all the variables in our model are cointegrated: ADF(e)=-3.74(-2.99) with out trend and -3.62(-3.61) with trend. The numbers in brackets are critical values.

Table 13: The General Model Results

Variables	lags		
	0	1	2
Dinf			
Dlm_2	0.045	0.017	-0.08
DLY_2	-0.925	0.385	0.422
DPE	0.004	0.003	0.005*
DLPM	0.115	-0.257	0.213
duinf	0.0001		
Ecm		-1.4**	

* **Significant at 10% significant level.**

** **Significant at 5% significant level.**

*** **Significant at 1% Significant level.**

R^{-2}= 0.65, F(14,9) =4.008, SE =5.63

AR F(1,11)=0.504, ARCH F(1,23) =1.05, RESET F(1,11)=0.706

Normality $X^2(1)$ =0.80

Here AR represents the serial correlation test, SE-the stand error of the regression, RESET tests for model specification, and ARCH tests for autoregressive heteroscedasticity. 'D' depicts differences, i.e, the variable is in a difference form.

From the diagnostic tests presented above we see that there is no autocorrelation, heteroscedasticity, function form or normality problem in the model.

Following the procedure we described above, we,thus,reduce the model sequentially and arrive at the following preferred results.

$$Dinf = 3.93^{**} - 1.048DIY2^{***} + 0.238Dly_2(-2) - 0.084DLm_2 - 0.19DLPM$$
(2.12) (-5.89) (1.52) (-1.48) (-1.28)

$$0.254DLPm^{*}(-2) - 0.012ECM^{***}$$
(1.79) (-4.68)

$R^2 = 0.68$, $F(6,18) = 9.68$, S.E $= 5.27$

AR $F(1,17) = 1.24$, RESET $F(1,17) = 0.17$ Normality $X = 0.48$

ARCH. $F(1,23) = 2.36$

When we compare the general model with the simplified one, we see that most of the insignificant variables in the general model are now excluded in the reduced model without loosing the explanatory power of the model. The standard error of the model declines from 5.63 to 5.27, and the adjusted R^2 gets improved.

When we come back to the statistical validity of each variable in the model we find that change in real income and import prices (after two years lag) affect the inflationary process in the country. Unlike the long run model, however, money supply takes wrong sign and becomes statistically insignificant.

As it is depicted in the reduced model a change in current real income brings about a statistically significant dampening effect on the inflation process of the country. However, the result shows that, in a disequilibrium situation, changes in income will have the stated impacts in a period of one year difference only. That is, real income changes that occurred some two or so years ago will remain passive to current changes in prices. This may be attributed to the very low level of income in the country.

In addition to income import price also has a significant impact on the dynamics of the inflation process in the country. But the reasons why it affects the country's inflation after two years lag is not clear. What we can suggest is that the lack of well developed physical infrastructure, along with poor distribution network in the country can create a lag in the realization of the impact of imported inflation on the general price level of the country.

The last but the most important element in our regression result is contained by the error correction term of the model.

As it is stated in econometric literature, the error correction term takes the negative sign and becomes statistically significant as it is expected. The magnitude and the sign of this term implies that under a disequilibrium situation, if there happens to be a shock, the disequiliibrating inflationary process in the country will go back to its long run stable situation after 15 months.

To conclude, inflation process in the country is very much influenced by real income and import price index in both the short run and long run. The broad money supply has also a statically significant effect in the long run though its effect is not one-to-one with the change in the inflation rate . Because of this we can conclude that the monetarist model does not explain the inflationary process in the country in a way the monetarists explain it. That is, though the monetarist variables are significant in the long run as well as the short run case, the impact, i.e., the coefficients do not add up to unity as has been stated in the literature.

5.2.2. The Structuralist Model

The Long run Model

In our structural model we incorporated some new structural variables such as rainfall, government deficit and real exchange rate in addition to what we have included in the monetarist model. We estimated the inflation rate in the country on all of these variables in level and got the following long run structuralist model:

Inf= 3.82 + 0.08lm2 - 0.60ly2 + 0.18lpm - 0.001PE + 0.07R1 -

(2.43) (1.54) (-3.61) (-2.59) (-0.68) (0.63)

0.12RER - 0.01deff + 0.001 duinf

(-0.24) (-1.98) (2.38)

adj R2 = 0.60, S.E=5.3 F(8,18)=5.78

AR F(1,17)=0.68, RESET test F(1,17)=0.72,Normality

X^2(2)=1.71 and ARCH F(1,25)= 0.93

In this model almost half of the variables became insignificant out of which two variables took wrong signs [rainfall and expected inflation variable]. On the other hand, the real income variable, import price index and the structuralist variable- government deficit- and the impulse dummy became statistically significant in the model.

The Error correction Model.

Following the procedures that we used in the monetarist model we derive the error correction representation of the structuralist model as follows.

TABLE 14: The General Results

Variable	Lags		
	0	1	2
Dly_2	-0.47	-0.97	1.15
DLM_2	0.08	0.09	0.25
DLPM	-0.34	0.40	0.22
DPE	-0.001		
DR_1	0.06	-0.12	0.01
DRER	0.18	2.12	
DDef	0.04	0.001	-0.01
Duinf	0.004		
ECM		-0.014	

$R^{-2}=0.48$ S.E=6.80 F(20,3)= 2.08

AR F(1,2)= 0.30 RESET F(1,2)=None Normality

$X^2(2)$ = None, and ARCH F (1,22) = 0.12

As can be observed from table 14, the general model shows that all the variables included in the model become statistically insignificant. The adjusted R^2 is below 0.5 and the model does

not fit well. In addition, though the model has no autocorrelation and heteroscedasticity problems, the diagnostic tests show that there are serious normality and model specification problems. All these things happen in this model due to over parameterization of the general model[39].

But, using the Hendry's general-to-specific approach we continued to simplify the general model and after a series of regression, we arrived at he following preferred model.

Table 15: The Reduced Error Correction Model

Variable	Lag		
	0	1	2
con	0.03(1.4)		
DLY^2	-0.49(-2.3)	-0.73(-2.67)**	
DLM_2	-	0.18 (2.3)	
DLPM	-0.21(-1.8)*	-	
DR_1		-0.12(-3.01)**	
DRER	0.03 (3.2)***	1.84 (2.9)**	
DDef		0.014 (2.7)**	
ECM		-0.02(-6.3)***	

$adjR^2=0.82$ S.E=4.0 F(12,11)= 9.81

AR F(1,10) = 1.8,RESET F(1,10) = 0.51

Normality $X^2(2)$ = 0.53,ARCH F(1,22) = 0.02

Here in the preferred model, or parsimonious error correction model, we find all the variables in the model to be statistically significant except for the deficit variable at the second lag. The

39.Out of the 24 observation we used we left with only 5 degrees of freedom.

adjusted R^2 improved considerably, 82%, and the model fits very well. In addition to this, the diagnostic tests confirmed that all the problems stated in the general model are now corrected.

According to the regression result the monetarists' variables such as changes in real income and the money stock have got an important impact on the inflation process in the country. Specifically, changes in the general price level of the country were found to be highly sensitive to changes in the real income of the population as time goes by; i.e., its dampening impact increases after two years than the current changes. [see the coefficients]. But what is surprising is that the impact of changes in real income became more vigorous and positive after two years lag than before, though the net effect seems negative.

Import prices also become statistically significant and negative at zero lag at 10% significance level though its adverse effect is offset by relatively higher rate after two lags and thereby leaving the net effect positive, [see their coefficients]

Another point that we should stress here is the effect of the structural variables and the validity of the structuralist argument against the monetarist model. As it has been stated in chapter 2, though the impact of money supply on the inflationary process of developing countries can be significant, this variable alone cannot be attributed as the sole cause of inflation in these countries. Rather, there are also other structural as well as institutional factors that have to be taken into account.

In line with this argument, the study indicates that some structural factors such as rainfall, government deficit and real exchange rate are equally or even more important determinants of inflation in the country. For instance, the change in rainfall which represents the agroclimatic conditions of the country is found to be statistically significant in our parsimonious error correction model. The reason why this is so emanates from the structure of the economy

basically because of the agricultural sector and the way the consumer price index is computed in the country[40].

As we all know, the agricultural sector which supports the lives of more than 85% of the population, and contributes the lion's share of the export revenue is basically a rain-dependent sector. This implies that any reduction in rainfall below a certain level will greatly reduce the overall production of the country, its foreign exchange earnings, the level of necessary imported materials, and other sectors' performance.This in turn put pressure on the general price level to rise. In this way, the agroclimatic condition of the country plays an important role in the dynamics of the inflationary process in the country.

In addition to rainfall the movement of the real exchange rate has also a statistically meaningful influence on the dynamics of inflationary process in the country. According to our results, depreciation of the domestic currency in real terms raises the general price level while appreciation leads to the contrary. [Note that in study the real exchange rate is computed as Birr per foreign currency]. And the mechanism through which it is generating an effect on the inflation rate is stated in section 4.4.3.

Another factor that worth mentioning here is the impact of government deficit in the country. As has been stated it above, Ethiopia has been indulged in a persistent deficit through out the period under discussion. And the reasons why the economy is involved in such persistent level of government deficit has its own institutional as well as structural background . As it is stated in the previous section, a relatively higher levels of government participation in the economy, relatively low grow rate of government revenue (as compared to government expenditure) and the low level of government control over expenditure are some of the factor that explain the level and persistent nature of budget deficit in the country.

40. For detail discussion, see chapter two.

But what is important in our case is the way it is financed. As we stated it above the tendency of the government to finance the budget was through domestic borrowing under a more or less stagnant economy which contributed to the expansion of money supply and thereby to inflation. And our regression result indicate that the inflationary impact of government deficit in the country diminished as time went by. This implies that government deficit has a direct and immediate impact on the inflationary process of the country. This, therefore, suggests that, unless caution is given to the way it is financed, the persistent nature of government deficit will continue to be one of the sources of inflation in the country.

The last (but not least) point that we should raise in our structural model analysis is the speed of adjustment or the time that the economy require to go back from a short run disequilibrium situation to that of the steady state equilibrium situation. This fact can be scrutinised by looking at the error correction term embodied in our parismonous error correction model.

As it can be seen from the table, if there occurs shock in the economy which has a direct or indirect impact on the inflation rate of the country, it takes about 17 months for the latter to come back to its long run steady state equilibrium.

All in all, we can say that, in addition to real income, money supply and import price other factors such as rainfall, government deficit, and real exchange rates which have a structural and institutional roots play a major role in the inflationary process of the country.

5.2.2.1 Sectoral Difference in Inflation

To capture the relative sectoral difference in response to changes in some of the policy variables, we divide the economy in to two- agricultural and nonagricultural sectors- and formulate two sectoral price equations. Following the usual procedure we found it possible to model the agricultural sector price equation in a error correction form. But for the non agricultural sector, we could not follow the same procedure for the variables do not cointegrate

and form a stochastic error term. Because of this we were forced to consider the short run situation only.

Agricultural Sector Price Equation Long Run Model.

Following the same procedures we used to follow in this chapter, we find the following long run inflation equation for the sector:[41]

$$\underset{}{Pa} = \underset{(2.15)}{2.5^{**}} - \underset{(-4.78)}{0.76\ Ya^{***}} + \underset{(5.84)}{0.51M^{s***}} + \underset{(1.6)}{0.21\ Pa^{e}} - \underset{(-0.30)}{0.03\ Pm_2} + \underset{(3.47)}{0.02\ DUPa^{**}}$$

$$+0.15D_1^{**}$$

$$(2.92)$$

$$adjR^2 = 0.97 \quad F\ (6,20) = 148.9 \quad S.E = 0.07$$

$$AR\ F(1,19) = 1.32\ \ REST\ F(1,19) = 0.88\ ARCH\ F\ (1,25) = 0.32\ Normality\ X1_{(1)}^2 = 0.81$$

Here DuPa and D_1 represent impulse dummy to agricultural price deflator and dummy for the regime changes[i.e., one for the period of market economy and zero for the years in which the country was in a command economy].

The diagnostic tests show that there is no-problem in the model and the adjusted R^2 and F-statistic show that the model fits well.

In this model we find that the agricultural sector inflation rate is very much determined by the agricultural income and broad money supply in the long run and it is found to be more responsive to changes in real income than otherwise. The import price index takes wrong sign and become statistically insignificant. The agricultural price level is also found to be not responsive to agricultural price expectation at all. The reasons for this irresponsiveness can be associated with the very subsistence nature of the agricultural sector and the various price

41. * - indicates significance at 10% significant level
**- indicates significance at 5% significant level
***- indicates significance at 1% significance level.

controlling mechanisms implemented for quite long period of time in the period under discussion.

The other interesting result in the long run model is the impact of regime change on the general sectoral price level. The market dummy shows that the shift from market (imperial period) to non market or command economy (the Derg regime) and then to market economy (the new economic regime) has an important positive impact on the general agricultural sectoral price level. According to this result, price of agricultural products is generally, high (since it is a shift factor) when the country is in the market economy than otherwise. This happens perhaps, because of the price control imposed by the Derg on the agricultural product prices during its long lasting regime. During this period farmers and retailers were usually, forced to sell part of their products to the agricultural marketing corporation [AMC]. In turn, the AMC uses its purchases to stabilize the agriculture product price in the country.

The Error Correction Model

The general specification of the error correction model shows that all the variables included in the models are statistically insignificant except for the error correction term. Moreover, the model does not fit well and has very low adjusted R^2(.0.27) even if there are no serial correlation, heteroscedasticity, functional form or normality, problem in the model.

Table 16:The General Model Results

Variable	lag length		
	0	1	2
DYa	-0.009 (-0.02)	0.742 (1.24)	0.38 (0.98)
DM2	-0.163 (-0.78)	-0.244 (-0.82)	-0.09 (-0.44)
DPm	-0.605 (-1.2)	0.508 (0.96)	-0.37 (-0.87)
DPa^e	0.67 (1.57)	0.02 (0.074)	-6.31 (-1.12)
DUP_a	0.006 (0.52)	-	-
D_1	0.031 (0.48)	-	-
ECM	-2.71 (-2.68)**	-	-

$R^2 = 0.27$ F (15,8) = 1.6 S.E = 0.12

AR F (1,7) = 006. RESET F(1,7) = 0.5, ARCH F(1,22) = 0.15, and Normality $X^2(1) = 3.5$

When we come to the final reduced model we find the following results

DPa = 0.02 + 0.46DYa (-1)- 0.49 DYa(-2) - 0.27DPM +**

(0.7) (1.6) (2.6) (-1.3)

$0.51DPa^{e**}$ -0.18 DP^ea(-2) - 2.13 ECM ***

(2.1) (-1.1) (-4.7)

adjR^2 = 0.54 F(6,17) = 5.59 S.E =0.09

AR F(1,16) =0.36, RESET F(1,16) = 0.80, ARCH F(1,22) =2.14 and Normality $X^2(2) = 0.33$.

Unlike the long run case, where the agricultural sector prices are responsive to the real income and money supply situation error correction representation, however, tells us that the former is responsive to change in real income and price expectation alone.

According to the parsimonious error correction model result, the impact of the change in real income (after two lags) is positive in the short run. This may be associated with the short run function of agricultural output and thereby income, one the one hand, and to the subsistent nature of agricultural production, on the other hand. Given the supply constraints and the low level of income that results in from these factors any marginal increase in real income would rather

induce the demand for agricultural products and raise the general price level than playing a dampening role by raising the domestic supply of good and service and by narrowing the gap between the rate of change in money supply and money demand.

On the other hand, the positive response of the agricultural price level to current change in inflation expectation is in line with our expectation. Given the subsistent level of production, a persistent gap in food availability, and fluctuating rainfall, any change in the current price-expectation will automatically be reflected in the general agricultural price level.

Another important point we should raise here is the irresponsiveness of the agricultural sector to change in money supply.

In our model the change in many supply has become statistically insignificant up to two lags. And this should be seen along with the structural rigidities prevailing in the country and the degree of monetization prevailing in the sector. The banking sector has not reached the majority of the rural population. Credit extension to the rural population is hardly a common phenomenon in the history of the country. Given this point, it is not surprising to observe a non responsive price structure to the changes in the money supply.

The Non Agricultural Sector

Unlike the agricultural sector variables in the nonagricultural sector inflation equation do not cointegrate. Because of this our analysis of the sector inflation process is restricted to the short run cases only.

In this model we try to capture the response of the sector inflation to the changes in import prices, real income of the sector, money supply, inflation expectation and policy changes. Taking all these variables in to account, we undertake a series of regression and at the following preferred regression result.

$$Pn = 5.50 - 1.45LYn - 0.40LYn(-1) + 0.42LM_2(-2) + 0.47P_n^e - 0.20D_1$$
$$\quad\quad (1.12) \quad\quad (-2.45) \quad (0.61) \quad\quad\quad (2.22) \quad\quad (-2.4) \quad\quad (-1.61)$$

In this study, it has been found that the general price level in the service as well as industrial sector is highly responsive to change in real income, money supply, inflation expectation and regime changes.

The result shows that a rise in real out put /income/ in the sector immediately reflected on the price level by quenching it down. But the effect does not last long: its effect become statistically, nil even after a single year.

This indicates that to control the inflation rate its impact on the sector, income has to be considered with other variables like money supply, or efforts have to be exerted to raise the sector's output substantially. But, the latter is basically associated with some structural factors which can not be changed in the short run (example are the impact of fluctuation in rain fall, and, poor infrastructure network, etc.)

Unlike the agricultural sector, inflation in these sectors is also found to be responsive to change in money supply. This is, of course, associated with relatively higher degree of monetization in those sectors. One important point that we observe from this relation is therefore, the cost of controlling inflation in the sector will be relatively smaller even though effect can be materialized after two years lag.

Generally, from the above discussion in agricultural and non agricultural sectors price response, one can deduce that there are, indeed, sectoral difference in response to change in some of important variable. For instance, while the non-agricultural sectors respond to change in money supply, the agricultural sector's general price level will remain unaffected by the change in money supply in the short run. This is associated with differences in the degree of monetization

of the economy and lack of transmission mechanisms in the agricultural sector. The impact of price expectation on the formulation of inflation process also varies from sector to sector in that the agricultural sectors is not responsive while the non-agricultural sectors do respond. And more importantly, though both sectors react to change in real income, the speed that the impact is materialized is different from sector to sector.

All these facts indicate that any policy measures [42] which aim at controlling the inflationary process in the country should give due emphasis to the relative sectoral differences to changes to some of the variables.

42. For detail discussion section 4.3.

SUMMARY AND CONCLUSION

The period under investigation is basically characterized as a period when Ethiopia witnessed scarious macroeconomic imbalances. During this period the government budget position has been persistently deteriorating, money supply has been continuously rising, income, i.e., GDP has been almost stagnant, the velocity of money has been decelerating and the country has been repeatedly bitten by droughts. In addition to this the dictating economic thinking of the country has shifted from market to command and then back to market economic regimes following the changes in the governments.

With regard to inflation, though various policies have been adopted to stabilize and keep prices low, inflation rate in the country has generally been on the increase. During the last 7 years of the Imperial era, the rate of inflation in the country was very low because of the low level of government deficit and the tight monetary policy the government was pursuing. But even under such situation the rate of inflation was oscillating from as low as -5.16% in 1971 to as high as 10.67% in 1973 following the 1973 oil crisis and political unrests prevailing in the country.

In the Derg regime the level inflation 'shifted' upward though it was fluctuating from year to year. In the regime alone, the inflation rate in the country was growing at an average rate of 9.12% per annum. At the beginning of the EPRDF regime it was very high but, due to the various radical measures taken by the government, it shows a declining tendency.

Given all the macroeconomic imbalances along with the movement of inflation rate, the logical question that should arise is, therefore, what the nature and the possible sources of inflation in the country are and what measures can be taken to manage the inflationary process in the country. This study among other things, tries to answer these questions in some detail.

The first point that we raise in our study is which side of the economy is a possible source of inflation in the country. Using statistical tools we investigate both the demand as well as the supply side of the economy.

Taking the low level of aggregate demand, especially the declining private consumption demand, along with the consumption pattern of the population whom they spend a significant proportion of their income on food, housing and beverages, we notice that inflation in the country is not a demand side phenomenon. Rather we have shown that it is a result of supply constraints prevailing in the country. This result is generally validated by our econometric analysis, too.

To look at the specific determinants of inflation and explain the dynamics of inflationary process in the country. We model the countries inflation from the monetarist as well as structuralists point of view.

In our monetarist model, all the explanatory variables included in the long run model are found to be statistically significant and with proper signs except the price expectation term. And the error correction model shows that, among these variables, it is the change in real income and that of import prices that play an important role in the determination of inflationary process in the short run. The broad money supply, however, takes the wrong sign and becomes statistically insignificant.

The inclusion of the real income variable in the model shows that real income has a statistically meaningful long run as well as short run adverse effects on the inflationary process in the country. In fact, among all the variables, it is real income that plays the most influential role in the country's inflation process [see the coefficients]. Like wise inflation rate in the country responds positively to changes in the import prices both in the long as well as short run cases.

From this we can deduce that the inflation process in the country is very much influenced by real income and import price in both the long and short run. Money supply has also a statistically significant effect in the long run though the monetarist proposition that the change in money supply will affect the inflation rate equiproportionally does not hold in our case. Because of this we conclude that the monetarist model does not explain the inflationary process in the country. It can explain to the maximum of 67% of the variation in the inflationary pressure in the country.

The structuralist model, on the other hand, explain the lion share of the variation in the inflation rate and provide additional equally important determinants of inflation in the country. According to this model, real income, import prices and government deficit are statistically significant in the long run, but money supply can be statistically acceptable at 86% confidence interval. The error correction model, however, shows that, in addition to the variables stated above, the changes in rainfall, real exchange rate and many supply have a significant impact on the inflationary pressure in the country.[43]

Moreover, to capture the relative sectoral differences in response to changes in some of important variables, we classify the economy in the agricultural and non agricultural sectors and model the respective sectors accordingly. In this way, we find that there are, indeed, sectoral differences in response to changes in some of the important macroeconomic variables we consider in the model.

For instance, the agricultural sector inflation rate is found to be very much determined by changes in agricultural income, and broad many supply in the long run; and it is highly responsive to the former variable than otherwise. But, in the short run, the sector's general price level is responsive to changes in real income and expectation alone.

When we consider the non agricultural sector, on the other hand, we find a relatively different response to changes in some of the variables. Like the agricultural sector, the non agricultural sector price level is found responsive to changes in real income, and price expectation in the short run. But, unlike the former, the non agricultural sector general price level is highly responsive to changes in money supply in the short run. This is, indeed, associated with the difference in the degree of monetization of the sector.

But what is more interesting here is the response of these sectors to regime changes. The agricultural sector general price level raises as the country shifts from command economy to free

43 Since 'how' and 'why' the variables affect inflation rate in the country are explained in the previous chapter, we do not try to repeat them here.

market economy in the long run. But the non agricultural sector's response is limited to the short run case only.

Given all these results, therefore, we conclude that:

1. Inflation in the country is not a demand side phenomenon. Rather, it is a result of supply restraints prevailing in the economy.

2. Inflation in the country is a repressed one.[44] This conclusion emanates from the various policies employed during the derg regime.

3. the monetarist argument that inflation has a one-to-one correspondence to changes in many supply does not hold in our case. What we see is that even under steady state (long run) equilibrium situation the impact of broad money supply on the inflationary process of the country is very minimal [see the coefficients in all the models].

4. The inflation dynamics in Ethiopia is well explained by the structuralist approach of inflation process in the developing countries. In line with this argument, on top of the monetarist variable, i.e., money supply, real income and import prices, the inflation process in the country is equally determined by changes or fluctuations in rainfall, real exchange rate and government deficit. But among all these variables, real income plays an important role in the dynamics of inflation process in the country. This point goes in line with conclusion number one.

5. There are, indeed, sectoral differences in response to change in some of the macroeconomic variables. 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 charges in price expectation the latter does not respond. And

44 This conclusion is made concerning the inflation rate during the derg regime.

more importantly, though both sectors react to changes in real income, the speed that the impact is materialized differ from sector to sector. And this has an important policy implication with respect to controlling inflation.

POLICY RECOMMENDATION

1. As it is repeatedly stated in this paper, inflation in the country is basically a result of supply restraints. And these supply bottlenecks have a structural as well a institutional roots. Thus, avoiding these constraints should be the main policy target to control the inflationary process in the country. For instance, reducing the agricultural sector's dependency on rainfall, the country's dependency on imports of consumer, intermediate as well as capital goods, etc, will help to increase output and reduce imported inflation, respectively. Since avoiding such structural rigidities are a time consuming process, it should be taken as a long run policy target.[45]

2. From our results we observe that government deficit, the real income level and import prices play an influential role in the long run process of inflation in the country. In the short run, in addition to all the variables mentioned above broad many supply[46] has also been proved to play an important role in the inflationary process of the country . From this we can infer that an effort to control the movement of especially income, import price and government deficit position will enable the country to manage not only the long run but also the short run dynamics of the inflationary process in the country.

3. In our econometric results we notice that there are, indeed, sectoral differences in response to change in some of the important macroeconomic variables. And even when they respond to changes in some of the variables (for instance to changes in real income) the speed they begin to respond differ from sector to sector. Thus, any policy that is geared towards managing inflation in the country should take these differences into account.

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45 The above stated recommendation is a more general fact in that most of the policies targets we rain here will be in one way or another part and parcel of the above recommendation

46 the impact of monetary v inflation is relation minimum

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APPENDIX 1: Augmented Dickey-Fuller Test for Unit Root

Variable		Test on Levels			Test on Their First Difference Lag Number			
		0	1	2	0	1	2	REMARK
LY_2	1	-1.12 (-2.98)	-1.10 (-2.98)	-1.08 (-2.99)	-4.86* (-2.98)	-3.71* (-2.98)	-3.19* (-2.99)	I (1)
	2	-2.09 (-3.59)	-2.31 (-3.59)	-2.29 (-3.6)	-4.81* (-3.59)	-3.70* (-3.60)	-3.19* (.3.61)	
inf	1	-3.28 (-2.98	-3.19 (-2.30)	-2.33 (-2.99)	-6.31* (-2.98)	-6.09* (-2.99)	-2.71 (-2.99)	I (1)
	2	-3.20 (-3.59)	-3.07 (-3.59)	-2.19 (-3.60)	-6.18* (-3.59)	-5.95* (-3.60)	-2.64 (-3.61)	
LM_2	1	0.28 (-2.96)	-0.23 (-2.98)	0.12 (-2.99)	-8.11* (-2.98)	-5.10* (-2.99)	-4.26* (-2.99)	I (1)
	2	-3.23 (-3.59)	-2.97 (-3.59)	-2.90 (-3.60)	-7.97* (-3.59)	-5.01 (-3.60)*	-4.26* (-3.61)	
LPM	1	-2.42 (-2.98)	-1.83 (-2.98)	-2.62 (-2.99)	-2.56 (-2.98)	-2.96* (-2.96)	-2.21 (-2.99)	I (1) or I (2)
	2	-0.64 (-3.59)	-1.49 (-3.59)	-1.28 (-3.60)	-2.89 (-3.59)	-3.85* (-3.60)	-3.34 (-3.61)	
LPe	1	-3.22* (-2.98)	-2.94 (-2.99)	-1.87 (-2.99)	-6.02 (2.99)	-5.86* (2.99)	-2.61 (-3.00)	I (1)
	2	-3.25 (-3.59)	-2.93 (-3.60)	-1.85 (-3.61)	-5.87 (-3.60)	-5.69* (-3.61)	-2.55 (-3.62)	
Def	1	-1.78 (-2.98)	-1.27 (-2.99)	-1.42 (-2.99)	-6.93 (-2.99)	-3.45* (-2.99)	-1.52 (-3.0)	I (2)
	2	-2.43(-3.59)	-1.39 (-3.60)	-1.40 (-3.61)	-6.86 (-3.60)	-3.45 (-3.61)	-1.49 (-3.62)	
R	1	-3.35* (-2.98)	-3.26 (-2.98)	-2.36 (-2.99)	-3.96 (-2.98)	-4.79* (-2.98)	-4.93* (-3.59)	I (1)
	2	-3.04 (-3.59)	-2.78 (-3.59)	-1.72 (-3.60)	-3.93 (-3.59)	-2.97 (-2.99)	-3.04 (-3.6)	
RER	1	-3.26* (-2.98)	-3.22 (-2.98)	-2.19 (-2.99)	-5.54 (-2.98)	-4.11* (-2.99)	-2.58 (-2.99)	I (1)
	2	-3.22 (-3.59)	-3.36 (-3.59)	-2.19 (-3.60)	-5.51 (-3.59)	-3.67* (-3.60)	-2.26 (-3.61)	
Winf	1	-1.45 (-2.98)	-2.07 (-2.98)	-1.39 (-2.99)	-4.77 (-2.98)	-4.46* (-2.99)	-4.51* (-2.99)	I (1)
	2	-3.29 (-3.59)	-4.12* (-3.59)	-3.88* (-3.60)	-4.67 (-3.59)	-4.37* (-3.60)	-4.32* (-3.61)	

Variable		Test on Levels			Test on Their First Difference Lag Number			
LP_n	1	-0.91 (-2.98)	-0.53 (-2.98)	-0.55 (-2.99)	-9.53 (-2.98)	-5.02* (-2.99)	-2.85 (-2.99)	I (1)
	2	-4.11 (-3.59)*	-2.03 (-3.59)	-1.68 (-3.60)	-9.28 (-3.59)	-4.90* (-3.60)	-2.78 (-3.61)	
LY_a	1	-1.13 (-2.98)	-1.1 (-2.98)	-0.91 (-2.99)	-5.25 (-2.98)	-4.22* (-2.99)	-3.57* (-2.99)	I (1)
	2	-3.0 (-3.59)	-3.23 (-3.59)	-3.05 (-3.60)	-5.13 (-3.59)	-4.12* (-3.6)	-3.47 (-3.61)	
LY_n	1	-2.25 (-2.98)	-2.10 (-2.98)	-2.38 (-2.99)	-4.98 (-2.98)	-4.68* (-2.99)	-3.0* (-2.99)	I (1)
	2	-2.99 (-3.59)	-3.18 (-3.59)	-2.38 (-3.60)	-4.95 (-3.59)	-4.92* (-3.60)	-3.17 (-3.61)	

The critical values are given in bracket

* denotes significance at 95%

** (1) and (2) indicate that the test is undertaken with out and with trend respectively. This is true for the Engle-Granger two step procedure.

APPENDIX 2:Engle and Granger Cointegration Tests

Vector		ADF Value			
		Lag number			
		0	1	2	REMARK
[Inf,Ly_2]	1	-4.24(-2.98)	-3.88*(-2.98)	-3.60*(-2.99)	Cointegrate
	2	-4.10(-3.59)	-3.70*(-3.59)	-3.40(-3.60)	
[Inf,Lm_2)	1	-3.65(-2.98)	-3.5*(-2.98)	-2.55(-2.99)	Not Cointegrate
	2	-3.54(-3.59)	-3.39(-3.59)	-2.49(-3.60)	
[Inf,def]	1	-4.0(-2.98)	-4.54*(-2.99)	-2.61(-2.99)	Cointegrate
	2	-3.89(-3.59)	-4.40*(-3.60)	-2.54(-3.61)	
[Inf,Lpm]	1	-3.58(-2.98)	-3.72*(-2.98)	-2.64(-2.99)	Cointegrate
	2	-3.49(3.59)	-3.62*(-3.59)	-2.57(-3.60)	
[Inf,RER]	1	-3.27(-2.98)	-3.07*(-2.98)	-2.24(-2.99)	Not Cointegrate
	2	-3.17(-3.59)	-2.99(-3.59)	-2.22(-3.60)	
[Inf,PE]	1	-4.69(-2.98)	-4.18*(-2.99)	-2.34(-2.99)	Cointegrate
	2	-4.57(-3.59)	-3.98*(-3.60)	-2.25(-3.61)	
[inf,r_1]	1	-3.16(-2.98)	-2.97(-2.98)	-2.20(-2.99)	Not Cointegrate
	2	-3.09(-3.59)	-2.89*(-3.59)	-2.16(-3.60)	
[inf,hy_2,lm2]	1	-4.37(-2.98)	-3.52*(-2.98)	-3.10*(-2.99)	Cointegrate
	2	-4.21(-3.59)	-3.32(-3.59)	-2.88(-3.60)	
[inf,Lm_2,pe]	1	-4.62(-2.98)	-4.05*(-2.99)	-2.28(-2.99)	Cointegrate
	2	-4.51(-3.59)	-3.93*(-3.60)	-2.22(-3.61)	
[inf,Lpm,r_1]	1	-3.45(-2.98)	-3.52* (-2.98)	-2.60(-2.99)	Not Cointegrate
	2	-3.37(-3.59)	-3.43(-3.59)	-2.54(-3.60)	
[inf,lpm,pe]	1	-4.52(-2.98)	-3.98*(-2.99)	-2.29(-2.99)	Cointegrate
	2	-4.44(-3.59)	-3.90*(-3.60)	-2.25(-3.61)	
[P_a,Y_a]	1	-3.79(2.98)	-2.94(-2.98)	-2.45(-2.99)	Not cointegrate
	2	-3.72(-3.59)	-2.88(-3.59)	-2.39(-3.60)	
[P_a,lpm]	1	-3.94(-2.98)	-3.8*(-2.98)	-2.92(-2.99)	cointegrate
	2	-3.85(-3.59)	-3.69*(-3.59)	-2.81(-3.6)	
[P_n,lpm]	1	-3.82(-2.98)	-2.37(-2.98)	-2.81(-3.6)	Not cointegrate
	2	-3.86(-3.59)	-2.34(-3.59)	-1.86(-2.99)	
[P_n,Y_n]	1	-4.26(-2.98)	-2.23(-2.98)	-2.07(-2.99)	Not cointegrate
	2	-4.14(-3.59)	-2.18(-3.59)	-2.03(-3.6)	
[P_n,lpm,Y_n]	1	-5.01(-2.98)	-2.78(-2.98)	-2.03(-2.99)	Not cointegrate
	2	-4.88(-3.59)	-2.73(-3.59)	-2.25(-3.6)	
[P_a,lpm,Y_a]	1	-3.98(-2.98)	-3.11(-2.98)	-2.55(-2.99)	Not cointegrate
	2	-3.9(-3.59)	-3.05(-3.59)	-2.51(-2.6)	

APPENDIX 3: Johansen VAR Test for Cointegration Based on Trace and Maximal Eigenvalue

Table 3.1: for the Monetarist Model.

R	With Linear Trend				With out Liner Trend			
	Trace Test		Eigen value Test		Trace Test		Eigenvalue Test	
	The Statistic	95% Value	The Statistic	95% Value	Statistic	95 % Value	Statistic	95 % Value
0	38.57	47.21	38.57	27.07	69.22	48.28	38.57	27.13
1	03.12	29.68	21.56	20.97	30.65	31.53	21.56	21.07
2	4.64	15.41	9.00	14.07	9.09	17.95	9.00	14.90
3	0.07	3.76	0.09	3.76	0.09	8.18	0.09	8.18

Table 3.2: Johansen VAR Test: For the Agricultural Sector Price Model

	With Linear Trend				Without Linear Trend			
	Trace Test		Eigen value Test		Trace Test		Eigenvalue Test	
	Statistic	95 % Value	Statistic	95 % Value	Statistic	95 % Value	Statistic	95 % Value
0	96.32	94.16	53.05	39.37	96.32	95.18	53.05	39.42
1	43.27	68.52	16.16	33.46	43.27	70.6	16.16	33.32
2	27.11	47.21	12.01	27.07	27.11	48.25	12.01	27.14
3	15.11	29.68	9.92	20.97	15.11	31.53	9.92	21.07
4	5.19	15.41	4.68	14.07	5.19	17.95	4.68	14.9

R represent the number of cointegrating Vectors

APPENDIX 3 (a): Bivariate Granger Non Causality Test

	DEPENDENT VARIABLES		
	DINF	DLY_2	DLM_2
DINF	-	0.09(0.9)	0.12(0.89)
DLY_2	2.73*(0.09)	-	0.52(0.6)
DLM_2	0.28(0.76)	0.06(0.94)	-
DLPM	0.39(0.69)	0.22(0.8)	1.77(0.2)
DR_1	3.79**(0.04)	6.5**(0.01)	-
DPE	4.68**(0.02)		
DRER	1.00(0.39)		

APPENDIX 3(b): Bivariate Granger Non Causality Test

	DEPENDENT VARIABLES			
	DPa	DY_a	DP_n	DY_n
DPa	-	01.91(0.18)		
DY_a	1.91(0.18)	-		
DP_n				0.04(0.95)
DY_n			2.07(0.15)	
Dlm_2	0.38(0.69)	0.18(0.83)	0.15(0.86)	0.19(0.83)

N.B. numbers in brackets show significant levels and those out side the brackets are F- values

APPENDIX 5: Percentage Share of Government Budget Deficit in GDP[1966-1994]

YEAR	SHARE			
	Current Revenue	Current expenditure	current account Deficit	Overall Budget deficit
1966	10.39	9.69	0.7	-
1967	7.99	9.38	-1.73	-3.48
1968	7.99	9.34	-1.4	-2.88
1969	8.36	9.01	-0.98	-2.10
1970	8.26	8.78	-0.75	-1.81
1971	9.48	9.41	0.71	-1.74
1972	9.28	9.24	-0.13	-1.70
1973	9.73	11.36	0.50	-1.52
1974	10.09	12.92	-1.27	-3.19
1975	11.09	13.3	-1.83	-4.27
1976	13.31	15.71	0.01	-3.03
1977	13.7	16.06	-2.00	-4.88
1978	15.11	16.57	-0.95	-3.06
1979	15.3	16.57	-1.27	-3.99
1980	16.22	16.97	-0.35	-3.68
1981	16.45	20.26	-0.52	-2.47
1982	17.09	19.12	-3.17	-9.48
1983	19.15	19.00	0.03	-5.63
1984	16.25	17.87	-2.75	-8.82
1985	18.75	16.9	0.88	-9.14
1986	18.27	21.38	1.37	-7.81
1987	20.92	22.44	-0.46	-9.95
1988	22.9	21.99	0.46	-11.93
1989	17.3	18.67	-4.69	-12.46
1990	13.47	15.9	-5.19	-11.14
1991	14.4	13.19	-1.50	-8.17
1992	11.8	12.42	-1.39	-7.09
1993	n.a.	10.34	n.a.	-4.24
1994	n.a.	n.a.	n.a.	21.97*

Source: Own computations

DECLARATION

I, the undersigned, declared that this thesis is my work and that all sources of materials used for the thesis have been duly acknowledged.

Name: Zewdu Belete Gedefaw

Signature: _____

Place and date of submission: Addis Ababa University, June 1997.

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