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SCHOOL OF GRADUATE STUDIES

GOVERNMENT BUDGET DEFICIT, MONEY SUPPLY ,INFLATION AND POLICY IMPLICATION

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BY

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ABSTRACT

The objective of the study is to examine the causal relationship between budget deficit , Money supply and Inflation in Ethiopia. Aghevli and Khan(1978) model was used in analyzing the Ethiopian annual data from 1974-2005.

In the model there are two period of analysis :period I from 1974-1991 where there is regulation of wages and prices and period II from 1992-2005 where there is structural adjustement programs at the beginning of the period and free market economy used as state's policy.

Instrumental Variables(Two-Stage Least Squares) estimation methods was used to analyse the short-run dynamics and long run relationships among budget deficit, Money Supply and Inflation.

The Findings of the study are:

In period I inflation is significant in the explanation of current price level ,the coefficients of Government Expenditure,Government Revenue equations are insignificant in the short-run .Thus we only draw conclusion and policy recommendation based on the equation of period II .

Two-way causation between money supply and inflation was demonstrated.

Government expenditures adjust faster than revenue ,as the mean lag of government expenditure is less than the mean lag of government revenue,that is,during inflation the real revenue fall faster than real government expenditures due to long lags in the collection of taxes.

The monetarist paradigm of sustained inflation resulting from budgetary deficit is empirically confirmed.

The policy implication is that without emplementing effective monetary and fiscal policies,it is difficult to see macroeconomic stability and good economic performance in the country.

As a recommendation ,the Minitry of Finance and Economic Development,Ministry of Revenue and National Bank of Ethiopia should coordinate their effort to impelement the monetary and fiscal policies to reduce the larege budget deficit,control the inflation and reduce lags in the collection of taxes,improving tax performce and efficiency in tax administration.

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Declaration

I, the undersigned; declare that this thesis is my own work, and has never been presented in any other university. All sources of materials used for this thesis duly acknowledged**.**

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Date: _____

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1. INTRODUCTION

1.1 BACKGROUND AND STATEMENT OF THE PROBLEM

Large budget deficits absorb domestic saving and foreign funds that could otherwise be channeled to private sector. Crowding out productive investments by farmers, entrepreneurs, and large business, government deficits place its financial system under great restrain. Often they induce rapid inflation, which inturn exacerbates the deficits, creating a vicious cycle (Research Observer 1993).

The consequence of government deficits depend on how they are financed. It was said that each major type of financing, if used excessively, results in a specific macroeconomic imbalance. Money creation leads to inflation, Domestic borrowing leads to a credit squeeze, external borrowing leads to current account deficit and appreciation of the real exchange rate and some times to balance of payment crisis (If foreign reserves are run down) or an external debt crisis (if debt is too high).

In developing countries ,where financial markets are underdeveloped, foreign exchange are in force, interest rates are set below market clearing level by the governments, these countries relied more on money creation (seigniorage) to finance their budget deficits than other sources of financing.

Regarding to the relationship between budget deficit and inflation, there is a positive relation between budget deficits and inflation in developing countries (Aghevli and Khan (1978)). These studies, in line with the monetarist explanation of inflation, assume the link between budget deficit through deficit financing by means of borrowing from the banking system. In contrast to this there are also other studies that indicate a two - way relation between budget deficit and inflation (Aghevli and Khan , 1978)

The explanation of this argument is as follows: inflation affects the government budget by lowering the real value of revenue due to long lags that exist in the collection of taxes. But the the expenditure side tends to be fixed in real terms so that when prices rise, the money value of expenditure is raised proportionately. The net effect of these two features of government budget is widening the budget deficit. The simultaneous operation of this causation tends to a self - perpetuating inflationary pressure.

The fiscal and monetary policies that have been undertaken by different political regimes of the country have affected the course of development in the country. Real GDP growth , which averaged 4 per cent per annum during 1965 - 75, dropped substantially to about 1. 5 per cent over the period 1974 – 91(Government of Ethiopia, 1993). In the period 1992-2005, the Ethiopian economy has been characterized by a steady growth of real GDP. It grows

on the average 4.4 percent in the period 1992-2005,showing a decline in the growth rate in 1994,1998,2000,2002,2003 of which the growth in1998,2002 and 2003 being below zero(The average growth rate calculated based on the various annual reports of National Bank of Ethiopia in the period).

Government budget deficit ,which was moderate before 1975 has risen dramatically after 1975 ,due to accerelated government expenditure. Government expenditure to GDP ratio increased from 14.3 per cent in 1970 to 45 . 2 per cent in 1990 (Teshome 1993) .It has also increased 84 percent on the average during 1992-2005

Monetary expansion also manifested some acceleration. Broad money expanded during 1987 - 90 at an average annual rate of 18 per cent compared to historical rate of 12.5 per cent (Government of Ethiopia ,1993) .It has expanded during 1992-2005 by about 12.4 per cent. Generally, monetary expansion was due to monetization of increased budget deficit .This, among other things, has resulted in inflationary pressure in the economy. Thus the goals of the study are to investigate the link between government budget deficit, money supply and inflation and to determine how strong or weak this relationship is and to examine the factors behind it.

1.2. OBJECTIVES OF THE STUDY

The main objective of the study is to examine the casual relationship between budget deficit, money supply and inflation .Finding the solution to the following issues: First, does increase in money supply, resulting from monetization of budget deficits, increase inflation. Does an increase in the general price level whether forces the government to increase money supply to finance the deficits? Does increase in the general price level lead to increase the money supply?

1.3 HYPOTHESIS OF THE STUDY

The basic hypothesis is that , as the inflation rate rises , government expenditures rises faster than government revenue, forcing the monetary authorities to issue money (money creation).There is self perpetuating effect between government deficits and inflation through money supply. In other words, nominal government revenues are generally fixed in the short run , and the real value falls in the face of rapid inflation. Even if in the long run government revenues match government expenditures, the lag structure in the government's budgetary mechanism creates a deficit in real terms as well as in nominal terms in the presence of inflation . In other words , there is simultaneous relationship between money supply and inflation .

1.4 SIGNIFICANCE OF THE STUDY

The study is useful for the following reasons:

- The knowledge of the casual relation may help monetary and fiscal policy makers to find solution to perpetuating effect of budget deficit and money supply so as to reduce the budget deficit and inflation keep minimal, and to bring macro - economic stability and economic growth in the country.
- The results may be useful for further research on related issues.

1.5 SCOPE AND LIMITATION OF THE STUDY

1.5.1 The Scope of the Study

Budget deficit has impact on macroeconomic variables such as interest rates ,trade deficits , growth, exchange rates etc.., the scope of the study is to examine the relationship between budget deficit ,money supply , and inflation, and the study is limited to the period 1974-2005

1.5.2 Limitation of the Study

The main limitation of the study is lack of data .Data on consumer price index at national level which covers the whole period is not available (data on national level is found only for the period 1996-2005). For this study Consumer Price Index for the Addis Ababa will be used in the analysis.

2. LITERATURE REVIEW

2.1 Concepts and Definition of Terms

Some concepts and definition of terms is given to understand the method of analysis and inference at the end of the analysis. The definitions are given as follows:

The term **inflation** will relate to general increase in the level of prices .The degree of inflation is measured by the movement of one of the general price indices. There are three types of price indices; these are Producer Price Index, Wholesale Price Index and Consumer Price Index. In the analysis, Consumer Price Index was used.

Another term that was used in the analysis is Money. This term has two different definitions the narrow and broad term .The broader term of the definition of money was used. Broad money is the sum of narrow money and net foreign assets. Moreover, High-Powered money is defined as currency in the circulation together with cash reserves that banks keep at the central bank . Broad money is related to high-powered money through money multiplier .High powered money is a key variable because it is directly controlled by the central bank.

Splicing is the two index number series, which means reducing two overlapping index series with different base periods into a single series

either at the base periods of the old series (one with an old base year) or at the base period of the new series (one with the current base year) period of the new series . Index numbers obtained from the central statistical agency has base year 1963G.C, 1996G.C and 2000G.C. The price indices used in the analysis are spliced into the 1963G.C. base period and all price indices from 1974 G.C to 2005G.C. , are corrected for inflation has the base year 1963G.C. Consumer Price Index that are constructed from 1974 G.C. to 2005 G.C. have constructed on the basis of the European calendar (ends December 31).Taking monthly price index and adjusting the calendar period to the Ethiopian Fiscal Year (ending June 30) and calculating the average price for each year we have price index and other variables have the same calendar period ,i.e., Ethiopian Fiscal year.

The objective of the study is to examine the causal relationship between budget deficit , money supply and inflation. In this part we try to see relationship between budget deficit and inflation which place great theoretical debates by different economists. Next we see the two school of thoughts the Monetarist and the Structuralist theory of inflation. At the end we see some empirical evidence regarding the link between budget deficit , money supply and inflation.

2.2 The Relationship Between Inflation and Budget Deficit

Government deficits and its financing as a primary cause of inflation has received serious attention since Friedman (1968). He argued that the monetary authorities control inflation rate , especially in the end, with control of money supply. Surgant and Wallace (1981) have supported the proposition that the Central Bank will be obliged to monetize the deficit either now or latter. Such monetization results in an increase in the money supply and the rate of inflation in the long run. An alternative view, expounded by Miller (1983) argues that government deficits are necessarily inflationary irrespective of whether the deficits are monetized or not. If the deficits are monetized it results in increase in money supply and and inflation rate as argued by Surgant and Wallace (1981).But, even if Central Bank does not monetize the deficits, deficits are still inflationary through crowding out. That is , non- monetised deficits lead to higher interest rates. Higher interest rates crowds out private investment, and hence reduce the growth of real output. Higher interest rates also spur the financial sector to innovate in the payment system and make government bonds more substitutable for money.

The inflationary effect of government deficits depends upon the means by which the deficit is financed .If the government attempt to finance the deficit through bond issues , this could be justified by the notion that the link between budget deficits and inflation depends on money

creation. Hence inflation is seen as being mainly a monetary phenomenon; in otherwords, expansion of the money supply is considered to be a factor which determines the rate of price increase.

The link between budget deficit and inflation is usually explained by the need to raise revenue from money creation (that is, seigniorage) to finance the budget deficit. When the government finance its deficits by printing money , which the public adds to its holdings of nominal money balances constant, we say the government is financing itself through the inflation tax .Inflation tax is the tax imposed on the money holder as result of inflation .Higher rate of inflation , however , do not always give maximum revenue to the government . As Freidman (1971) put it , there is a revenue maximizing rate of inflation which correspond the point where the demand for money is unitary elastic. Beyond that point , further increase in inflation will actually reduce the inflation tax revenue in the steady state. That is, the amount of revenue the government can raise by printing money depends on how fast the government increases the monetary base and how much people want to hold money balance. As money growth increases, seigniorage revenue increases as does inflation rate .As inflation rises , people economize on real cash balances because the opportunity cost of holding money rises. Because of these velocity adjustments, seigniorage will increase less than proportionately with increase in money growth and inflation.

Tanzi:(1977) shows the mechanism through which inflation increases budget deficit. As he pointed out, due to lags in the collection of government revenue ,in the presence of inflation, real value of government revenue declined so that deficit increase. Tanzi:(1977) presented the analysis mathematically as follows:

Let R= Real value of tax revenue accruing in period zero but paid n period later,

T=Nominal value of accruals in period zero,

$P_{0=}$Price level at time zero and

E= Elasticity of tax accrual with respect to changes in the price level.

$II=dP_0/P_0dt$=inflation rate at time zero

$R=T/P_0(1+II)^n$----------(1)

$E=dT/dP_0xP_0/T$----------(2)

Rearranging equation (2),

$Ed\ P_0/P=dT/T$---------(3)

$dT/T-E\ d\ P_{0/}\ P = 0$ -------(4)

Integrating equation (4) give us

$Ln(T)-ELn(P_0)$ =c -------(5) or $\log_eT-E\log_eP_0$ =c where c is the constant of integration

$\log_eT.P_0^{-E}$= c

$e^c=TP_o^{-E}$ or $T=k\ P_o^{E}$ -----(6)

Substituting equation (6) into equation (1)

$R= \frac{kP_0^{E}}{P_0(1+II)^n} = \frac{kP_o^{E-1}}{(1+II)^n}$ ----------(7)

Differentiating equation (7) partially with respect to II,P_0,E and n

$\partial R/\partial II=\partial/\partial II(kP_0^{E-1})/(1+II)^n =\partial/\partial II(k\ P_0^{E-1}(1+II)^{-n})$

$=kP_0^{E-1}\partial/\partial II(1+II)^{-n}$

$=kP_0^{E-1}\ x\ –n(1+II)^{-n-1}=\frac{kP_0^{E-1}\ x\ –n}{(1+II)^{n+1}}$----------(8)

Equation (8) implies as II increase R will fall as long as II is greater than zero.If ,n=0,R will not change with II regardless of E.

$\partial R/\partial P_0=\partial/\partial P_0((kP_0^{E-1})/(1+II)^{n+1}))=k/(1+II)^{n+1}\partial/\partial P_0(P_0^{E-1})=\frac{kx\ E\text{-}1x\ P_0^{E-2}}{(1+II)^n}$ ------- --(9)

Equation (9) indicates that if E is equal to unity or two.R will not depend on P_0,but only on II and n.

$\partial R/\partial E=\partial/\partial E((k\ P_0^{E-1})/(1+II)^n)=k/(1+II)^n\partial/\partial E(P_0^{E-1})=\frac{kP_0^{E-1}xLn\ (P_0)}{(1+II)^n}$ ----------(10)

Equation (10) implies that given II and P_0 the higher E is, the higher R will be

$\partial R/\partial n=\partial/\partial n(P_0^{E-1})(1+II)^{-n}=kP_0^{E-1}\partial/\partial n(1+II)^{-n}=kP_0^{E-1}Ln(1+II)\ (1+II)^{-n}=$

$\frac{kP_0^{E-1}Ln(1+II)}{(1+II)^n}$---------(11)

Equation (11) implies that given a positive rate of inflation (II) the longer lag n the smaller R will be.

Regarding to the causation between budget deficit and inflation there are two lines of thinking. The first, started with the classical hyperinflation of Cagan (1952) concentrates on unidirectional relationship between budget deficit and inflation in a way that the causation is from the budget deficit to inflation. Here the change in the money supply is treated as exogenous. That is , increase in the budget deficit can move the economy into unstable path that can result in in increase in inflation, the relationship is expressed thruogh monetisation of budget deficit.

The second is the Aghevli and Khan (1978) model of two way interaction between budget deficit and inflation. When there is a large budget defict financed by money creation, it increases the money supply and causes inflation. As a result, inflation rate increased, government expenditures raised faster than government revenue that forced the monetary authorities to increase their issuance of money and even further, this also induced inflation to increase by creating a vicious cycle between budget deficit and inflation. In the model the expansion of money supply is itself a result of the ongoing inflation, hence, money supply is treated as an endogenous variable in the model.

In general, since governments in developing countries could not finance their deficit through open market operation due underdeveloped capital markets, they are forced to print new money. This causes expansion of money supply which intern causes inflation in the economy. That is why inflation in developing countries a monetary phenomenon.

2.3 The Monetarist Model of Budget Deficit

The monetarist school of thought have argued that there is a positive link between government deficits and money growth, asserting that higher bond-financed deficits will put upward pressure on interest rates and on government bonds. Because the Central Bank is concerned with smoothing interest rate movements, so it would then tend to increase money supply (Darrat ,1985)

2.3.1 THE EQUATION OF EXCHANGE AND QUANTITY THEORY

To understand the monetarist model which have new version and old version we start from the equation of exchange popularized by Professor Irving Fischer's it is written as :

MV=PT------- (1)

This formula is derived from a very simple and self evident fact , namely, that what is given in payment for anything in given period is equal in value what is sold. Stated some what more fully, the quantity of money (M) , multiplied by the average number of times each unit of money is used during a given period (V) ,is equal to

the sum total of goods and claims traded (T), during the period , multiplied by the average price (P).When certain assumptions are made concerning the various terms in the equation of exchange we arrive at the " rigid " quantity theory of money. The assumptions underlying the rigid quantity theory are:

1. The costancy of V and T
2. The passivity of P
3. The proportionality of P to M

$M^S V = PT$ (Quantity Theory Of Money).-------(2)

Where M^S = Supply of Money

V =Velocity of Money

P = The General Price Level

In equation (2) when we keep V and T constant and increase in M=money supply will be reflected with proportionate increase in the general price level

2.3.2 THE CASH BALANCE APPROACH

The Cambridge Cash - Balance approach frames the demand for money as the demand to hold a stock of liquid balances . The equation is written as follows:

$M^S = K P Y$------ (3)

Where M^S = Supply of Money

P = The general price level

Y = Real Income

K = propotionality constant

If real income is assumed to be maintained at full employment level and if K is relatively stable then the Cash -Balance Approach is converted to the Quantity Theory.

In equation (1) taking the logarithms of both sides and differentiating with respect to time ,

$$d/dt(\log(MV)) = d/dt(\log(PT))$$

$$d/dt(\log M + \log V) = d/dt(\log P + \log T)$$

$$d/dt(\log M) + d/dt(\log V) = d/dt(\log P) + d/dt(\log T)$$

When V and T are constant then $d/dt(\log V) = 0 = d/dt(\log T)$

$$d/dt(\log M) = d/dt(\log P)$$

we have the change in money supply and the change in the price level is one-to-one , that is , if we increase the money supply (monetize the deficit) it will result in an equal increase in the price level (inflation) when the assumptions are fullfilled.

2.4 The STRUCTURALIT'S VIEW

According to this view , inflation is caused where there is a structural bottle-neck in the economies of developing countries and the elimination of inflation requires removing the various structural bottle- necks which are said to initiate and perpetuate inflation (S.Ghatak,1995, pp96). Moreover, very important characteristics of developing countries, relates to the

nature of their tax system and budgetary process which means prone to perpetuation of inflation once it gets in motion. Specifically , their tax system tend to be characterized by low inflation elasticity in the sense that when the general price level rises the real value of taxes often falls.

In general the structuralists believed that government budget deficit is a structural problem which causes inflation when large projects are financed by money creation. According to them inflation is unavoidable unless necessary structural changes has been taken place.

2.5 EMPIRICAL EVIDENCE

Empirical investigations examining the relationship between budget deficit and infilation have not reached consensus on the possible relationship between the rate of inflation and deficits.

Aghelvi and Khan (1977) developed a model which take into account the two way causation between money supply and inflation in Indonesia. In their study ,they developed a dynamic model of inflation based on the idea that the rate of inflation tends to increase nominal expenditure faster than revenue. The resultant budget deficit increases the money supply and induces further inflationary pressure. This self- perpetuating process is formulated in a continuous time framework and system of stochastic differential equations estimated simultaneously.

Using error correction model, Sowa (1994) estimated an infilation equation of Ghana over the period 1963-90.This study found that inflation in Ghana is influenced more by output volatility than monetary factors ,both in the long-run and in the short run.

Semu(1994) ,identified inflation as a function of the growth of money supply and real GDP, expected inflation ,budget deficit and lagged real money balance. On the basis of linear regression R-squared and F-statistics, the monetarist model did not explain inflation in Ethiopia.

Demirew(1998), studied government deficits and inflationary process in Ethiopia. He uses annual data from 1966-1996 and he examined the casual relationship between budget deficit money supply and inflation. He use Aghelvi and Khan model having four stochastic equations representing Government Revenue, Government Expenditures, Price and money supply and one definitional equations representing Inflation Equation. He came up with the result that the equations are well fitted to the data under study. First, when he presented the results of each equation .The data on consumer price index are based on the European calendar year the other variables are computed based on the Ethiopian Fiscal Year. In this case regression are fitted as if all the variables are collected at the same calendar periods.

It could be concluded from the studies that there are commonalities and controversies regarding estimation technique and specification .However, overall the empirical evidence on the inflationary effect of deficits is inconclusive

3. METHODOLOGY AND SOURCE OF DATA

3.1 METHODOLOGY AND SOURCE OF DATA

The methodology consists of two parts :First a descriptive analysis of the nature and behavior of government budgetary revenue and expenditure ,monetary and inflationary development will be examined. Second, to see the link between budget deficit , money supply and inflation Instrumental Variables (Two- Stage Least Squares) Method will be used. The Sources of data for this study are Ministry of Finance and Economic Development, Central Statistical Agency and National Bank of Ethiopia.

3.2.SPECIFICATION OF THE MODEL

The Aghevli and Khan (1978) Model

The chosen model employed in this paper assumes that money supply and inflation are linked in a two-way relationship and this link is expressed as a reflection of te monetization of budget deficit to inflation. The basic model involves four stochastic equations explaining, respectively , the price level ,government expenditures, government revenues, and the money supply, and one definitional equation dealing witthe formation of expectations regarding inflation (Aghevli and Khan, 1978).

A. Demand for Money

The demand for real money balances is specified as a function of real income and the expected rate of inflation, with the latter variable being used as a proxy for the opportunity cost of holding money. In most developing countries, where capital markets are not well developed , and thus the alternative to holding money balances for most parts is to hold goods. Since the real value of money balances is decreased by rises in the price level , the expected rate of inflation can be treated as the opportunity cost of holding money. There is , of course, some substitutability between money and bonds, the rate of interest should be introduced to measure the opportunity cost of holding money relative to bonds. Rates of interest in Ethiopia, however , is controlled by the monetary authorities , and thus are not accurate in reflecting market conditions, for these reason we exclude the rate of interest from the model. Therefore the desired stock of real money balances can be specified in log-linear form as :

$\text{Log } (M/P)^d_t = a_0 + a_1 \text{Log } y_t - a_2 \pi_t$ ---------- (1)

Where $a_1 , a_2 > 0$

M = Stock of Nominal money balances

P = Price Level (CPI)

Y= Real Income

π_t = Expected rate of inflation

d = demand

t = time

The actual stock of real money balance is assumed to adjust proportionally to the difference between the demand for real money balances and the actual stock in the previous period (Aghevli and Khan , 1978).So,

$\Delta \text{ Log } (M/P) = \lambda ((\text{ Log } (M/P)^{d}_{t} - \text{Log } (M/P)_{t-1}) + U_{t1}$ ---------- (2)

Where λ denotes the coefficient of adjustment , $0 < \lambda < 1$. The disturbance U_{t1} is brought in to allow for random influences in carrying the adjustment .Substituting (1) into (2)

$\text{Log } (M/P)_t - \text{Log } (M/P)_{t-1} = \lambda (a_0 + a_1 \text{ Log } Y_t - a_2 \pi_t - \text{Log } (M/P)_{t-1}) + U_{t\,1}$

$\text{Log } (M/P)_t = \text{Log } (M/P)_{t-1} + \lambda a_0 + \lambda a_1 \text{ Log } Y_t - \lambda a_2 \pi_t - \lambda \text{ Log } (M/P)_{t-1} + U_{t\,1}$

$\text{Log } (M/P)_t = (1- \lambda) \text{ Log } (M/P)_{t-1} + \lambda a_0 + \lambda a_1 \text{ Log } Y_t - \lambda a_2 \pi + U_{t\,1}$----------(3)

$\text{Log } (P/M)_t = - \lambda a_0 - (1- \lambda) \text{ Log } (M/P)_{t-1} - \lambda a_1 \text{Log } Y_t + \lambda a_2 \pi + U_{t\,1}$----------(4)

$\text{Log } P_t = - \lambda a_0 - (1- \lambda) \text{ Log } (M/P)_{t-1} - \lambda a_1 \text{Log } Y_t + \lambda a_2 \pi - \text{ Log } (M)_t + U_{t\,1}$------(4')

Government Expenditure Equation: Assuming that desired real government expenditures are related to the level of real income , the log-linear functional form is :

$\text{Log } (G/P)^{d}_{t} = g_0 + g_1 \text{ Log } Y_t$ --------(5)

Where $g_1 > 0$ and G = Nominal Government Expenditures. Assuming that in the end the governments increase its real expenditures proportionally with real income growth , g_1 is expected to be unity.

The actual real government expenditures are assumed to adjust to the difference between the desired real expenditure and actual real expenditure in the previous period,

$\Delta \text{Log}\ (G/P)_t = d\ (\text{Log}\ (G/P)^d_t - \text{Log}\ (G/P)_{t-1}) + U_{t\,2}$ ------(6)

Where, $0 < d < 1$, and d = The coefficient of adjusment. The disturbance $U_{t\,2}$ is brought to allow for random influences to carry out the adjustment.

Substituting (6) into (5) results

$\text{Log}\ (G/P)_t - \text{Log}\ (G/P)_{t-1} = d\ (g_0 + g_1\ \text{Log}\ Y_t - \text{Log}\ (G/P)_{t-1}) + U_{t\,2}$

$\text{Log}\ (G/P)_t = \text{Log}\ (G/P)_{t-1} + d\ g_0 + d\ g_1\ \text{Log}\ Y_t - d\ \text{Log}\ (G/P)_{t-1} + U_{t\,2}$

$\text{Log}\ (G/P)_t = (1-d)\ \text{Log}\ (G/P)_{t-1} + d\ g_0 + d\ g_1\ \text{Log}\ Y_t + U_{t\,2}$-------(7)

$\text{Log}\ G_t = (1-d)\ \text{Log}\ (G/P)_{t-1} + d\ g_0 + d\ g_1\ \text{Log}\ Y_t - \text{Log}\ (P)_t + U_{t\,2}$-------(8)

From these equations one can obtain the mean or average time lag in the adjustment of real government expenditures. This lag is defined simply as (1- d)/ d .Here we expect in the long run the growth of government expenditure is proportional to the growth of price, that is ,price elasticity of nominal government expenditure is expected to be unity.

Government Revenue Equation: Assuming that desired real government revenues are related to the level of real income , the log - linear functional form is :

$\text{Log}\ (R/P)^d_t = t_0 + t_1\ \text{Log}\ Y_t$---------(9)

Where, $t_1 > 0$ and R = nominal government revenues

Assuming that in the long run the government increases its real revenue proportionally with real income growth, t_1 is expected to be unity.

The actual real government revenue is assumed to adjust to the difference between the desired real revenue and the actual real revenue in the previous period.

$\Delta Log\ (R/P)_t = e\ (Log\ (R/P)^d_t - Log\ (R/P)_{t-1}) + U_{t\,3}$-------(10)

Where, $0 < e < 1$, and e = the coefficient of adjustment. Substituting (10) into (9)

$Log\ (R/P)_t - Log\ (R/P)_{t-1} = e\ (Log\ (R/P)^d_t - Log\ (R/P)_{t-1}) + U_{t\,3}$

$Log\ (R/P)_t = Log\ (R/P)_{t-1} + e(t_0 + t_1 Log\ Y_t - Log\ (R/P)_{t-1}) + U_{t\,3}$

$Log\ (R/P)_t = Log(R/P)_{t-1} + e\ t_0 + e\ t_1 Log\ Y_t - e\ Log\ (R/P)_{t-1} + U_{t\,3}$

$Log\ R_t = (1- e)\ Log(R/P)_{t-1} + e\ t_0 + e\ t_1 Log\ Y_t - Log\ (P)_t + U_{t\,3}$ -------(11)

From these equations , one can obtain the mean or average time lag in the adjustment of real government revenue. This lag is defined simply as (1-e)/e. Here we expect in the long run the growth of government revenue is proportional to the growth of price , that is , the price elasticity of nominal government revenue is expected to be unity.

In this framework , even if one start from a balanced budget , as nominal income rises , one will observe an increasing divergence between expenditure and revenue. If the former adjust faster, that is , the nominal deficit will be a function of increase in the price level , provided that e <d ,even though $g_1 = t_1$

There are plausible reasons for expecting government expenditure in developing countries like Ethiopia, to adjust faster than revenue to nominal income increases arising from inflation. Even if the government

fully recognizes the need to restrain expenditure during inflation period, it finds difficult to reduce its commitments in real terms; On the other hand, low nominal income elasticity of taxes and long lags in tax collection causes tax revenue to fall in real terms.

Money Supply Equation: Money Supply M (in broader term) is related through money multiplier , b , to the stock of high powered money (Money in the circulation plus the reserves that banks keep in the central bank) , H ,

$M_t = b_t * H_t$--------- (12)

The change in high powered money can be occured due to change in central bank's claim on government (Δ CG) and changes in the foreign currency reserves and changes in the central bank's claims on commercial banks denoted in one composite term (Δ FC). That is

$\Delta H_t = \Delta CG_t + \Delta FC_t$---------- (13)

$H_t = \Delta CG_t + \Delta FC_t + H_{t-1}$

If changes in central bank's claims is a reflection of fiscal deficit, the above equation can be written as

$H_t = G_t - R_t + \Delta FC_t + H_{t-1}$------ (14)

$H_t = G_t - R_t + E_t$ ----------(15)

Where, $E_t = \Delta FC_t + H_{t-1}$

A change in the fiscal deficit is thus assumed to result an equal change in stock of high-powered money. This would be true to the extent that government deficits are financed from central bank ,

borrowing abroad or borrowing from commercial banks with the banks immediately replenishing reserves by recourse to the central bank. Therefore, the money supply equation can be written as

$M_t = b_t (G_t - R_t + E_t)$ ---------- (16)

The use of identity (16) along with the other equations would make the model non-linear in variables ; since one can use a system method of estimation , it is more convinient to work with linear models so we approximate equation (16) by a relationship linear in logarithms from which was obtained by linearizing about the sample means. The resulting linear equation is :

$\text{Log } (M/b)_t = k_0 + k_1 \text{ Log } G_t - k_2 \text{ Log } R_t + k_3 \text{ Log } E_t + U_{t\,4}$ -------(17)

$\text{Log } M_t = k_0 + k_1 \text{ Log } G_t - k_2 \text{ Log } R_t + k_3 \text{ Log } E_t + \text{Log } b_t + U_{t\,4}$-------(18)

Where the parameters k_0, k_1, k_2 , and k_3 all are functions of the sample means of logarithms of the variables G, R , and E and driving them or by estimating them within the model along with the other parameters.

Inflation Equation : The expected rate of inflation is assumed to be generated by the adaptive expectations or by error learning mechanism, so that

$\Delta \pi_t = \beta(\Delta \text{Log } P_t - \pi_{t-1})$ --------- (19)

$\pi_t - \pi_{t-1} = \beta \Delta \text{Log } P_t - \beta \pi_{t-1}$

$\pi_t = \beta \Delta \text{Log } P_t + \pi_{t-1} - \beta \pi_{t-1}$

$\pi_t = \beta \Delta \text{Log } P_t + (1 - \beta) \pi_{t-1} + U_{t\,5}$-------(20)

The compelete model can be obtained as follows

$\text{Log } P_t = -\lambda a_0 - (1-\lambda) \text{Log } (M/P)_{t-1} - \lambda a_1 \text{Log } Y_t + \lambda a_2 \pi - \text{Log } (M)_t + U_{t\,1}$ ----- (21)

$\text{Log } G_t = (1-d) \text{Log } (G/P)_{t-1} + d\, g_0 + d\, g_1 \text{ Log } Y_t - \text{Log } (P)_t + U_{t\,2}$ -------(22)

$\text{Log } R_t = (1-e) \text{Log } (R/P)_{t-1} + e\, t_0 + e\, t_1 \text{ Log } Y_t - \text{Log } (P)_t + U_{t\,3}$ -------(23)

Log Mt=k0 + k1 LogGt-k2 LogRt+k3 LogEt +Log bt+ Ut 4 --------- (24)

$\pi_t = \beta\, \Delta \text{Log } P_t + (1-\beta)\, \pi_{t-1} + U_{t\,5}$ - ----------(25)

The variables defined as Endogenous, Exogenous and Pre-determined are the following :

ENDOGENOUS:

P = Domestic Price Level

G = Nominal Government Expenditures,

R = Nominal Government Revenues,

M = Broad Money Supply , Which consists of Money in circulation , Demand deposits , Time and saving deposits

π_t = Expected Rate of Inflation.

Exogenous :

Y = Real Income

B = Money Multiplier

E = The sum of changes in the central bank claim on the private sector and the stock of high powered money in the previous period.

Pre - determined Variables:

$(M/P)_{t-1}$= Real Money Balance in the previous period

$(G/P)_{t-1}$=Real Government expenditures in the previous period

$(R/P)_{t-1}$= Real Government revenue in the previous period

π_{t-1}= Inflation in the previous period.

To test whether expenditure increase faster than revenue with increase in prices. it needs to prove that the average time lag in government expenditure (1-d) / d is less than to that of revenue(1-e)/e.

3.3 METHODS OF ESTIMATION AND MODEL EVALUATION

The model is estimated by Two- Stage Least Squares Method (2SLS). Two -Stage least Squares is a method used for replacing the endogenous variables of the right hand side of equations by their pridicted values obtained from the regression of the reduced form equations by ordinary least squares estimation.

At the first stage of estimation, each endogenous variable are fitted to the exogenous and predetermined variables and then obtain the reduced form regression equations. Afterwards predicted values of the endogenous variables are generated .At the second stage of regression OLS regression is fitted replacing the predicted value of the dependent variables to the right of the dependent variables .The standard errors at the second stage are corrected and used to calculate the estimated value of the test statistics.

4. ANALYSIS OF BUDGETARY AND MONETARY DEVELOPMENT

4.1 BUDGETARY DEVELOPMENT

Public finance affects economies in many different ways . Revenue, expenditure and public sector deficit determine the inflation rate, the current account deficit , the growth of the national debt and the level of economic activity (World Bank, 1988).

In Ethiopia in the past three decades government budget deficit has been affecting the course of economic development. During 1965-1974, strong currency due to prudent monetary and fiscal policies kept the budget deficit small. It was during the period 1974-1991 when there is general price control that large budget deficit sustained. In 1992 there is implementations of economic reform and stabilization programmes. However, the budget deficit continues to increase until 2005.

The average budget deficit as a share of GDP at current factor cost was 2, 9 and 10 per cent during 1961-1974, 1975-1991 and 1992- 2005 respectively. The fast growth of the public sector economy was the main reason for the persistent large deficit in the economy particularly during the Derg regime. The development of large public sector in the economy has peculiar feature. It started by the socialist government through the nationalization of the private property during 1975 and 1976.Already, by the middle of 1976, much of the economic wealth of

the country were in the hands of the government and major control and management responsibilities of the economy also lay with the government. This form of management and the establishment of an expanded bureaucracy, state administration and the conduct of endless “campaigns" during 1975-1991 had resulted a large public economy and large and persistent budget deficit .Socialist motto was the rule during this period. Private sectors participations in the economy were limited by law and public investment were not necessarily guided by social rate of return ,government expenditure may not be planned always and may reflect the needs to cover " emergency cost". There was a trend towards increased government reliance on ad hoc and unstable revenue sources and the role of fiscal policy in the alleviation of mass poverty and in bringing about economic structural adjustments was not played (Teshome,1993)

In 1991, the central planned economy was replaced by a market-based economy. The general features of the fiscal policy since then are set in Policy Framework Papers(PFPs) of Ethiopia. The fiscal policy measures that are contained in the PFPs fall under either of the following five sub-themes: decentralization of authority to regions, reforms of government revenue and expenditure, fiscal imbalances and financing and fiscal administration. However, there is a continuous increase in the budget deficit.For the proper understanding and analysis of fiscal deficit over the longer period that consists of different economic policy oriented regimes, it requires through observation of the nature of government expenditure, revenue and ways of deficit financing.

4.1.1 GOVERNMENT EXPENDITURE

The scale of public finance has increased dramatically in the country during the past three decades. This results, large and growing government budget deficit as shown in Table 1. During 1961-1974 , average annual public expenditure as a share of GDP at current factor cost was about 12 per cent .It has increased to about 27, 84 per cent for the period 1975-1991 and 1992-2005,respectively.However, the growth rate of public revenue has not kept pace with that of public spending. In the same period, average annual share of total domestic revenue in GDP was 10, 18 and 53 percent respectively. Higher growth of government expenditure relative to revenue that can be seen also from the decline in the ratio of total domestic revenue to total government expenditure.

Table 1 : Average annual ratio of Domestic Revenue to total Expenditure, Total expenditure to GDP and Domestic revenue to GDP at current factor cost (per cent)

Period	Domestic revenue/ Total Expenditure	Total Expenditure/ GDP	Domestic Revenu GDP
1961 -1974	87.9(22.65)	11.8(2.8)	9.9(1.2)
1975-1991	66.59(7.3).	26.9 (5.3)	18.1 (3.3)
1992-2005	63.5(8.05)	84.4(25.8)	53..4(15.8)

Source:Ministry of Finance and Economic Development,Budgetary Revenues and Expenditure.

Note : the figures in the parentheses are the standard deviation of yearly ratios.

The ratio averaged 88 per cent per annum during 1961-1974 declined to 68 and 64 per cent for the period 1975-1991 and 1992-2005 respectively. Generally the trend of increasing government deficit has been shown by higher share of expenditure in GDP to that of revenue and by the continuous decline in the ratio of total domestic revenue to total government expenditure.

The relatively highest growth rate of expenditure has been also shown in Table 2.Average annual growth rate of total real expenditure was about 10,9 and 23 per cent in the years 1961-1974,1975-1991 and 1992-2005,respectively.

Table 2: Average Annual Growth Rate of Real Government Expenditures(in per cent)

Period	Recurrent expenditures	Capital Expenditures	Total Expenditure
1961-1974	9.80(12.84)	17.48(31.79)	9.17(15.47)
1975-1991	8.3(14)	11.2(24.4)	8.8(14.9)
1992-2005	13.1(13.9)	10.9(16.7)	22.5(26.2)

Source: Ministry of finance and Economic Development, Budgetary revenues and Expenditures.

Note:The figure in parentheses are the standard deviations of the yearly ratios.

Regarding the structure of expenditures, and the impact these had on the nature and magnitude of government deficits several observations are indicated.

Government expenditure allocation between capital and recurrent expenditure are shown in Table 2

Table 3:Government Recurrent/Capital Expenditure(Yearly average)

Period	Recurrent/Capital Expenditure
!961-1974	4.4(0.87)
1975-1991	2.9(0.74)
1992-2005	2.2(0.68)

Source: Ministry of Finance , Budgetary Revenues and Expenditure.

Note: The figures in parentheses are the standard deviations of yearly ratios.

The average annual ratios of recurrent to capital expenditure have been declining over time. The decline in the ratio for the period 1975-1991, need not imply that a significant change had occurred in the overall investment level in the country. Rather it implies the change in investment responsibility from private sector to the government. This could be seen from the fact that government share of total fixed capital formation, which averaged a mere 20 per cent per annum during

the period 1961-1974, has increased to 71 percent per year during 1975-1992(Teshome,1993) .

The lowest ratio for the period 1992-2005 2 per cent implies that even though the socialist planned economic system changed to market based economic system, the overall structure of government expenditure has not still changed with the period of time.

With regard to the structure of recurrent expenditure and its impact on budget deficit as showed in Table 4, a number of points can be made. First , while the bulk of expenditure is made in " General Service", " Defense" expenditure forms the single most important category of that group. Defense on the average, accounted from the total recurrent expenditure 22, 39 and 27 per cent during 1961-1974,1975-1991 and 1992-2005 respectively. The high share of defense in total recurrent expenditure particularly during the period 1975-1991 shows how the government pumped its resources into destructive activities with the adverse effect on economic growth.

Second, even though expenditure on social services has not shown relatively a declining trend , the economic trend, the economic service share in the total recurrent expenditure has been continuously declining except for the period 1992-2005.

Table 4: Functional Distribution of Recurrent Expenditure (in percent)

Period	Defence/recurren expenditure	General service/ Recurrent expenditure	Economic/Recurrer Expenditure	Social /Recurr nt Expenditu
1961-1974	22.0(4.43)	51.4(8.17)	11.3(2.87.)	21.7(2.52)
1975-1991	41.66 (6.02)	55.2(6.01)	10.73(2.87)	18.9(1.29)
1992-2005	26.8(15.37)	45.3(15.36)	10.54(1.96)	27.08(4.97)

Source: Ministry of Finance and Economic Development, Budgetary Revenues and Expenditure.

Note: The figure in parentheses are the standard deviations of yearly ratios.

Third, during 1992-2005 , the allocation of recurrent expenditure to defense has dramatically decreased but the advantage that could have been reaped from this has virtually been off settled by declining government revenues. For example, total expenditure in 1992 fiscal year declined by 35 per cent, while domestic revenue fell by 36 per cent .The overall deficit ,therefore, remained at about 10 per cent of GDP which was more or less equal to the 1991 level.

Fourth, the rapid growth of government expenditure has created a situation where domestic revenue fails to cover recurrent expenditure let alone to contribute to capital expenditure. For example ,of the period 1975-1991,it was only in 1984,and of the period 1994-1997 it was only in 1988 that domestic revenue has met recurrent expenditure.

4.1.2 GOVERNMENT REVENUE

The levels of structure on taxes are other factor that affect government deficit. As it shown in Table 5 ,on the average ,taxes are risen slightly as a proportion of GDP from the period 1961-1974 to 1975-1991 but declined during 1992-2005 due to higher relative growth rate of GDP. Real tax revenues had an annual average growth rate of about 9 per cent during 1961-1974, but declined to 5.4 per cent during 1975-1991.The ratio of tax revenue to total expenditure also has shown a declining trend indicating a widening gap between government expenditure and tax revenue. Likewise the ratio of tax revenue to domestic revenue has declined, showing a higher growth rate of non tax revenue.

Table 5: The annual average Growth rate of Tax share in GDP, Total expenditure and Domestic Revenue (in per cent)

Period	Growth rate Of Real Tax Revenue	Tax Revenue/ GDP	Tax Revenue/Tota Exp.	Tax Revenue/ Domestic Revenue
1961-1974	8.7(19.42)	8.4(1.24)	74.9(19.54)	85.2(2.93)
1975-1991	5.4 (13.2)	13.4(1.69)	50.8(8.18)	74.9(6.77)
1992-2005	6.7(3.13)	37.5(12.41)	44.4(5.55)	70.3(6.25)

Source:Ministry of Finance and Economic Development,Budgetary Revenue and Expenditure.

Note: The figures in parentheses are the standard deviations of yearly ratios and growth rates.

With respect to the structure of tax revenue as shown in Table 6 , during 1961-1974 the average annual share of direct and Foreign Trade Taxes have decreased but the share of indirect taxes has increased. During the period 1975-1991, the average annual share of foreign trade taxes has declined mainly due to poor performance of foreign trade taxes

Table 6: Tax Revenue Structure (in percent)

Period	Direct taxes/Total Taxes	Indirect Tax/Total Taxes	Foreign Trade Taxes/ Total Taxes
1961-1974	25.9(3.96)	30.7(6.14)	43.4(5.92)
1975-1991	36.0(7.14)	29.1(4.47)	34.9(10.83)
1992-2005	32.7(3.58)	24.8(4.47)	42.5(7.31)

Source: Ministry of Finance and Economic Development, Budgetary revenues and expenditure.

Note: The figures in parentheses are the standard deviations of yearly ratios.

Generally, though real revenue growth rate has lagging behind the expenditure growth rate over the longer period, we have seen the rising trend of tax revenue. This is attributed to tax reforms and some improvements made in tax administration. To cite some example of reforms made in the past:

- Rural land use Fee and Agricultural Activities Income Tax proclamation 77/1976 and the amendment proclamation 152/1978,

- The Customs Tarrifs Regulatios,Legal Notice 42/1976,
- Income Tax Proclamation 30/1992 and 107/1994,
- Sales and Exice Tax proclamation 68/1993,
- Export Tax proclamation 38/1993 and import tax proclamation,
- Value Added Tax proclamation 285 /2002

4.1.3 DEFICIT FINANCING

The large and growing deficit which have been recorded in the past have been financed through domestic and external finance The former includes borrowing from the domestic bank, non-bank sectors and money printing and the latter refers to borrowing from the rest of the world.

The borrowing of government from the central bank directly affects reserve and total money supply. Recourse to commercial bank finance may have similar effects on the level of money supply and it has a crowding out effect on the private sector. In fact, the crowding out effect was carried out through a more direct route during 1975-1991.
In this period private sector participation was limited by law. Moreover, credit rationing, cumbersome procedures in licensing and permits, frequent changes in investment law and a red - taps were directly discourage investment.
As shown in table 7, a number of points may be made with regard to the sources of deficit financing are:

First, even though the levels of external assistance have been increasing throughout the period and its share in the total annual deficit financing on the average have shown a declining trend. External assistance were about 73 per cent of the total yearly deficit financing on the average durig 1964-1974 but declined to 27 and 9 per cent during 1975-1991 and 1992-2005,respectively.On the other hand, the level of share of external loan has been increasing for the period 1992-2005.It accounted about 29 per cent of deficit financing level

Table 7:Source of Deficit Financing

Period	External Assistance	External loan	External Assistance And Loan	Domestic Bank Borrowing	Total Deficit
A. Average Annual Levels(in Million Birr)					
1964-1974	86.5	40.3	126.8	-8.0	118.8
1975-1991	292.1	332.2	624.3	471.7	1096
1992-2005	391	1255	1646	2676	4322
B. Average Annual share of Deficit Financing (in Percent					
1964-1974	72.8	33.9	106.7	-6.7	100
1975-1991	26.7	30.3	57	43	100
1992-2005	9	29	38	62	100

Source;Ministry of Finance and Economic Development,Budgetary Revenues and Expenditures.

Note;The Figures in Parentheses are standard deviations of the yearly Ratios

Negative Sign in the Fifth column indicate Domestic Bank Saving and budget surplus.

Second with regard to domestic bank borrowing, the level and the share of domestic bank borrowing has increased throughout the period .The maximum level and share has reached during 1992-2005.in this period the annual average share of domestic borrowing was about 62 percent of the total yearly deficit financing.

4.2 MONETARY DEVELOPMENT

In the next table, the country experienced an expansionary monetary policy since 1964. In fact , the source (or cause) of liquidity growth differ from regime to regime depending on the source of deficit financing each regime adopted.

Table 8:Monetary Variables

Period	A. Growth Rates (in per cent)				
	C	D	QM	M1	M2
1964-1974	9.7(11.8)	8.3(18.6)	19.1(9.6)	9.1(10.4)	11.5(8.8)
1975-1991	12.9(12.5)	17.8(15.3)	10.4(12.6)	14(8.3)	12.6(4.2)
1992-2005	7.5(8.7)	12.3(8.5)	18.4(97.9)	9.4(5.2)	12.4(4.6)
Period	B.Growth Rates in percen		C.Share in total DC		Inflation Rate
	NFA	DC	CG	CS	
1964-1974	19.2(43.2)	11.8(6.4)	20.6	79.4	2.7
1975-1991	-9.6(	17.4(12.1)	50.1	49.9	9.9
1992-2005	46.9(86.8)	10.9(8.9)	57.9	42.1	3.5

Source: National Bank of Ethiopia

Note:The Figures In Parentheses are the standard deviations

Where;C = Money in Circulation outside bank

D = Demand Deposit

QM=Quasi Money

M1 =Narrow Money Supply

M2=Broad Money Supply

NFA= Net Foregn Asset

DC=Domestic Credit

CG=Credit to central government

CS=Credit to other sectors

The average annual growth of narrow and broad money supply during 1964-1974, was about 9 and 12 percent respectively. In addition, net foreign asset and domestic credit has increased during this period are 19 and 12 per cent, respectively.In this period external sources constitute the major factor influncing money supplly,while domestic credit plays a secondary role in determining the growth of money broad money(M2).During this period the ratio of claim on central government tototal domestic credit was 21 percent whereas credit to other sector accounted about 80 per cent of the total domestic credit.

During 1975-1991 when the country experinced large and growing budget deficit, the average annual growth rate of M1 and M2 was 14 and 13 per cent, respectively.during this period the expansion of domestic credit become a dominant factor for the growth rate of broad money supply.Domestic credit grew during this period on the average by 17 per cent per annum whereas net foreign asset have shown a declining trend on the average by 9.6 per cent per annum.The share of credit to total domestic credit reached about 50 per cent where as the remaining is attributed to claim on the other sector.

During the period 1992-2005 the was an upsurge of domestic lquidity with M1 and M2 expand by 9 and 12 per cent ,respectively.

The expansion of broad money resulted from significant increase in net foregn asset which was about 47 per cent.domestic credit has increased about at 11 percnt.

As shown in table 8,the annual average inflation rate for the period 1964-1974 was about 3 per cent increased to about 10 per cent during 1975-1991, and declined to about 4 per cent during 1992-2005.

Thus, we have seen that in the past,government deficits increased continuously mainly due to accelerated growth of government expenditue.This resulted in an expansion of money supply which on the average the past four decades grew at 12 per cent per annum,showing a strong link between budget deficit and money supply.The expansion of money supply in turn caused inflation in the country.

5. EMPRICAL RESULTS AND DISCUSSIONS

5.1 DICUSSIONS ABOUT ESTIMATION AND DIAGNOSTIC TESTING

Threre are four equations specified in the Aghvli and Khan Model.Thse are Price, Government Expenditure , Government Revenue, and Money supply.Limited Information method of estimation of Simultaneous Equation Methods of which Two-Stage Least Squares is used. Two-Stage Least Squares is a method which uses estimating the reduced form of the model by regressing each endogenous variable on all of the predetermined variables in the ,model and then predict the estimated values of each endogenous variables at the first stage of regression. In the second stage running ordinary least squares regression on each structural equation by replacing the endogenous regressors on the right hand side of each equation with its predicted values.

The software used to process the data analysis is Stata Version 8.1 was used. First,declaring the data used is time-series,labeling the variables.At the First stage of regression regress command and saving the predicted values of the dependent variables in each equations.In the second stage ,ivreg command to estimate the the structural equations with instrumental variables (2SLS) regression . The instruments used for the estimation the endogeneous regressors are replaced by their predicted values.Post estimation commands are used for diagnostic testing ,that is whether the assumptions of the models are met.

In the investigation since time-series data are used stationarity (unit Root) and cointegration tests have been undertaken . The tests have shown that the variables in each equation are unit root and cointegrated. Using Dickey –

Fuller test for unit root it was found that a unit root exist when there is a drift and constant parameters are present. The solution given to this problem is in the specification of the original model there are a one time lag of each endogenous variables included in the Model. Regarding to the cointegration problem . A one time lag of the residuals term is included and then the coefficient of each lagged residual term is found to be statistically insignificant .As a consequence a one lagged residual term is dropped and estimation is undertaken for each equation using the variables at level , that is,we do not go to error correction method.

While coming to the detection of serial correlation of the disturbance terms using White (1980) test ,serial correlation is detected in the government Revenue equation in period II and inflation nequations in both periods .This problem is detected using Cochrane-Orcutt iterative method.This estimation method used to estimate for the predicted value of the residuals estimate autoregressive process of order one to estimate correlation coefficient and the run a generalized difference equation.

The distribution of error terms follow a normal distribution and has constant variances.Thus we can use tests such as t,F ,x^2 make tests and give decision based on the calculated statistic and policy conclusions.

5.2 Methods In Diagnostic Tests

A.Tests of Serial Correlation

Breush and Godfrey Test

Breush and Godfrey have developed a test of autocorrelation that is general,in the sence that it allows for

(1) nonstochastic regressors ,such as lagged values of the regressors and:(2)Higher order autoregressive schemes.In the analysis AR(1) is tested for each equations of the model.The null hypothesis is that

H_o $\rho=0,$ there in no serial correlation of order one in the disturbance term

H_1 $\rho\neq1$,there is firist order autocorrelation in the disturbance term

The steps are as follows steps.

1.Estimate each equation by OLS and obtain residuls .

2.Regress the estimated residuals on the regressors and lagged residuals.

3.If the sample size is large Breush and Godfrey have shown that

$(N-1)R^2$ follows chi-square with one degree of freedom.

B.Test of Hetroskedasticity(White's general Test)

The general test of hetroskedasticity proposed by White given as follows:

Under the null hypothesis disturbance terms are homoskedastic,that is

$H_o:\sigma^2_i=\sigma^2$

H1:Not H_o

the steps proceeds as follows:

1.Given the data estimate the model and save the residuals

2.Run the auxiliary regression of squared residuals on the original regressors, their squred values ,and cross product of the regressors.

3. Under the null hypothesis of no hetroskedasticity ,White has shown that N times R^2 obtained from the auxiliary regression asymptotically follows chi-squared distribution with degrees of freedom equal to the number of repressors (excluding the constant term)

4.If the calculated value is greater than the tabulated value, the conclusion is that there is hetroskedasticiy.

C. Hausman Specification Test

In the system Hausman (1978) test of specification is undertaken for each equation of the model and the result shows that Instrumental variables (two stage least squares) is efficient than the ordinary least squares estimation.The Hausman test is based on looking for under the null hypothesis both instrumental variables(two-stage least squares) and ordinary least squares are consistent but ordinary least squares is efficient relative to instrumental variables (two stage least squares ,while under the alternative hypothesis two-stage least squares remains consistent while ordinary least squares is inconsistent.

D.COCHRANE-ORCUTT ITERATIVE PROCEDURE

These procedure uses tha assumptions that AR(1) scheme for the disturbance term

$U_{t=}\ \rho U_{t-1}+e_t$, $-1<\rho<1$ and e_t is a white-noise

The steps are as follows:

1) Estimate the regression equation by OLS and obtain residuals.

2) Using the residuals obtained in step (1),run a regression

$\hat{U}_t=\rho\hat{U}_{t-1}+V_t$

3.Estimate ρ and estimate the generalized difference equation.

This gives the regression result with the autocorrelation in the disturbance term is corrected .

When we come to the overall fit of each equations in both periods in the model the F-statistic shows that the coefficients in each equations is jointly zero is rejected indicating that the data under investigation well fit to the model .

In modeling the response of economic variables to policy stimuli,it is expected that there will be a possibility of long lags between policy changes and its impact on important economic variables.In the specification of the model it has been used lagged values of the endogenous variables to see the long run and short run flactuations for the Price,Government Expenditure and Government Revenue Equations.The interpretation of these equations the coefficients are based on the models with lagged variables(distributed lag Models) .For these equations we have short run as well as long run parameters estimates and the mean lag for the selected parameters in the model .The estimated equestions of the model for period I and II are presented as follows

PERIOD I(RESULTS)

1. PRICE EQUATION

$$\log Pt = 0.733654 - 0.08173 \log Yt - 0.880901[\log M - \log P]_{t-1}$$
(1.5158) (.2162016) (0.1039179)

$$+ 0.744209\ \pi_t + 0.9588773 \text{Fit M}$$
(0.2162016) (0.074974)

adjusted R^2 = 0.9798
F(4.12) = 184.02 (000)
Root MSE = 0.04839

2. GOVERNMENT EXPENDITURE EQUATION

$$\log Gt = -11.94303 + 1.81638 \log Yt + 0.13105 [\log G - \log P]_{t-1}$$
(4.437038) (0..654687) (0..2827596)

$$+ .5084372 \text{Fit P}$$
(0..3550034)

adjusted R^2 = 0.8459
F(3.13) =29.96 (000)
Root MSE = 0.22178

3. Government Revenue Equation

$$\log Rt = -6.404662 + 1.028564 \log Yt + .4511846[\log R - \log P]_{t-1}$$
(5.288022) (0.75193) (0..3937004)

$$+ 0.6471068 \text{ Fit P}$$
(0.2621659)

adjusted R^2 = 0.9000
F(3.13) = 48.42
Root MSE = 0.16215

4. Money Supply Equation

$$\log Mt = -0.7364307 + 1.00316 \text{FitG} - 0.079476 \text{Fit R}$$
(0.620353) (0.3424) (.4040492)

$$+ 0.1317927 \log Et + 0.4690522 \log Bt$$
(0.0575394) (0.5627217)

adjusted R^2 = 0.9396
F(4.12) = 63.13(0.0000)
Root MSE = 0.14505

5. INNFLATION EQUATION

$$\Pi_t = 0.7043806\ \Delta \log Pt + 0.2856194\ \Pi (t-1)$$
(0.225763) (0.2023842)

Note : Figures in Parenthesis are Standard Errors

PERIOD II(RESULTS)

6. PRICE EQUATION

$$\log Pt = 1.2059 - 0.2292 \log Yt - 0.6021[\log M - \log P]_{t-1}$$
$$(1.7059) \quad (.2693) \quad (0.097)$$
$$+ 0.9166\, \pi_t + 0.5243 \text{Fit M}$$
$$(0.1383) \quad (0.1394)$$

adjusted R^2 = 0.9187
F(4.8) = 26.83(000)
Root MSE = 0.02556

7. GOVERNMENT EXPENDITURE EQUATION

$$\log Gt = -1.299131 + 0.492281 \log Yt + 0.70957\, [\log G - \log P]_{t-1}$$
$$(4.847703) \quad (0.82706331) \quad (0..2563524)$$
$$+ 0.6191548 \text{Fit P}$$
$$(0.5880705)$$

adjusted R^2 = 0.9592
F(3.9) =94.5 (000)
Root MSE = 0.09523

8. Government Revenue Equation

$$\log Rt = -5.39722 + 1.370921 \log Yt + 0.6039283[\log R - \log P]_{t-1}$$
$$(2.364662) \quad (0.273645) \quad (0.158150)$$
$$+ 0.436561 \text{ Fit P}$$
$$(0.2269101)$$

adjusted R^2 = 0.7852
F(3.8) = 14.41(0.001)
Root MSE = 0.04395

9. Money Supply Equation

$$\log Mt = 0.310674 + 1.526768 \text{FitG} - 0.89225619 \text{Fit R}$$
$$(0.7064178) \quad (0.4524854) \quad (0.427081)$$
$$+ 0.313749 \log Et + 0.775642 \log Bt$$
$$(0..1330422) \quad (0..4579092)$$

adjusted R^2 = 0.9576
F(4,8) = 69.35(0.0000)
Root MSE = 0.08557

10. INNFLATION EQUATION

$$\Pi_t = 0.9129107\, \Delta \log Pt + 0.087540 \Pi (t-1)$$
$$(0.1592253) \quad (0.176864)$$

Note : Figures in Parenthesis are Standard Errors

While interpreting the individual coefficient of the system,all coefficients of the equatins in both periods have signs with a priori expectation.Regarding the interpretation of the short –run price eqations ,previous year real money balance,fitted values of money supply and expected inflation are statistically significant in both periods.Real income is not statistically significant in both periods.If previous year real money balance has increased by one percent ,the current price level will decline by 88 percent in period I and 60 percent in period II.This results ,of course,from the original money demand function,which implies that the higher the stock of real money balance in the previous year for a given demand for that balance,the smaller will be the real demanmd for money in the current period will decline assuming other variables remain constatnt in both periods.

The coefficient of adjustement for price equation is λ=0.12(1-0.88) for period I and λ=0.40(1-0.60) for period II,implying that about 12 percent in period I and 40 percent for period II of the discrepancy between the expectedand actual price level is eliminated in a year.The mean time lag in the adjustement of real money demand to the difference between the desired and actual real money balance in the previos period is (1- λ)/ λ=0.88/0.12=7.3 years in period I and 0.60/0.40=1.5 years in period II.When we compare the two periods the mean time lag in the adjustement of real money balance is shorter in period II as compared to period I.If the government increase the stock of money ,the public took 7 years for period I and 1.5 years for period II to realize actually the stock of money balance has increased in the economy in order to adjust their real demand for money accordingly.

If the expected inflation increased by one percent the current price level will increase by 0.74 percent in period I and 0.92 percent in period II this shows that in

period II the increase in the current price level is larger than as compared to period I.

The long –Run price equation estimated by dropping

$[\ logM-logP]_{t-1}$ term.The result is:

$logP_t=4.4635+0.4097logY_t+0.0165\pi_t+0.658541FitM_t$
(3.7646) (0.5526) (0.3404) (0.1714)

For period I and

$logP_t=6.485865-.021733logY_t+0.9187635\pi_t+0.334488FitM_t$
(3.49683) (0.6343201) (0.3290396) (0.2711453)

For period II

From the above equatios in the long–run the expected rate of inflation is statistically significant in period II and statistically insignificant in period I.This shows that the expected rate of inflation has a significant influence on the current price level for period II.In both periods real income has no significant influence on the current price level..As can be seen from the two equations the coefficient of FitMt is significant in period II and insignificant for period I.In period II if the stock of real money balance increased by one percent the current price level will increase by 0.65 percent.This is the confirmation that in the long run the growth of price is proportional to the growth of the nominal money supply assuming other variables remain constant

When we see the short-run Government expenditure function the partial income elasticity of expenditure is about 1.8 in period I and 0.49 in period II is statistically significant and insignificant in period I.Previous year real government expenditure is not statistically in period I and significant in period II

The coefficient of adjustement for the government expenditure equationis

d=(1-.71)=.29 for period II,implying that about 29 percent of the discrepancy between expected and actual government expenditure is eliminated in a year.The mean (average) time lag in the adjustement of government expenditure function is (1-d)/d=(1-.29)/.29=2.44 years.

The long-run government Expenditure function is:

$\log G_t$=-12.9074+1.922446$\log Y_t$+0.5490$FitP_t$
(3.7809) (.591779) (.3319)

for period I and

$\log G_t$=-12.82942+2.731127$\log Y_t$-0.59036$FitP_t$
(3.61114) (.50.2554893) (0.2550)
For period II

From the above equation one can observe that the long run partial income elasticity of government expenditure is 1.9 for period I and 2.73 for period II .The short run partial income elasticity is 1.028 for period I and 0.49 for period II.When we see period II partial income elasticity of government expenditure is much greater than its short run partial income elasticity.

In both periods the growth rate of nominal expenditure is greater than the growth rate of real income.That is,if real income increase by one percent the nominal government expenditure increase by 1.9 percent for period I and 2.73 percent for period II.This is due to high government spending resulted from the need for education and infrastructural development.High spending also arisen from financing war in period I and cyclical drought which have existed for both period.Another result that is observed from yhe expenditure function is that price elasticity of nominal government expenditure is 0.5490 for period I and 0.5904 for period II,the coefficient is statistically significant in period II and it is insignificant

for period I.In both periods the coefficients are different from unity,which is not with a priori expectation.

Concerning the government revenue equation, all coefficients are statistically insignificant for period I and all coefficients are statistically significant for period II.Thus for period II the short-run partial income elasticity of government revenue is 1.37 .Previous year real revenue is statistically significant for period II and has a significant positive correlation with nominal government revenue.The adjustement coefficient of the revenue equation is e= 1-0.6039=0.3961 and has a mean time lag of 1.5 year.This implies that 39.61 percent of the discrepancy between the desired and actual real revenue in the previous period will be eliminated in a year.

The long run revenue function is:

$\log R_t$=-11.49818+1.7209$\log Y_t$-0.562344FitP_t
(2.897289) (0.453477) (0.2543389)
For period I and

$\log R_t$=-12.43985+2.632766$\log Y_t$-0.5742126FitP_t
(3.94469) (0.27909) (0.28452)

As can be seen from the result ,all coefficients are statistically significant at five percent level of significance for bothperiods.The long-run partial income elasticity of government revenue is estimated to be 1.72 for period I and 2.63 for period II. The price elasticity of long run government revenue equation is 0.56 for period I and 0.57 for period II.For both periods the long run government revenue is highly price inelastic.

Regarding to the money supply equations, only fitted value of expenditure and loge significant in period I and only logB and the constant term is insignificant. expend. According to the regression results for period II,a one per cent increase in the budget deficit will increase the stock of the money supply by

(1.526768-0.892256)=0.634512 per cent assuming other terms remains constant. Moreover, money supply would also increase, the higher the growth rate of E term which consist of change in foreign reserves, changes in the central bank claims for the private sector, and the stock of high powered money in the previous period.

The follwing table give summary of the adjustement coefficients,long –run parameters and mean time lag of each equation for period II

Table.9 Long-run Parameter Estimates and Short-run adjustement coefficients

Price Equation	Government Expenditure Equation
λ =0.12	d=0.29
a_0 =6.485865	g_0=-12.82942
a_1 = 0. 00217	g_1=2.731127
a_2=0.9187635	
Government Revenue Equation	**Money Supply Equation**
e =.3961	k_0=0.3106
t_0=-12.43985	k_1=1.5267
t_1=2.632766	k_2=0.8922
	k_3=0.3137

Note: the coefficient of price levels in government expenditure and Revenue initially expected to be unity. In both equations the coefficients are different from unity. The coefficient of the money supply in the price equation also expected to be unity and it has found that it is statistically not different from unity

Table 10.Average Time Lags

Money Demand	(1- λ)/ λ=1.5
Government Expenditures	(1- d)/ d=2.44
Government Revenue	(1- e)/ e=2.5

From the above two government budgetary equations, one can observe that the adjustment coefficients of government function, d=0.29. Whereas, the adjustment coefficients of the revenue function is 0.3961. The mean time lag in the adjustment of real government expenditure to the difference between desired and actual real expenditure in previous year, is 1.5year. On the other hand, the mean time lag to the revenue equation is 2.5 year. Thus, this comparison confirms that the basic hypothesis is nominal government expenditures adjust upwardly faster than to that of revenue to keep pace with the growth of inflation. Thus, in fact leads to the conclusion that in the short-run the lag structure in the government budgetary mechanism would create a deficit in real as well as nominal terms so that two-way causation between money supply and inflation hypothesized by Aghevli and Khan model has been demonstrated in period II.

The interaction among budget deficit, money supply and inflation can be illustrated as follows:

Suppose the money supply increase due to an increase in net foreign reserves. This would rise the price level which in turn pushes the government expenditure to rise faster than the government revenue. The estimated result showed that the adjustment coefficient of government expenditure is greater than that of revenue

,which tent amount to say means that growth rate of government expenditure is greater than the growth rate of government revenue. So that, government budgetary deficit would increase as a consequence the inflated budget deficit in turn pushes the money supply to rise. This is in general implies that there is a two-way causation between money supply and inflation.

6. CONCLUSION AND POLICY RECOMMENDATION

6.1 CONCLUSION

Using Aghevli and Khan (1978) model,two way causation between money supply and inflation in Ethiopia has been demonstrated in period II. In summary, the self-perpetuating inflationary process, that is a rise in E terms leads to a rise in the stock of money supply. The rise in the stock of money supply, in turn result in an increase in the inflation rate. Empirical evidence has shown that while government expenditure rise keep pace with inflation, government revenue would tend to fall behind in real terms due to long time lags in tax collection so that budget deficit increases. The financing of the inflation-induced deficit would the increase the money supply the process repeats itself.

The monetarist paradigm that sustained inflation resulted from the budget deficit by money creation has been empirically confirmed in period II. This is a definite confirmation that in the long-run the growth of price is proportional to the growth of money supply.

Due to the effect of government borrowing and fluctuation in the foreign asset, the central bank found to have a limitation in conducting independent monetary policy.

6.2 POLICY RECOMMENDATION

The main finding of the study is that large budget deficit has impact on the growth of money supply and general price level in the country. The monetary policy has to be mixed and implemented to have macroeconomic stability.

Therefore, the policy recommendations of the result of the study are:

- Controlling inflation requires a deliberate action by the government to eliminate budgetary deficit and increase budgetary surplus in a way possible. The ministry of Finance and Economic Development, National Bank of Ethiopia and Ministry of Revenue must work together to implement sound Fiscal and Monetary policy either to eliminate the deficit or to reduce the deficit as small as possible.

- In the past four years, Revenue Authority took measure to increase the total revenue by Tax Reform, implemented Value Added Tax Which was introduced in 2002.However, and more attention has to be given to reducing the time lags in the collection of taxes. By creating awareness to taxpayers, in order to pay their taxes on scheduled time.

- To bring down the budget deficit, reducing defense expenditure, which accounts a substantial share of the total government expenditure, has to be the primary task of the government. his in fact requires political stability.

- The only supplier of the stock of money is National Bank of Ethiopia, when there is money creation beyond some limit will create inflation and these in turn pushes the deficit to increase. There must be other sources of financing ,in addition to money creation to bring the budget deficit down. It must conduct sound monetary policy to reduce the deficit without inflation to explode in the long-run.
- The Mintry of Finance and Economic Development, The Ministry of Revenue Should have a good macro-econometric forecasting framework by which macroeconomic variables behaves in the long run. Consequently, macroeconomic variables are modeled in time series framework in order to know the deficit in advance.

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APPENDIX I :ESITIMATION RESULT FOR PERIOD I

1. **INSTRUMENTAL VARIABLES (2SLS) ESTIMATION**

Dpendent Variable is log P			
Regressor	Coefficient	Standard Error	t-ratio (Prob)
constant	0.7336547	1.515836	0.49 (0.635)
logY	- 0.0817365	0.2162016	-0.38 (0.712)
(logM-logP)t-1	- 0.880901	0.1039179	- 8.48(0.000)
Fit M	0.9588773	0.0749474	12.79(0.000)
EXPINF	0.744209	0.1767724	4.75(0.059)
R-Squared	0.9848	F.Statistic	F(4,12) =184.02(000)
AdjR - Squared	0.9798	Root MSE	0.04839
Residual Sum of Squares	0.02810347	Meanof Dependent	
S.D of dependent Variable	0.3954171	Variable	5.956849
D.W Statistic	2.6546		

DIAGNOTIC TESTING			
Type of test	Test statistic	Calculated	Tabulated
A. Serial Correlation	NR^2	2.303144	3.84146
B. Hausman Test	H	0.90141882	5.35
C. Normality	JB	2.85	3.83
D. Hetroskedasticity	NR^2	16.875117	18.3

APPENDIX I continued

2. INSTRUMENTAL VARIABLES (2SLS) ESTIMATION

Dependent variable is log R			
Regressor	Coefficient	StandardError	t-ratio (Prob)
constant	-6.471068	5.288022	-1.21
logY	0.1.028564	0.7519369	(0.247))
(logR-logP)t-1	0.4511846	0.3937004	1.37
Fit P	0.6471068	0.2621659	(0.195)
			1.15(0.272)
			2.47
			(0.028)
R-Squared	0.9188	F. Statistic	
Adj R- Squared	0.9000	Root MSE of	F(3,13)=48.42
Residual Sum		Regression	0.16215
of Squares	0.341787	Mean of	
S.Dofdependent		Dependent	
Variable	0.5632017	Variable	7.48445
D.W Statistic	2.034712		

Diagnostic Tests

Type of test	Teststatistic	Calculated	Tabulated
A. Serial Correlation	NR^2	2.0249721	3.84
B. Hausman	H	0.00557	1.03
C. Normality	JB	0.71	3.84
D. Hetroskedasticity	NR^2	12.237478	15.23

APPENDIX I continued

3. INSTRUMENTAL VARIABLES (2SLS) ESTIMATION

Dependent variable is log G			
Regressor	Coefficient	Standard Error	t-ratio (Prob)
constant	-11.94303	4.437038	- 2.69(0.018)
logY	1.816381	0.654687	2.77(0.016)
(logG-logP)t-1	0.131025	0.2827596	0.46(0.6510)
Fit P	0.5084372	0.3550034	1.43(0.176)

R^2-Squared	0.8748	F. Statistic	F (3,13)=29.26
AdjR - Squared	0.8459	Root MSE	0.22178
Residual Sum of Squares	0.6394136	Mean of Dependent	
S.D of dependent Variable	0.621419	Variable	7.82993
D.W Statistic	1.882359		

DIAGNOTIC TESTING

Type of test	Test statistic	Calculated	Tabulated

A. Serial Correlation	NR^2	0.1311	3.84146
B. Hausman Test	H	0.962836	1.5234
C. Normality	JB	5.45	6.71
D. Hetrroskedasticity	NR^2	8.0914539	10.96

APPENDIX I continued

INSTRUMENTAL VARIABLES (2SLS) ESTIMATION

Dependent variable is log M			
Regressor	Coefficient	Standard Error	t-ratio (Prob)
constant	-0.7364307	0..620353	-1.19 (0.256)
FitR	-0.079476	0.4040492	-0.20 (0.847)
Fit G	1.00316	0.3424	3.21 (0.007)
log B	0.46900522	0.5627217	0.83 (0.421)
log E	0.1317927	0.0575394	2.29(0.041)
R-Squared	0.9547	F.Statistic	F(4,12)=63.13 (0.000)
Adj R - Squared	0.9396	Root MSE	0.14505
Residual Sum of Squares	0.252457	Mean of Dependent Variable	7.940967
S.D of dependent Variable	0.6217002		
D.W Statistic	1.66142		

Diagnostic Tests			
Type of test	Test statistic	Calculated	Tabulated

A. Serial Correlation	NR^2	0.686158	3.84146
B. Hausman	H	1.826876	2.751
C. Normality	JB	0.72	1.94
D. Hetroskedasticity	NR^2	16.406104	18.30

APPENDIX I continued

Cochrane - Occult AR (1) regression - iterated estimate

Dependent variable is INF			
Regressor	Coefficient	Standard Error	t-ratio (Prob)
FITINF	0.7043806	0.225763	-3.12(0.009)
INF (-1)	0.2856194	0.2023842	1.46 (0.170)
R-Squared	0.6267	F.Statistic	F(3,12)= 6.71(0.000)
AdjR - Squared	0.5333	Root MSE	0.07528
Residual Sum of Squares	0.058009938	Mean of Dependent Variable	0.0979011
S.D of dependent Variable	0.1011253		
number of iteration	45		
D.W statistic	2.119238		

DIAGNOTIC TESTING

Type of test	Test statistic	Calculated	Tabulated
A. Serial Correlation	NR^2	5.33	3.84

B. Hausman	H	0.001	0.96
C. Normality	JB	0.02	0.71
D. Hetroskedasticity	NR^2	4.69626	8.60

Unit root Test Co integration Test For Price for Period I

1. Random walk	With Drift $\alpha \neq 0$	$\sigma \neq 0$ (no constant)	
Test statistic	1% critical value	5%critcal value	10%critical
- 3.326	-4.380	-3.600	-3.240
2. Random walk	without Drift	$\alpha \neq 0$ $\sigma = 0$	
Test Statistic	1 critical value	5%critcal value	10%critical
- 0.979	-3.750	-3.000	-2.630
3. Random walk	Without drift	$\alpha = 0$	$\sigma = 0$
Test statistic	1%critical vales	5%critical value	10%critical
1.490	-2.660	-1.950	-1.600

Unit Root and Cointegration Test for Expenditure for period I

1. Random walk	Without drift	$\alpha = 0$	$\sigma = 0$
Test statistic	1% critical value	5%critical value	10 % CR
-2.392	-4.380	-3.600	-3.240
2. Random walk	Without drift	$\alpha \neq 0$	$\sigma = 0$
Test statistic	1% critical value	5%critical value	10%crit
-1.604	-3.750	-3.000	-2.630

3. Randomwalk	With drift	$\alpha \neq 0$	$\sigma \neq 0$
Test statistic	1% critical value	5%critics values	10% critical
2.514	-2.660	-1.950	-1.600

Unit Root and Cointegration Test for Revenue for period I

1. Random walk	Without drift	$\alpha = 0$	$\sigma = 0$
Test statistic	1% critical value	5%critical	10% crit
2.268	-2.660	-1.950	-1.600
2. Random walk	Without drift	$\alpha \neq 0$	$\sigma = 0$
Test statistic	1% critical Value	5%critical value	10% crit
0.124	-3.750	-3.000	-2.630
3. Random Walk	With Drift	$\alpha \neq 0$	$\sigma \neq 0$
Test Statistic	1% critical Value	5%critical value	10% crit
-2.392	-4.380	-3.600	-3.240

Unit Root and Cointegration Test for Money Supply for period I

1. Random walk without Drift $\alpha = 0$ $\sigma = 0$ no constant

Test statistics	1% critical value	50% critical value	10% crit
0.799	-2.660	-1950	-1.600

2. Random walk without drift $\alpha \neq 0$ $\sigma = 0$

Test statistics	1% critical value	5% critical value	10% crit
-2.180	-3.750	-3.000	-2.630

3. Random walk without drift $\alpha \neq 0$ $\sigma \neq 0$

Test statistics	1% critical value	5% critical value	10% crit
0.118	-4.380	-3.600	-3.240

Causality between Price and Money Supply for Period I

Dependent Variable is logP

Repressor	Coefficients	Standard Error	t-ratio (prob)
Constant	0.826511	0.3442052	2.40(0.031)
(logp) (-1)	0.6552831	0.1469396	4.46 (0.001)
(logM) (-1)	0.1653754	0.0923629	1.79 (0.095)

Causality between Money Supply and Price for Period I

Dependent Variable is logM

Repressor	Coefficients	Standard Error	t-ratio (prob)
(logM) (-1)	0.9789129	0.0517165	18.93 (0.000)
$(logP)_{t-1}$	0.0517314	0.0822755	0.63(0.540)
Constant	0.0021885	0.192729	-0.11(0.911)

Causality between Price and Revenue for period I

Dependent Variable is logP

Repressor	Coefficients	StandardError	t-ratio (prob)
(logP) (-1)	0.7472207	0.1907565	3.92(0.002)
(logR) (-1)	0.1023382	0.1226104	0.83(0.418)

Constant	0.8240312	0.3442052	2.40(0.031)

Causality between Revenue and Price for period I

Dependent Variable is logR

Repressor	Coefficients	StandardError	t-ratio (prob)
Constant	0.847834	0.4531162	2.57(0.022)
(logR) (-1)	0.8322611	0.1406107	5.92(0.000)
(logP) (-1)	0.0828801	0.2187612	0.38(0.710)

Causality between Price and Government Expenditures for Period I

Dependent Variable is logP

Repressor	Coefficients	StandardError	t-ratio (prob)
(logG) (-1)	0.1590987	0.0879039	1.81(0.092)
(logP) (-1)	0.6502719	0.1481088	4.39(0.001)
Constant	0.9214578	0.3581112	2.57(0.022)

Causality beween Government Expenditure and Price For Period I

Dependent Variable is logG

Repressor	Coefficients	StandardError	t-ratio (prob)
(logG) (-1)	0.4642076	0.2317325	2.00(0.065)
(logP) (-1)	0.6815828	0.390449	1.75(0.103)
Constant	0.249835	0.9440536	0.26(0.795)

APPENDIX II:ESITIMATION RESUT FOR PERIOD II

1.INSTRUMENTALVARIABLES(2SLS)ESTIMATION

Dpendent Variable is log P			
Regressor	Coefficient	Standard Error	t-ratio (Prob)
constant	0.12059	1.7059	0.71(0.500)
logY	- 0.2292	0.2693	-0.85 (0.420)
(logM-logP)t-1	- 0.6021	0.0987	- 6.10(0.000)
Fit M	0.5243	0.1394	3.75(0.006)
EXPINF	0.9166	0.1383	6.63(0.000)
R-Squared	0.9458	F.Statistic	F(4,8) =26.83(000)
AdjR - Squared	0.9187	Root MSE	0.02556
Residual Sum of Squares	0.0.0052247	Meanof Dependent	
S.D of dependent Variable	0.0.0885422	Variable	6.815776
D.W Statistic	1.89299		

DIAGNOTIC TESTING			
Type of test	Test statistic	Calculated	Tabulated
A. Serial Correlation	NR^2	0.428124	3.84146
B. Houseman Test	H	0.94	0.051
C. Normality	JB	1.86	2.17
D. Hetroskeoasticity	NR^2	16.87	18.30

APPENDIX II continued

2. Cochrane - Occult AR (1) regression - iterated estimate

Dependent variable is log R			
Regressor	Coefficient	StandardError	t-ratio (Prob)
constant	-5.39722	2.364662	2.28(0.652)
logY	1.370921	0.273645	5.01(0.001)
(logR-logP)t-1	0..6039283	0.158150	3.82(0.005)
Fit P	0.436561	0.2269101	1.92 (0.091)
R-Squared	0.8438	F. Statistic	
Adj R- Squared	0.7852	Root MSE of	F(3,8)=14.41
Residual Sum		Regression	0.04395
of Squares	0.015450188	Mean of	
S.Dofdependent		Dependent	
Variable	0.5640766	Variable	8.926323
D.W Statistic	1.9276		

Diagnostic Tests			
Type of test	Test statistic	Calculated	Tabulated
A. Serial Correlation	NR^2	4.0249721	3.84
B. Hauseman	H	0.023	0.01(0.99)
C. Normality	JB	4.63	5.80
D. Hetroskeoasticity	NR^2	12.23	18.30

APPENDIX IIcontinued

3. INSTRUMENTAL VARIABLES (2SLS) ESTIMATION

Dependent variable is log G			
Regressor	Coefficient	Standard Error	t-ratio (Prob)
constant	-1.299131	4.847703	- 0.27(0.795)
logY	0.4922806	0.8276331	0.59(0.567)
(logG-logP)t-1	0.7095887	0.2563524	2.77(0.022)
Fit P	0.6191548	0.5880705	1.05(0.320)
R^2-Squared	0.9694	F. Statistic	F (3,9)=94.50(0.000)
AdjR - Squared	0.9592	Root MSE	0.09523
Residual Sum of Squares	0.0816202	Mean of Dependent Variable	
S.D of dependent Variable	0.1238		

D.W Statistic	2.16

DIAGNOTIC TESTING

Type of test	Test statistic	Calculated	Tabulated
A. Serial Correlation	NR^2	0.486	3.84146
B. Hausman Test	H	0.0218	0.01(0.096)
C. Normality	JB	2.82	3.84
D. Hetrroskedasticity	NR^2	8.0914	14.6

APPENDIX II continued
4.INSTRUMENTAL VARIABLES (2SLS) ESTIMATION

Dependent variable is log M			
Regressor	Coefficient	Standard Error	t-ratio (Prob)
constant	0.310674	0..7064178	0.44(0.672)
FitR	-0.89225619	0.427081	-2.20 (0.050)
Fit G	1.526768	0.4524854	3.37 (0.010)
log B	0.7756842	0..4579092	1.69(0.129)
log E	0.313749	0.1330422	2.36(0.046)
R-Squared	0.9717	F.Statistic	F(4,8)=69.35 (0.000)
Adj R - Squared	0.9576	Root MSE	0.08557
Residual Sum of Squares	0.05858227	Mean of Dependent Variable	9.859633
S.D of dependent Variable	0.4543524		

D.W Statistic	2.271648

DIAGNOTIC TESTING

Type of test	Test statistic	Calculated	Tabulated
A. Serial Correlation	NR^2	0.7746	3.84146
B. Hausman	H	9.6405	0.96(0.91)
C. Normality	JB	3.2521	3.84
D. Hetrskedasticity	NR^2	16.40	17.2

APPENDIX II continued

5. Cochrane - Occult AR (1) regression - iterated estimate

Dependent variable is INF			
Regressor	Coefficient	Standard Error	t-ratio (Prob)
FITINF	0.9129107	0.1592253	-5.73(0.000)
INF (-1)	0.087540	0.176864	10.091 (0.188)
R-Squared	0.8594	F.Statistic	F(3,9)= 18.34(0.004)
AdjR - Squared	0.8126	Root MSE	0.0320442
Residual Sum of Squares	0.02299824	Mean of Dependent Variable	0.03844
S.D of dependent Variable	0.0729967		
number of iteration	16		

D.W statistic	1.96

DIAGNOTIC TESTING

Type of test	Test statistic	Calculated	Tabulated
A. Serial Correlation	NR^2	9.76	3.84
B. Houseman	H	1.05	0.23(0.7)
C. Normality	JB	0.261	.301
D. Hetroskedasticity	NR^2	4.69	5.27

APPENDIX II Unit root Test Co integration Test For Price for Period II

1. Random walk	With Drift $\alpha \neq 0$	$\sigma \neq 0$ (no constant)	
Test statistic	1% critical value	5%critcal value	10%critical
- 0.970	-4.380	-3.600	-3.240
2. Random walk	without Drift	$\alpha \neq 0$ $\sigma = 0$	
Test Statistic	1 critical value	5%critcal value	10%critical
- 1.010	-3.750	-3.000	-2.630
3. Random walk	Without drift	$\alpha = 0$	$\sigma = 0$
Test statistic	1%critical vales	5%critical value	10%crifielt
0.929	-2.660	-1.950	-1.600

Unit Root and Cointegration Test for Expenditure for period II

1. Random walk	Without drift	$\alpha = 0$	$\sigma = 0$
Test statistic	1% critical value	5%critical value	10 % CR
-1.935	-2.660	-1.950	-1.600
2. Random walk	Without drift	$\alpha \neq 0$	$\sigma = 0$
Test statistic	1% critical value	5%critical value	10%crit
-1.861	-3.750	-3.000	-2.630
3. Randomwalk	With drift	$\alpha \neq 0$	$\sigma \neq 0$
Test statistic	1% critical value	5%critics values	10% critical
-2.375	-4.380	-3.600	-3.240

Unit Root and Cointegration Test for Revenue for period II

1. Random walk	Without drift	$\alpha = 0$	$\sigma = 0$
Test statistic	1% critical value	5%critical	10% crit
-1.492	-2.660	-1.950	-1.600
2. Random walk	Without drift	$\alpha \neq 0$	$\sigma = 0$
Test statistic	1% critical Value	5%critical value	10% crit
-1.928	-3.750	-3.000	-2.630
Random Walk	With Drift	$\alpha \neq 0$	$\sigma \neq 0$
Test Statistic	1% critical Value	5%critical value	10% crit
-2.345	-4.380	-3.600	-3.240

Unit Root and Cointegration Test for Money Supply for period II

1. Random walk without Drift $\alpha = 0$ $\sigma = 0$ no constant

Test statistics	1% critical value	50% critical value	10% crit
-1.050	-2.660	-1950	-1.600

2. Random walk without drift $\alpha \neq 0$ $\sigma = 0$

Test statistics	1% critical value	5% critical value	10% crit
-1.300	-3.750	-3.000	-2.630

3. Random walk without drift $\alpha \neq 0$ $\sigma \neq 0$

Test statistics	1% critical value	5% critical value	10% crit
-1.242	-4.380	-3.600	-3.240

Causality between Price and Money Supply for Period II

Dependent Variable is logP

Repressor	Coefficients	Standard Error	t-ratio (prob)
Constant	0.3216577	2.542702	0.13(0.902)
(logP) (-1)	0.8754582	0.3821597	2.29 (0.045)
(logM) (-1)	0.0560066	0.0520882	1.08(0.308)

Causality between Money Supply and Price for period II

Dependent Variable is logM

Repressor	Coefficients	Standard Error	t-ratio (prob)
(logM) (-1)	0.979939	0.0.0299007	32.77 (0.000)
$(logP)_{-1}$	0.3663752	0.2193752	1.07(0.126)
Constant	-2.178607	1.459614	-1.49(0.166)

Causality between Price and Rvenue for Period II

Dependent Variable is logP

Repressor	Coefficients	Standard Error	t-ratio (prob)
(logP) (-1)	0.9271445	0.3965503	2.34(0.041)
(logR) (-1)	0.0197233	0.0413348	0.48(0.643)
Constant	0.3443883	0.0.657242	0.13(0.899)

Causality between Revenue and Price for Period II

Dependent Variable is logR

Repressor	Coefficients	Standard Error	t-ratio (probe)
Constant	-4.444808	0.2.391564	-1.86(0.093)
(logR) (-1)	0.8105687	0.037202	21.79(0.000)
(logP) (-1)	0.9232512	0.3569026	2,59(0.643)

Causality between Price and Government Expenditures for period II

Dependent Variable is logP			
Repressor	Coefficients	Standard Error	t-ratio (probe)
(logG) (-1)	0.0246977	0.0428644	0.58(0.577)
(logP) (-1)	0.9227994	0.3939083	2.34(0.041)
Constant	0.3183735	2.642295	0.12(0.906)
Causality between Government Expenditure and Price for Period II			
Dependent Variable is logG			
Repressor	Coefficients	Standard Error	t-ratio (probe)
(logG) (-1)	0.8288553	0.056072	15.67(0.000)
(logP) (-1)	0.2782302	0.5152812	0.54(0.601)
Constant	-0.0300	0.4469	-0.07(0.947)

DETERMINANTS OF MONEY SUPPLY

YEAR	C	D	M1	QM	M2	NFA	DC	COG	COS	OTHERS
1974	432.9	161.5	694.3	380.7	1075.1	611.3	634.6	64.8	569.8	170.8
1975	661.4	171.3	832.7	318.2	1150.9	649.9	722.0	209.7	512.3	221.0
1976	810.2	282.6	1092.8	329.0	1421.8	736.2	895.3	407.5	487.8	209.7
1977	696.6	299.7	996.3	471.6	1467.9	786.6	968.1	443.1	525.0	286.8
1978	857.3	329.9	1187.2	495.0	1682.2	453.8	1451.5	766.3	685.2	223.1
1979	952.0	389.3	1341.3	506.7	1848	377	1703.2	862.3	840.9	232.2
1980	1062.8	380.2	1443	610.2	2053.2	349.1	1998.3	972.7	1025.6	294.2
1981	1027.1	688.2	1715.3	662.3	2377.6	217.3	2764.6	1106.7	1657.9	604.3
1982	1129.8	754.1	1883.9	751.5	2635.4	362.6	3065.2	1185.8	1879.4	792.4
1983	1258.2	922.2	2180.4	860.1	3040.5	224.1	3647.9	1979.4	1668.5	831.5
1984	1282.9	1096.4	2379.3	1004.4	3383.7	136.4	4092.2	2293.4	1798.8	844.9
1985	1358.5	1333.6	2692.1	1156.9	3849	232.1	4477.6	2620.7	1856.9	860.7
1986	1640.2	1680.6	3320.8	1100.6	4421.4	476.1	5080.5	2975.5	2105.0	1135.2
1987	1734.3	1988.3	3722.6	1228.7	4951.3	496.6	5654.8	3281.3	2373.5	1200.1
1988	1908.3	2002.5	3910.8	1327.9	5238.7	152.3	6406.1	3502.3	2903.8	1319.7
1989	2181.8	1992.6	4174.4	1530.6	5705	418	6835.2	3886.8	2948.4	1548.2
1990	2736.3	2253.7	4990	1718.2	6708.2	49.9	7972	5027.4	2944.6	1313.7
1991	3820.8	2314.0	6134.8	1827.4	7962.2	288.3	8930.3	5890.7	3039.6	1256.4
1992	4315.8	2529.5	6845.3	2165.6	9010.9	403	10106	7033.6	3072.3	1498.0
1993	4883.2	2697.5	7580.7	2556.0	10137	866.8	11634	9128.0	2505.6	2363.7
1994	5158.9	3214.3	8373.2	3225.5	11599	3767.4	12789	9615.9	3173.1	4957.7
1995	5833.8	4088.6	9922.4	4486.0	14408	5709.3	14352	9057.6	5294.5	5653.0
1996	5656.9	4260.5	9917.4	5737.4	15655	6235.8	15411	7888.0	7522.6	5991.6
1997	5176.3	4847.7	10024	6524.8	16549	5625.5	16446	7942.2	8503.9	5522.8
1998	4716.8	6288.9	11006	7549.3	18555	5830.9	18523	8857.6	9665.8	5799.3
1999	5196.4	6182.5	11379	8020.4	19399	6087.8	20096	9585.0	10511.4	6784.9
2000	5914.3	7136.0	13050	9127.5	22178	4770.5	26271	14775.7	11495.3	8863.7
2001	5911.8	7834.0	13746	10770.4	24516	4800	27552	15171.1	12380.6	7835.5
2002	6491.8	8690.6	15182	12139.5	27322	7822.5	27529	15985.1	11543.7	8029.3
2003	7611.9	8834.8	16447	13643.4	30090	11049	28202	17229.8	10972.6	9161.1
2004	8873.8	10192.1	19066	15590.0	34656	12871	31139	19199.2	11939.6	9353.8
2005	10026.0	11265.1	21291	18920.7	40211	13868	40313	21673.8	18639.0	13969.0

APPENDIX III (continued)

Year	Revenue	Expenditure	Deficit	CPI	inflation	GDP
1974	618.1	777.4	-159.3	154.39	0.1067	6928.6
1975	711.5	1032.9	-321.4	170.1	0.1018	6927.7
1976	781.1	1182.8	-401.7	218.1	0.2822	7048.3
1977	1011.3	1326	-314.7	255.1	0.1696	7123.2
1978	1187.2	1680.9	-493.7	281.6	0.1039	7032
1979	1382.1	1831	-448.9	338.4	0.2017	7431.2
1980	1567.5	2122	-554.5	353.01	0.0432	7854.6
1981	1757	2281.5	-524.5	359.64	0.0188	9324.5
1982	1876.7	1629.7	247	385.9	0.073	9374
1983	2174.5	3786.1	-1611.6	400.74	0.0385	10326.5
1984	2293.8	3169	-875.2	399.44	-0.0032	9675.8
1985	2323.3	3823.4	-1500.1	473.13	0.1845	8734.7
1986	2806	4062.2	-1256.2	495.04	0.0463	9597.3
1987	2925.9	4003.1	-1077.2	448.18	-0.001	10948.7
1988	3467.1	4820.9	-1353.8	457.85	0.0216	10947.8
1989	3898.9	5725.8	-1826.9	501.83	0.0961	10986.4
1990	3142.6	5283	-2140.4	527.7	0.0516	11432.7
1991	2706.3	4854.2	-2147.9	637.83	0.2087	10938.1
1992	2207.9	4205.4	-1997.5	771.88	0.2102	10534.6
1993	3191.2	5219.4	-2028.2	849	0.0999	11798.7
1994	3938.9	7093.8	-3154.9	858.98	0.0118	11999.3
1995	5912.8	8372	-2459.2	965.27	0.1237	12644.3
1996	6966.1	10194	-3227.9	982.55	0.0179	13930.9
1997	7885.6	10014.9	-2129.3	876.74	-0.1077	14640.2
1998	8381.4	10898.8	-2517.4	861.7	-0.0172	14429
1999	9550.5	14677.2	-5126.7	860.92	0.0009	15294
2000	9769.7	17533.5	-7763.8	896.78	0.0417	16112.3
2001	10540.2	17120.7	-6580.5	883.85	-0.0144	17354.4
2002	10430.8	19187.9	-8757.1	834.78	-0.0555	17632.4
2003	11151	19861.4	-8710.4	873.67	0.0466	16941.5
2004	13919	20248.3	-6329.3	923.03	0.0565	18900.9
2005	15592	24579.3	-8987.3	989.25	0.0717	20702.1

APPENDIX I :ESITIMATION RESULT FOR PERIOD I

1. INSTRUMENTAL VARIABLES (2SLS) ESTIMATION

Dpendent Variable is log P			
Regressor	Coefficient	Standard Error	t-ratio (Prob)
constant	0.7336547	1.515836	0.49 (0.635)
logY	- 0.0817365	0.2162016	-0.38 (0.712)
(logM-logP)t-1	- 0.880901	0.1039179	- 8.48(0.000)
Fit M	0.9588773	0.0749474	12.79(0.000)
EXPINF	0.744209	0.1767724	4.75(0.059)
R-Squared	0.9848	F.Statistic	F(4,12) =184.02(000)
AdjR - Squared	0.9798	Root MSE	0.04839
Residual Sum of Squares	0.02810347	Meanof Dependent Variable	5.956849
S.D of dependent Variable	0.3954171		
D.W Statistic	2.6546		

DIAGNOTIC TESTING			
Type of test	Test statistic	Calculated	Tabulated
A. Serial Correlation	NR^2	2.303144	3.84146
B. Hausman Test	H	0.90141882	5.35
C. Normality	JB	2.85	3.83
D. Hetroskedasticity	NR^2	16.875117	18.3

APPENDIX I continued

2. INSTRUMENTAL VARIABLES (2SLS) ESTIMATION

Dependent variable is log R			
Regressor	Coefficient	StandardError	t-ratio (Prob)
constant	-6.471068	5.288022	-1.21 (0.247))
logY	0.1.028564	0.7519369	1.37 (0.195)
(logR-logP)t-1	0.4511846	0.3937004	1.15(0.272)
Fit P	0.6471068	0.2621659	2.47 (0.028)

R-Squared	0.9188	F. Statistic	F(3,13)=48.42
Adj R- Squared	0.9000	Root MSE of	0.16215
Residual Sum of		Regression	
Squares	0.341787	Mean of	
S.Dofdependent		Dependent	7.48445
Variable	0.5632017	Variable	
D.W Statistic	2.034712		

Diagnostic Tests

Type of test	Teststatistic	Calculated	Tabulated
A. Serial Correlation	NR^2	2.0249721	3.84
B. Hausman	H	0.00557	1.03
C. Normality	JB	0.71	3.84
D. Hetroskedasticity	NR^2	12.237478	15.23

APPENDIX I continued

3. INSTRUMENTAL VARIABLES (2SLS) ESTIMATION

Dependent variable is log G			
Regressor	Coefficient	Standard Error	t-ratio (Prob)
constant	-11.94303	4.437038	- 2.69(0.018)
logY	1.816381	0.654687	2.77(0.016)
(logG-logP)t-1	0.131025	0.2827596	0.46(0.6510)
Fit P	0.5084372	0.3550034	1.43(0.176)
R^2-Squared	0.8748	F. Statistic	F (3,13)=29.26
AdjR - Squared	0.8459	Root MSE	0.22178
Residual Sum of Squares	0.6394136	Mean of Dependent Variable	7.82993
S.D of dependent Variable	0.621419		
D.W Statistic	1.882359		

DIAGNOTIC TESTING

Type of test	Test statistic	Calculated	Tabulated
A. Serial Correlation	NR^2	0.1311	3.84146
B. Hausman Test	H	0.962836	1.5234
C. Normality	JB	5.45	6.71
D. Hetrroskedasticity	NR^2	8.0914539	10.96

APPENDIX I continued

INSTRUMENTAL VARIABLES (2SLS) ESTIMATION

Dependent variable is log M			
Regressor	Coefficient	Standard Error	t-ratio (Prob)
constant	-0.7364307	0..620353	-1.19 (0.256)
FitR	-0.079476	0.4040492	-0.20 (0.847)
Fit G	1.00316	0.3424	3.21 (0.007)
log B	0.46900522	0.5627217	0.83 (0.421)
log E	0.1317927	0.0575394	2.29(0.041)
R-Squared	0.9547	F.Statistic	F(4,12)=63.13 (0.000)
Adj R - Squared	0.9396	Root MSE	0.14505
Residual Sum of Squares	0.252457	Mean of Dependent Variable	7.940967
S.D of dependent Variable	0.6217002		
D.W Statistic	1.66142		

Diagnostic Tests

Type of test	Test statistic	Calculated	Tabulated
A. Serial Correlation	NR^2	0.686158	3.84146
B. Hausman	H	1.826876	2.751
C. Normality	JB	0.72	1.94
D. Hetroskedasticity	NR^2	16.406104	18.30

APPENDIX I continued

Cochrane - Occult AR (1) regression - iterated estimate

Dependent variable is INF			
Regressor	Coefficient	Standard Error	t-ratio (Prob)
FITINF	0.7043806	0.225763	-3.12(0.009)
INF (-1)	0.2856194	0.2023842	1.46 (0.170)

R-Squared	0.6267	F.Statistic	F(3,12)= 6.71(0.000)
AdjR - Squared	0.5333	Root MSE	0.07528
Residual Sum of Squares	0.058009938	Mean of Dependent Variable	0.0979011
S.D of dependent Variable	0.1011253		
number of iteration	45		
D.W statistic	2.119238		

DIAGNOTIC TESTING

Type of test	Test statistic	Calculated	Tabulated
A. Serial Correlation	NR^2	5.33	3.84
B. Hausman	H	0.001	0.96
C. Normality	JB	0.02	0.71
D. Hetroskedasticity	NR^2	4.69626	8.60

Unit root Test Co integration Test For Price for Period I

1. Random walk	With Drift $\alpha \neq 0$	$\sigma \neq 0$ (no constant)	
Test statistic	1% critical value	5%critcal value	10%critical
- 3.326	-4.380	-3.600	-3.240
2. Random walk	without Drift	$\alpha \neq 0$ $\sigma = 0$	
Test Statistic	1 critical value	5%critcal value	10%critical
- 0.979	-3.750	-3.000	-2.630
3. Random walk	Without drift	$\alpha = 0$	$\sigma = 0$
Test statistic	1%critical vales	5%critical value	10%critical
1.490	-2.660	-1.950	-1.600

Unit Root and Cointegration Test for Expenditure for period I

1. Random walk	Without drift	$\alpha = 0$	$\sigma = 0$
Test statistic	1% critical value	5%critical value	10 % CR
-2.392	-4.380	-3.600	-3.240
2. Random walk	Without drift	$\alpha \neq 0$	$\sigma = 0$
Test statistic	1% critical value	5%critical value	10%crit
-1.604	-3.750	-3.000	-2.630
3. Randomwalk	With drift	$\alpha \neq 0$	$\sigma \neq 0$
Test statistic	1% critical value	5%critics values	10% critical
2.514	-2.660	-1.950	-1.600

Unit Root and Cointegration Test for Revenue for period I

1. Random walk	Without drift	$\alpha = 0$	$\sigma = 0$
Test statistic	1% critical value	5%critical	10% crit
2.268	-2.660	-1.950	-1.600
2. Random walk	Without drift	$\alpha \neq 0$	$\sigma = 0$
Test statistic	1% critical Value	5%critical value	10% crit
0.124	-3.750	-3.000	-2.630
3. Random Walk	With Drift	$\alpha \neq 0$	$\sigma \neq 0$
Test Statistic	1% critical Value	5%critical value	10% crit
-2.392	-4.380	-3.600	-3.240

Unit Root and Cointegration Test for Money Supply for period I

1. Random walk without Drift $\alpha = 0$ $\sigma = 0$ no constant

Test statistics	1% critical value	50% critical value	10% crit
0.799	-2.660	-1950	-1.600

2. Random walk without drift $\alpha \neq 0$ $\sigma = 0$

Test statistics	1% critical value	5% critical value	10% crit
-2.180	-3.750	-3.000	-2.630

3. Random walk without drift $\alpha \neq 0$ $\sigma \neq 0$

Test statistics	1% critical value	5% critical value	10% crit
0.118	-4.380	-3.600	-3.240

Causality between Price and Money Supply for Period I

Dependent Variable is logP			
Repressor	Coefficients	Standard Error	t-ratio (prob)
Constant	0.826511	0.3442052	2.40(0.031)
(logp) (-1)	0.6552831	0.1469396	4.46 (0.001)
(logM) (-1)	0.1653754	0.0923629	1.79 (0.095)

Causality between Money Supply and Price for Period I

Dependent Variable is logM			
Repressor	Coefficients	Standard Error	t-ratio (prob)
(logM) (-1)	0.9789129	0.0517165	18.93 (0.000)
$(logP)_{t-1}$	0.0517314	0.0822755	0.63(0.540)
Constant	0.0021885	0.192729	-0.11(0.911)

Causality between Price and Revenue for period I

Dependent Variable is logP			
Repressor	Coefficients	StandardError	t-ratio (prob)
(logP) (-1)	0.7472207	0.1907565	3.92(0.002)
(logR) (-1)	0.1023382	0.1226104	0.83(0.418)
Constant	0.8240312	0.3442052	2.40(0.031)

Causality between Revenue and Price for period I

Dependent Variable is logR			
Repressor	Coefficients	StandardError	t-ratio (prob)
Constant	0.847834	0.4531162	2.57(0.022)
(logR) (-1)	0.8322611	0.1406107	5.92(0.000)
(logP) (-1)	0.0828801	0.2187612	0.38(0.710)

Causality between Price and Government Expenditures for Period I

Dependent Variable is logP			
Repressor	Coefficients	StandardError	t-ratio (prob)
(logG) (-1)	0.1590987	0.0879039	1.81(0.092)
(logP) (-1)	0.6502719	0.1481088	4.39(0.001)
Constant	0.9214578	0.3581112	2.57(0.022)

Causality beween Government Expenditure and Price For Period I			
Dependent Variable is logG			
Repressor	Coefficients	StandardError	t-ratio (prob)
(logG) (-1)	0.4642076	0.2317325	2.00(0.065)
(logP) (-1)	0.6815828	0.390449	1.75(0.103)
Constant	0.249835	0.9440536	0.26(0.795)

APPENDIX II:ESITIMATION RESUT FOR PERIOD II

1.INSTRUMENTALVARIABLES(2SLS)ESTIMATION

Dpendent Variable is log P

Regressor	Coefficient	Standard Error	t-ratio (Prob)
constant	0.12059	1.7059	0.71(0.500)
logY	- 0.2292	0.2693	-0.85 (0.420)
(logM-logP)t-1	- 0.6021	0.0987	- 6.10(0.000)
Fit M	0.5243	0.1394	3.75(0.006)
EXPINF	0.9166	0.1383	6.63(0.000)
R-Squared	0.9458	F.Statistic	F(4,8) =26.83(000)
AdjR - Squared	0.9187	Root MSE	0.02556
Residual Sum of Squares	0.0.0052247	Meanof Dependent	
S.D of dependent Variable	0.0.0885422	Variable	6.815776
D.W Statistic	1.89299		

DIAGNOTIC TESTING

Type of test	Test statistic	Calculated	Tabulated
A. Serial Correlation	NR^2	0.428124	3.84146
B. Houseman Test	H	0.94	0.051
C. Normality	JB	1.86	2.17
D. Hetroskeoasticity	NR^2	16.87	18.30

APPENDIX II continued

2. Cochrane - Occult AR (1) regression - iterated estimate

Dependent variable is log R			
Regressor	Coefficient	StandardError	t-ratio (Prob)
constant	-5.39722	2.364662	2.28(0.652)
logY	1.370921	0.273645	5.01(0.001)
(logR-logP)t-1	0..6039283	0.158150	3.82(0.005)
Fit P	0.436561	0.2269101	1.92 (0.091)
R-Squared	0.8438	F. Statistic	F(3,8)=14.41
Adj R- Squared	0.7852	Root MSE of Regression	0.04395
Residual Sum of Squares	0.015450188	Mean of Dependent Variable	8.926323
S.Dofdependent Variable	0.5640766		
D.W Statistic	1.9276		

Diagnostic Tests

Type of test	Test statistic	Calculated	Tabulated
A. Serial Correlation	NR^2	4.0249721	3.84
B. Hauseman	H	0.023	0.01(0.99)
C. Normality	JB	4.63	5.80
D. Hetroskeoasticity	NR^2	12.23	18.30

APPENDIX IIcontinued

3. INSTRUMENTAL VARIABLES (2SLS) ESTIMATION

Dependent variable is log G			
Regressor	Coefficient	Standard Error	t-ratio (Prob)
constant	-1.299131	4.847703	- 0.27(0.795)
logY	0.4922806	0.8276331	0.59(0.567)
(logG-logP)t-1	0.7095887	0.2563524	2.77(0.022)
Fit P	0.6191548	0.5880705	1.05(0.320)

R^2-Squared	0.9694	F. Statistic	F (3,9)=94.50(0.000)
AdjR - Squared	0.9592	Root MSE	0.09523
Residual Sum of Squares	0.0816202	Mean of Dependent Variable	
S.D of dependent Variable	0.1238		
D.W Statistic	2.16		

DIAGNOTIC TESTING

Type of test	Test statistic	Calculated	Tabulated
A. Serial Correlation	NR^2	0.486	3.84146
B. Hausman Test	H	0.0218	0.01(0.096)
C. Normality	JB	2.82	3.84
D. Hetrroskedasticity	NR^2	8.0914	14.6

APPENDIX II continued
4.INSTRUMENTAL VARIABLES (2SLS) ESTIMATION

Dependent variable is log M			
Regressor	Coefficient	Standard Error	t-ratio (Prob)
constant	0.310674	0..7064178	0.44(0.672)
FitR	-0.89225619	0.427081	-2.20 (0.050)
Fit G	1.526768	0.4524854	3.37 (0.010)
log B	0.7756842	0..4579092	1.69(0.129)
log E	0.313749	0.1330422	2.36(0.046)
R-Squared	0.9717	F.Statistic	F(4,8)=69.35 (0.000)
Adj R - Squared	0.9576	Root MSE	0.08557
Residual Sum of Squares	0.05858227	Mean of Dependent Variable	9.859633
S.D of dependent Variable	0.4543524		
D.W Statistic	2.271648		

DIAGNOTIC TESTING

Type of test	Test statistic	Calculated	Tabulated
A. Serial Correlation	NR^2	0.7746	3.84146
B. Hausman	H	9.6405	0.96(0.91)
C. Normality	JB	3.2521	3.84
D. Hetrskedasticity	NR^2	16.40	17.2

APPENDIX II continued

5. Cochrane - Occult AR (1) regression - iterated estimate

Dependent variable is INF			
Regressor	Coefficient	Standard Error	t-ratio (Prob)
FITINF	0.9129107	0.1592253	-5.73(0.000)
INF (-1)	0.087540	0.176864	10.091 (0.188)

R-Squared	0.8594	F.Statistic	F(3,9)= 18.34(0.004)
AdjR - Squared	0.8126	Root MSE	0.0320442
Residual Sum of Squares	0.02299824	Mean of Dependent Variable	0.03844
S.D of dependent Variable	0.0729967		
number of iteration	16		
D.W statistic	1.96		

DIAGNOTIC TESTING

Type of test	Test statistic	Calculated	Tabulated
A. Serial Correlation	NR^2	9.76	3.84
B. Houseman	H	1.05	0.23(0.7)
C. Normality	JB	0.261	.301
D. Hetroskedasticity	NR^2	4.69	5.27

APPENDIX II Unit root Test Co integration Test For Price for Period II

1. Random walk	With Drift $\alpha \neq 0$	$\sigma \neq 0$ (no constant)	
Test statistic	1% critical value	5%critcal value	10%critical
- 0.970	-4.380	-3.600	-3.240
2. Random walk	without Drift	$\alpha \neq 0$ $\sigma = 0$	
Test Statistic	1 critical value	5%critcal value	10%critical
- 1.010	-3.750	-3.000	-2.630
3. Random walk	Without drift	$\alpha = 0$	$\sigma = 0$
Test statistic	1%critical vales	5%critical value	10%crifielt
0.929	-2.660	-1.950	-1.600

Unit Root and Cointegration Test for Expenditure for period II

1. Random walk	Without drift	$\alpha = 0$	$\sigma = 0$
Test statistic	1% critical value	5%critical value	10 % CR
-1.935	-2.660	-1.950	-1.600
2. Random walk	Without drift	$\alpha \neq 0$	$\sigma = 0$
Test statistic	1% critical value	5%critical value	10%crit
-1.861	-3.750	-3.000	-2.630
3. Randomwalk	With drift	$\alpha \neq 0$	$\sigma \neq 0$
Test statistic	1% critical value	5%critics values	10% critical
-2.375	-4.380	-3.600	-3.240

Unit Root and Cointegration Test for Revenue for period II

1. Random walk	Without drift	$\alpha = 0$	$\sigma = 0$
Test statistic	1% critical value	5%critical	10% crit
-1.492	-2.660	-1.950	-1.600
2. Random walk	Without drift	$\alpha \neq 0$	$\sigma = 0$
Test statistic	1% critical Value	5%critical value	10% crit
-1.928	-3.750	-3.000	-2.630
Random Walk	With Drift	$\alpha \neq 0$	$\sigma \neq 0$
Test Statistic	1% critical Value	5%critical value	10% crit
-2.345	-4.380	-3.600	-3.240

Unit Root and Cointegration Test for Money Supply for period II

1. Random walk without Drift $\alpha = 0$ $\sigma = 0$ no constant

Test statistics	1% critical value	50% critical value	10% crit
-1.050	-2.660	-1950	-1.600

2. Random walk without drift $\alpha \neq 0$ $\sigma = 0$

Test statistics	1% critical value	5% critical value	10% crit
-1.300	-3.750	-3.000	-2.630

3. Random walk without drift $\alpha \neq 0$ $\sigma \neq 0$

Test statistics	1% critical value	5% critical value	10% crit
-1.242	-4.380	-3.600	-3.240

Causality between Price and Money Supply for Period II

Dependent Variable is logP

Repressor	Coefficients	Standard Error	t-ratio (prob)
Constant	0.3216577	2.542702	0.13(0.902)
(logP) (-1)	0.8754582	0.3821597	2.29 (0.045)
(logM) (-1)	0.0560066	0.0520882	1.08(0.308)

Causality between Money Supply and Price for period II

Dependent Variable is logM

Repressor	Coefficients	Standard Error	t-ratio (prob)
(logM) (-1)	0.979939	0.0.0299007	32.77 (0.000)
$(logP)_{-1}$	0.3663752	0.2193752	1.07(0.126)
Constant	-2.178607	1.459614	-1.49(0.166)

Causality between Price and Rvenue for Period II

Dependent Variable is logP

Repressor	Coefficients	Standard Error	t-ratio (prob)
(logP) (-1)	0.9271445	0.3965503	2.34(0.041)
(logR) (-1)	0.0197233	0.0413348	0.48(0.643)
Constant	0.3443883	0.0.657242	0.13(0.899)

Causality between Revenue and Price for Period II

Dependent Variable is logR

Repressor	Coefficients	Standard Error	t-ratio (probe)
Constant	-4.444808	0.2.391564	-1.86(0.093)
(logR) (-1)	0.8105687	0.037202	21.79(0.000)
(logP) (-1)	0.9232512	0.3569026	2,59(0.643)

Causality between Price and Government Expenditures for period II

Dependent Variable is logP			
Repressor	Coefficients	Standard Error	t-ratio (probe)
(logG) (-1)	0.0246977	0.0428644	0.58(0.577)
(logP) (-1)	0.9227994	0.3939083	2.34(0.041)
Constant	0.3183735	2.642295	0.12(0.906)

Causality between Government Expenditure and Price for Period II			
Dependent Variable is logG			
Repressor	Coefficients	Standard Error	t-ratio (probe)
(logG) (-1)	0.8288553	0.056072	15.67(0.000)
(logP) (-1)	0.2782302	0.5152812	0.54(0.601)
Constant	-0.0300	0.4469	-0.07(0.947)

DETERMINANTS OF MONEY SUPPLY

YEAR	C	D	M1	QM	M2	NFA	DC	COG	COS	OTHERS
1974	432.9	161.5	694.3	380.7	1075.1	611.3	634.6	64.8	569.8	170.8
1975	661.4	171.3	832.7	318.2	1150.9	649.9	722.0	209.7	512.3	221.0
1976	810.2	282.6	1092.8	329.0	1421.8	736.2	895.3	407.5	487.8	209.7
1977	696.6	299.7	996.3	471.6	1467.9	786.6	968.1	443.1	525.0	286.8
1978	857.3	329.9	1187.2	495.0	1682.2	453.8	1451.5	766.3	685.2	223.1
1979	952.0	389.3	1341.3	506.7	1848	377	1703.2	862.3	840.9	232.2
1980	1062.8	380.2	1443	610.2	2053.2	349.1	1998.3	972.7	1025.6	294.2
1981	1027.1	688.2	1715.3	662.3	2377.6	217.3	2764.6	1106.7	1657.9	604.3
1982	1129.8	754.1	1883.9	751.5	2635.4	362.6	3065.2	1185.8	1879.4	792.4
1983	1258.2	922.2	2180.4	860.1	3040.5	224.1	3647.9	1979.4	1668.5	831.5
1984	1282.9	1096.4	2379.3	1004.4	3383.7	136.4	4092.2	2293.4	1798.8	844.9
1985	1358.5	1333.6	2692.1	1156.9	3849	232.1	4477.6	2620.7	1856.9	860.7
1986	1640.2	1680.6	3320.8	1100.6	4421.4	476.1	5080.5	2975.5	2105.0	1135.2
1987	1734.3	1988.3	3722.6	1228.7	4951.3	496.6	5654.8	3281.3	2373.5	1200.1
1988	1908.3	2002.5	3910.8	1327.9	5238.7	152.3	6406.1	3502.3	2903.8	1319.7
1989	2181.8	1992.6	4174.4	1530.6	5705	418	6835.2	3886.8	2948.4	1548.2
1990	2736.3	2253.7	4990	1718.2	6708.2	49.9	7972	5027.4	2944.6	1313.7
1991	3820.8	2314.0	6134.8	1827.4	7962.2	288.3	8930.3	5890.7	3039.6	1256.4
1992	4315.8	2529.5	6845.3	2165.6	9010.9	403	10106	7033.6	3072.3	1498.0
1993	4883.2	2697.5	7580.7	2556.0	10137	866.8	11634	9128.0	2505.6	2363.7
1994	5158.9	3214.3	8373.2	3225.5	11599	3767.4	12789	9615.9	3173.1	4957.7
1995	5833.8	4088.6	9922.4	4486.0	14408	5709.3	14352	9057.6	5294.5	5653.0
1996	5656.9	4260.5	9917.4	5737.4	15655	6235.8	15411	7888.0	7522.6	5991.6
1997	5176.3	4847.7	10024	6524.8	16549	5625.5	16446	7942.2	8503.9	5522.8
1998	4716.8	6288.9	11006	7549.3	18555	5830.9	18523	8857.6	9665.8	5799.3
1999	5196.4	6182.5	11379	8020.4	19399	6087.8	20096	9585.0	10511.4	6784.9
2000	5914.3	7136.0	13050	9127.5	22178	4770.5	26271	14775.7	11495.3	8863.7
2001	5911.8	7834.0	13746	10770.4	24516	4800	27552	15171.1	12380.6	7835.5
2002	6491.8	8690.6	15182	12139.5	27322	7822.5	27529	15985.1	11543.7	8029.3
2003	7611.9	8834.8	16447	13643.4	30090	11049	28202	17229.8	10972.6	9161.1
2004	8873.8	10192.1	19066	15590.0	34656	12871	31139	19199.2	11939.6	9353.8
2005	10026.0	11265.1	21291	18920.7	40211	13868	40313	21673.8	18639.0	13969.0

APPENDIX III (continued)

Year	Revenue	Expenditure	Deficit	CPI	inflation	GDP
1974	618.1	777.4	-159.3	154.39	0.1067	6928.6
1975	711.5	1032.9	-321.4	170.1	0.1018	6927.7
1976	781.1	1182.8	-401.7	218.1	0.2822	7048.3
1977	1011.3	1326	-314.7	255.1	0.1696	7123.2
1978	1187.2	1680.9	-493.7	281.6	0.1039	7032
1979	1382.1	1831	-448.9	338.4	0.2017	7431.2
1980	1567.5	2122	-554.5	353.01	0.0432	7854.6
1981	1757	2281.5	-524.5	359.64	0.0188	9324.5
1982	1876.7	1629.7	247	385.9	0.073	9374
1983	2174.5	3786.1	-1611.6	400.74	0.0385	10326.5
1984	2293.8	3169	-875.2	399.44	-0.0032	9675.8
1985	2323.3	3823.4	-1500.1	473.13	0.1845	8734.7
1986	2806	4062.2	-1256.2	495.04	0.0463	9597.3
1987	2925.9	4003.1	-1077.2	448.18	-0.001	10948.7
1988	3467.1	4820.9	-1353.8	457.85	0.0216	10947.8
1989	3898.9	5725.8	-1826.9	501.83	0.0961	10986.4
1990	3142.6	5283	-2140.4	527.7	0.0516	11432.7
1991	2706.3	4854.2	-2147.9	637.83	0.2087	10938.1
1992	2207.9	4205.4	-1997.5	771.88	0.2102	10534.6
1993	3191.2	5219.4	-2028.2	849	0.0999	11798.7
1994	3938.9	7093.8	-3154.9	858.98	0.0118	11999.3
1995	5912.8	8372	-2459.2	965.27	0.1237	12644.3
1996	6966.1	10194	-3227.9	982.55	0.0179	13930.9
1997	7885.6	10014.9	-2129.3	876.74	-0.1077	14640.2
1998	8381.4	10898.8	-2517.4	861.7	-0.0172	14429
1999	9550.5	14677.2	-5126.7	860.92	0.0009	15294
2000	9769.7	17533.5	-7763.8	896.78	0.0417	16112.3
2001	10540.2	17120.7	-6580.5	883.85	-0.0144	17354.4
2002	10430.8	19187.9	-8757.1	834.78	-0.0555	17632.4
2003	11151	19861.4	-8710.4	873.67	0.0466	16941.5
2004	13919	20248.3	-6329.3	923.03	0.0565	18900.9
2005	15592	24579.3	-8987.3	989.25	0.0717	20702.1

Declaration

I, the undersigned; declare that this thesis is my own work, and has never been presented in any other university. All sources of materials used for this thesis duly acknowledged**.**

Declared by:

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Signature: _____

Date: _____

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