



**ST. MARY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES**

**THE DYNAMIC EFFECT OF MONETARY POLICY ON ETHIOPIAN
ECONOMY**

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The Dynamic EFFECT of Monetary policy on Ethiopian Economy

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and Development Studies) ST. MARY'S UNIVERSITY In partial fulfillment
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DECLARATION

I declare that “**Dynamic EFFECT of Monetary policy on Ethiopian Economic Growth**” is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

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APPROVAL SHEET

This is to certify that the thesis prepared by Girma Tadesse, entitled “**Dynamic Effect of Monetary policy on Ethiopian Economic Growth**” and submitted in Partial fulfillment of the requirements for the degree of Master of Science in Development Economics complies with the regulations of the university and meets the accepted standards with respect to originality and quality.

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ACRONYMS

ADFT	Augmented Dickey-Fuller Test
AfDB	African Development Bank
CPI	Consumer Price Index
ECM	Error Correction Model
EEA	Ethiopian Economic Association
HIC	Hannan-Quinn Information Criteria
MOFEC	Ministry of finance and Economic Cooperation
NBE	National Bank of Ethiopia
QTM	Quantity Theory of Money
VAR	Vector Auto Regressive
EEA	Ethiopian economic association
ARDL	Auto Regressive distributive lag

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ABSTRACT

Various studies found out contending findings of regarding the effect of monetary policy on economic growth of across a country. In many developing countries study result showed that monetary policy has positive, some indicate negative and other found to be uncertainty. Therefore, the purpose of this study is to examine the extent of impact of monetary policy variables on economic growth in Ethiopia. To examine the effect of monetary policy in Ethiopia, secondary time series data were collected from national bank of Ethiopia and mofec starting 1970 EC to 2011 EC. To analyze the data both descriptive statistics and econometrics model such as using Autoregressive Distributive lag (ARDL) model were applied. The main findings of the model attested that in the long run money supply, and unemployment rate have positively affected real GDP growth rate, while domestic credit, interest rate and inflation have negatively affected the growth. Besides, the ECM model result of short run shows that money supply has statistically significant negative effect on the real gross domestic product growth. The unemployment rate, domestic credit, interest rate and inflation have positive effect on growth in the short run. Even though Ethiopia has registered almost double digit growth rate for more than a decade, unemployment rate has been increasing. As a result, the net increment of unemployment and Economic growth rates have positive relationship both in the short and the long-runs, which is against existing theory. This is because in Ethiopia there are many unskilled and unemployed youth who migrate from rural to urban could not be absorbed in the industries. Hence, though there is fast economic growth in Ethiopia for the last one decade, unemployment rate is increased along with real GDP growth.

Keywords: *Real GDP, Money Supply, Economic growth, ARDL model and Ethiopia.*

CHAPTER ONE

1. INTRODUCTION

1.1. Background of the Study

Ethiopia has experienced rapid economic growth over the last several years since 2003/2004. The economy has been registering almost double digit growth rates, more or less with slight balanced growth in all sectors. Two periods of Growth and Transformation Plans (GTPI & GTPII) which were launched in 2010/11 and 2017/18 were put economic growth as the major pillar strategy to eradicate poverty of the country (EEA, 2018).

To eradicate poverty and bring an economic prosperous a country, economic policies play vital role to achieve the desired outputs. The two most important macroeconomic policies in the economics are monetary and fiscal policies. The four major economic policy objectives are: full employment, price stability, high and sustainable rate of economic growth, and keeping the balance of payments in equilibrium. Economic policy affects employment primarily through monetary and fiscal policies, which with their instruments affect aggregate supply and demand for goods and services (Blanchard, 2005). One of the most important economic policies in which the monetary authority use to control the supply of money is monetary policy, usually it targets the inflation rates or interest rates to stabilize the price and other macro variables such as employment, and output (khan, 2010).

A policy instrument is an economic variable under the control of government that can affect one or more of the macroeconomic goals. One of the essential instruments is monetary policy that determines the money supply and demand as well as interest rates, in order to achieve desired economic objectives. Changes in the money supply move interest rates up or down and affect spending in sectors such as investment, housing, and net exports that would have important affect economic growth.

Accordingly, Romer (1994) defined monetary policy as the process by which the monetary authority of a country controls the money supply, which often targets an inflation rate or interest rate to ensure price general trust and stability in the currency. Therefore, the objective of the banks operation is to stabilize prices through controlling money supply in order to bring effective

monetary policy whose general objective is to improve the wellbeing of people through the stabilization of the economy on its long-run equilibrium.

The National Bank of Ethiopia uses monetary policy instruments to stabilizing the macro variables. Monetary Policy in Ethiopia is geared at containing inflation and rebuilding of international reserve at levels that ensure economic activity that takes place in a low inflationary environment (IMF, 2010).The objective of monetary policy is to ensure price stability, reflected in low and non-volatile rates of inflation, sustainable economic growth and development policy, keeping unemployment rate low, balancing foreign trade, stabilizing exchange and interest rates, etc that in general used to attaining stable and well-functioning macro-economic environment.

Many theories and studies show that monetary policy has dynamic impacts on dynamic economic growth process in which many macroeconomic variables are synchronized in order to complement towards the desired goal. According to the Schwartz and Friedman (1963), money supply may be increased by central bank through open market operations. It increases commercial bank reserves and credit availability to the public and it also increases money supply multiple times. When central bank decides to reduce money supply, banks and non-bank organizations starts purchasing securities sold by the central bank through open market operations. According to Friedman (1968) general price and the quantity of money in circulation have strong relationship. In quantity theory of money, the money supply and corresponding price have direct impact on output level. The function of monetary policy is most often analyzed with reference to money supply.

The New Keynesian Economic theory of money shares with the analysis of the New Classical School principle of monetary policy dedicated only to the stability of general price level consistent with the search for neutrality (AfDB, 2013). If we follow this analysis, in which prices are flexible, so it is not necessary to conduct an active monetary policy to stabilize the economy, whereas, in fixed prices we must refer to monetary policy. Discretionary policies, especially monetary policies, are needed in the African continent where the performance in terms of price stability is well established, providing a possibility that monetary authorities could take advantage.

Many studies showed that monetary policy has impact on economic growth and economic performance. For instance, study conducted by Alavinasab (2016) examines the impact of

monetary policy on economics growth in Iran by using ECM model and find out that money supply, exchange rate and inflation had a long run relationship with the economic growth. In other words, the variables have positive association in the long-run. In addition, Anowor and Okorie, (2016) also adopted ECM model and they find out that an increasing on cash reserve ratio led to increase in economic growth in Nigeria. Moreover, Fasanya et al., (2013) found that inflation, exchange rate, and external reserve are important force of driving economic growth in Nigeria. Furthermore, Fernald, Spiegel, & Swanson (2014) examine the monetary effectiveness in China and their findings indicate that increases in bank reserve requirements reduce economic activity and changes in interest rates also have the impacts on economic activity and price level. On the other hand, Sylvie Nibeza (2015) employed the Johansen for integration and Vector Error Correction to check for the existence of long run association between variables and the result showed that there are an integration among variables, exchange rate and money supply that had a significantly effect on economic growth of Rwanda.

In addition, Gul et al. (2012) found that interest rate has negative impact on the output whereas money supply has strong positive impact on the output. Moreover, the study of Precious(2014) also investigates the impact of monetary policy in promoting economic growth in the South African economy (by using Johansen co-integration and the ECM) find out that money supply, interest rate and exchange rate had the positive impact on economic growth. In general, the study conducted by Zhang & Sun (2017) in china shows that when the central bank adapt an easing monetary policy leads to better economic environment and higher economic growth. Hence, the aim of this study is to examine impact of the monetary policy in Ethiopia on Ethiopian economic growth using dynamic analysis. The monetary policy macroeconomic variables such as money supply, interest rate, domestic credit, unemployment, and inflation in order to appropriate policy to maintain economic growth of the country.

1.2. Statement of the Problem

Monetary policy is playing central role in economic growth of a country. Monetary policy is planned to sustain economic growth and maintain price stability by controlling the growth of money supply and other macroeconomic variables in the economy. The combined efforts macro variables should be investigated by policy maker to increase the supply of money so as to reduce the prices of goods and services and boost the growth of the economy. The right choice of any

effective macroeconomic policy may derive a country to better economic positions, while making the monetary policy by the central banks is an important to understand the real effect of the policy on targeted variables.

Varies studies indicated that monetary policy variables have both positive and negative impacts on economic growth. For instance, the study of Babatunde and Shuaibu (2011) examines that money supply, inflation and economic growth in Nigeria indicates that there is negative relationship between policy macro variables and economic growth. In addition, the study of Bhattarai (2011) also indicated that the impact of exchange rate and money supply on economic growth found to have negative. However, Ehigiamusoe and UyiKizito, (2013) studied on the link between money market and economic growth in Nigeria, and they found out that money supply is significantly negative impact on economic growth and the link between money market and the real sector is very weak. In addition, VimalySavannarideth (2015) examines the money-output Granger causality in Lao PDR found that money supply does not Granger-cause output. On the other hand, study carried out by Artus and Barroux (1990) find out that both positive and negative impact of money supply shock on output; which imply that there is uncertainty about the future path of money supply.

In Ethiopia the monetary policy framework swings between conflicting objectives of restraining inflation and accelerating economic growth. The Ethiopian government has been undertaking various measures to stabilize inflation including monetary policies, such measures as raising the reserve requirement (rr) of banks, increasing interest rates, and reducing domestic credit. Rapid economic growth in real GDP has closely coincided with the inflation rate in recent years (BKP, 2013). However, some empirical studies indicate that inflationary situation in Ethiopia are due to fast increase in broad money supply and other fiscal policy instruments (Jema and Fekadu, 2012; ADB, 2011; Desta, 2009). But, the study of Teshome (2011) indicates that the source of inflation and economic growth in Ethiopia is not a monetary phenomenon, and thus to control money supply (to reduce inflation) will hinder economic growth of the country. In other words, money supply has positive impact on economic growth.

There are contending findings of various studies and across countries. Various studies have done across many developing countries found that monetary policy has positive, some indicate negative and other found to be uncertainty. Therefore, the purpose of this study is to examine the

extent of impact of monetary policy variables such as money supply, interest rate, domestic credit, interest rate, unemployment, and inflation rate on economic growth over time and to help formulate appropriate policy in order to maintain the desired economic growth of the country.

1.3 Objective of the study

The general objective of the study is to investigate the dynamic impact of macro monetary policy variables on economic growth in Ethiopian.

The specific objectives of the study are:

- to assesses the trends monetary policy and other macroeconomic variables.
- to investigate the short-run and long-run impact monetary policy on GDP growth in Ethiopia.

1.4. Hypotheses of the Study

This study sets the following hypothesis

Ho: There is negative relationship between money supply and the level of GDP growth.

H₁: There is positive relationship between money supply and the level of GDP growth.

Ho₀: There is negative relationship between inflation and the level of GDP growth.

H₁: There is positive relationship between inflation and the level of GDP growth.

Ho: There is negative relationship between interest rate and the economic growth.

H₁: There is positive relationship between interest rate and the economic growth.

Ho: There is negative relationship between credit and growth of GDP.

H₁: There is negative relationship between credit and growth of GDP.

Ho: There is negative relationship between unemployment and economic growth.

H₁: There is positive relationship between unemployment and economic growth.

1.5. Significance of the study

Economic growth is a serious issue for many developed and developing countries in the world. Economic growth is affected by economic policy. Economic policy is an important instrument that positively or negatively influences economic growth. Monetary policy uses some variables such as money supply, interest rate, exchange rate, etc that could affect the economic growth.

Economic growth is one of strategic pillars of poverty reduction of Ethiopian government. Many studies had been conducted on economic policies shows that macroeconomic variables manipulations have impact on economic growth of a country. The studies indicate that monetary policy instruments have uncertain impacts on economic growth; in other words, they do not have the same impact in all countries. So the importance of this study is to carry out comprehensive study on many monetary policy instruments and to identify the extent of impact of these instruments on economic growth, which essential target of Ethiopian government to pull out many citizens who are below poverty line. Therefore, this study is helpful to policy makers. Furthermore, it will help other researchers to make further research works in this area.

1.6 Scope and limitation of the Study

In this study, dynamic effect of monetary policy on the Ethiopian economy was analyzed by using the time series data ranging from 1970- 2011 (E.C) are used There as on for the specification of the time period is based on several grounds. First, to rationally investigation the relationship several reasonably long time horizon in an attempt to overcome the limitation arising from low time span observations. Moreover, the time series data set in Ethiopia are relatively available since the rebellion of the imperial regime. Money supply being the focus variable, other variables like Interest rate, unemployment, real Gross Domestic Product, Domestic credit and inflation were controlled in the model. Availability of data is a long time problem be handicapped and it also continued to be a challenging problem for researchers in developing countries like Ethiopia, as it was the limiting factor to undertake this thesis.

1.7. Organization of the study

This research paper is divided into five chapters: chapter one deals with introduction that includes the background, statement of the problem, objective of the study, scope and significance of the study. Chapter two addresses review of literature (both theoretical and empirical) and chapter three focuses on methodology of analysis. Chapter four of the study deals with the results and the interpretation. The last chapter, chapter five, deals with conclusion and policy recommendation of the study.

CHAPTER TWO

2. REVIEWS OF RELATED LITERATURE

2.1. Basic Concepts and Definitions

By its very nature the concept of economic growth and economic policy is complex and broad. For clear understanding about them, it is important to explain some concepts of main macro variables.

Money supply (M2): traditionally, money supply is defined from its narrow and broader sense: Narrow money (M1) is a measure of money stock intended primarily for use in transactions; it consists of currency held by the public, traveler's checks, demand deposits and other checkable deposits. Broad money (M2) is a measure of the domestic money supply that includes M1 plus Quasi-money (savings and time deposits), overnight repurchase agreements, and personal balances in money market accounts. Mostly, M2 includes money that can be quickly converted to M1.

Real Gross Domestic Product (RGDP) Growth: is aggregate measure of the size of an economy adjusted for price changes. Gross domestic product (GDP) is the value of all final goods and services produced in the country for a given period of time measured in local currency. The market value of GDP depends on the actual quantity of goods and service produced and their price.

Interest rate:- It is defined as the proportion of an amount loaned which a lender charges as interest to the borrower, normally expressed as an annual percentage. It is the rate a bank or other lender charges to borrow its money, or the rate a bank pays its savers for keeping money in an account

Inflation rate:- is a sustained increase in the general price level of goods and services in an economy over a period of time. When the general price level rises, each unit of currency buys fewer goods and services; consequently, inflation reflects a reduction in the purchasing power per unit of money – a loss of real value in the medium of exchange and unit of account within the economy.

Domestic Credit:- is way of measuring growth in the total amount of money in a country's economy at a particular time. It includes bank loans to private customers in the country and abroad, and the Public Sector Borrowing requirement (the amount of money the government will need to borrow in the future for all its different sectors). It does not include the amount of money owed by the government to private companies increased government borrowing tends to lead to increased domestic credit expansion.

Unemployment rate:- is the share of the labor force that is jobless, expressed as a percentage. It is a lagging indicator, meaning that it generally rises or falls in the wake of changing economic conditions, rather than anticipating them. When the economy is in poor shape and jobs are scarce, the unemployment rate can be expected to rise. When the economy is growing at a healthy rate and jobs are relatively plentiful, it can be expected to fall.

2.2. Theoretical Review of Related Literature

2.2.1. The Classical View of Monetary Policy

The classical economists' view of monetary policy is based on the quantity theory of money. The quantity theory of money is usually discussed in term of Fisherian equation of exchange, which is given by the expression $MV = PY$. In the expression, M denotes the supply of money over which the Federal Government has some control; V denotes the velocity of circulation which is the average number of times a currency is spent on final goods and services over the course of a year; P denotes the price level and Y denotes GDP. Hence, PY represents current nominal GDP. The equation of exchange is an identity which states that the current market value of all final goods and services (nominal GDP) must equal the supply of money multiplied by the average number of times a currency is used in transaction in a given year

The classical economist believes that the economy is always at or near the natural level of real GDP. Thus, they assume that in the short run, the Y in the equation of exchange is fixed. They further argue that the velocity of circulation of money tends to remain constant. So that V can also be regarded as Fixed. Given that both Y and V are fixed, it follows that if the National Bank is to engage in expansionary (or contractionary) monetary policy, it will lead to an increase (or decrease) in money supply (M), the only effect would be to increase (or decrease) the price level P, in direct proportion for the change in money supply (M). In other words, expansionary

monetary policy can only lead to inflation, and contractionary monetary policy can only lead to deflation of the price level.

Why should printing money have an impact on production, consumption, and other real economic variables? After all, people care about real things like food, cars, or leisure. This reasoning motivates why Classical macroeconomics starts with examining real economic activity and assumes money has no impact on real variables. Even if money does have real effects in reality, imagining a world without money is a useful thought experiment; it helps clarify why and under which condition money matters.

The Classical Model of the Real Economy here is a basic model of the real economy. Output is produced with capital and labor. Labor is supplied by households who make tradeoffs between leisure and consumption, resulting in a labor supply function that depends on the real wage. Firms pay a real wage equal to the marginal product of labor. In equilibrium, labor demand equals labor supply at the market-clearing real wage. The labor force is fully employed in the sense that everyone can find a job at prevailing wages, though workers may be unemployed while they are searching for new jobs. The output that can be produced with the available capital stock and the equilibrium labor input defines the aggregate supply on the goods market.

2.2.2. Keynesian View of Monetary Policy

Keynesian theory did not buy the notion that the relationship between money and price is direct and proportional. They share the view that it is indirect through the rate of interest. Also they reject the notion that the economy is always at or near the natural level of real GDP so that Y in the equation of exchange can be regarded as fixed. They also reject the proposition that the velocity of circulation of money is constant. Keynesians believe that expansionary monetary policy increases the supply of loanable funds available through banking system, causing interest rates to fall. With lower interest rate, aggregate expenditures on investment and interest-sensitive consumption goods usually increase, causing real GDP to rise. Hence, monetary policy can affect real GDP indirectly. (Snow don and rane2005)

Demand for goods comes from households (for consumption), firms (for capital investment), the government, and foreigners. Because consumers have a choice to consume or to save and earn interest, consumption and savings naturally depend on the interest rate specifically, on the real interest rate, because they care about real consumption. Because capital investment yields returns

with delay and must be financed, investment also depends on the interest rate, on the real interest rate, because real investment produces real output. Higher real interest rates unambiguously reduce investment, but they have conflicting income and substitution effects on consumption: the income effect of higher interest income encourages consumption; the substitution effect encourages savings. The ambiguity is theoretical, however; empirically the aggregate demand for goods depends negatively on the real interest rate (r). To remember this dependence, we write aggregate demand Y^d as function $Y = Y^d(r)$ with negative slope.

The supply of goods (aggregate output) may depend positively on the real interest rate, namely if a higher interest rate encourages workers to supply more labor. We will sometimes ignore this effect for simplicity and assume and exogenous supply is essentially exogenous. Thus aggregate supply (Y^s) as function of r has steep positive or vertical slope.

An output-interest rate relation helps to illustrate how output and the real interest rate are determined: Aggregate demand is a downward sloping line that determines the real interest rate at which supply equals demand, $Y^s(r) = Y^d(r)$. In Keynesian macro, the Y^d -curve is commonly called the IS-curve and the classical supply is called potential output, Y_p . The IS-curve is motivated by the following: By definition, personal savings are disposable income minus consumption, $S_{\text{household}} = Y - T - C$. Government savings equal the budget surplus $S_{\text{gov't}} = T - G$ (deficit if negative), the difference between taxes (T) and government spending (G). Negative net exports (net imports) can be interpreted as savings of foreigners. If one takes the demand identity $Y = Y_d = C + I + G + NX$ and rearranges, one finds $I = Y - C - G - NX = (Y - T - C) + (T - G) + S_f = S_{hh} + S_{gov} + S_f = S$. Investment equals total savings (S), $I = S$.

2.2.3. The Monetarist View of Monetary Policy

Monetarist is one of schools of thoughts led by Milton Friedman. This school of thought is a modern variant of classical macroeconomics. They developed a subtler and relevant version of the quantity theory of money. Like any school of thought, Friedman (1963) emphasized on the supply of money as the key factor affecting the well-being of the economy and as well, accepted the need for an effective monetary policy to stabilize an economy.

He also has the notion that, in order to promote steady growth rate, money supply should grow at a fixed rate, instead of being regulated and altered by the monetary authority. Friedman equally argued that since money supply might be demanded for reasons other than anticipated

transaction, it can be held in different forms such as money, bonds, equities, physical goods and human capital. Each form of this wealth has a unique characteristic of its own and a different yield.

The economy may not always be operating at the full employment level of real GDP. Thus, in the short-run, monetarists argue that expansionary monetary policies may increase the level of real GDP by increasing aggregate demand. However, in the long-run, when the economy is operating at the full employment level, they argue that the quantity theory remains a good approximation of the link between the supply of money, price level, and the real GDP. In the long-run expansionary monetary policy only leads to inflation and do not affect the level of real GDP.

2.3. Transmission Mechanism of Monetary Policy

Even though it is a powerful tool, monetary policy could have unexpected or unwanted consequences. To be successful in conducting monetary policy, the monetary authorities, must have an accurate assessment of the timing and effect of their policies on the economy, thus requiring an understanding of the mechanism through which monetary policy affects the economy. Specific to developing countries, where the financial sector is not well developed, channels through which monetary policy is transmitted includes money channel, interest rate channel, exchange rate channel and credit channel.

The money channel assumes that changes in reserve money are transmitted to broad money via the money multiplier that banks are in the business of creating inside money. When the central bank changes the reserve requirement that banks should keep in it, the amount of money available for banks to lend will be changed. This changes the capacity of banks to create money via lending in the economy. But this argument also assumes a role for individuals holding components of broad money, currency in circulation, and various forms of deposits. It is still a significant channel in countries where financial depth is low and money is still a major asset in people's portfolios as in Ethiopia.

The interest channel of transmission of monetary policy was also clearly defined in Keynes's General Theory. The present value of capital and durable consumption goods is negatively related to the real interest rate (marginal efficiency of capital function). The traditional Keynesian approach to the monetary transmission mechanism works directly through the interest

rate. The proposition is based on the belief that monetary policy (e.g. a change in the short-term official interest rate) has an impact on (short and long term) nominal as well as real interest rates that in turn affect consumer and investment spending, aggregate demand and output (Mishkin, 1996).

The credit channel is a financial market imperfection, namely asymmetric information phenomena, as an essential factor of propagation and amplification of initial monetary policy shocks. Bernanke and Gertler (1995), as advocator of this mechanism, points out the basic premise of their conception about the channel. The premise states that wherever there is a problem of information asymmetry and costly enforcement of contracts which interrupt the smooth functioning of financial market, there will be imperfect substitutability between different sources of financing (the cost of external funds and opportunity cost of internal funds) This cost spread between self-financing and credit, called the external finance premium. The difference between the two funds reflects the dead weight cost associated with principal agent problem that exist between lenders and borrowers. Lenders expected cost of evaluation, monitoring and collection; the information advantage of the borrower than the lender about its prospect; cost of distortion in the behavior of borrowers that arise from moral hazard-are some of the factors reflected in the external finance premium (Bernanke and Gertler, 1995). The higher the external finance premium (cost due to financial imperfection), the lower will be the investment and consumption spending. According to Bernanke and Gertler (1995), monetary policy affects not only general level of interest rates, but also the size of external finance premium. There are two transmission mechanisms under the credit view which arise as a result of credit market imperfection: the bank lending channel and the balance sheet (net-worth) channel.

2.4. Theory of Economic Growth

2.4.1. The Adam smith growth model

Smith's analysis of the market as a self-correcting mechanism was impressive. But his purpose was more ambitious than to demonstrate the self-adjusting properties of the system. Rather, it was to show that, under the impetus of the acquisitive drive, the annual flow of national wealth could be seen to grow steadily.

2.4.2. The Ricardo theory of economic growth

According to Ricardo, there are three agents of production that participate in the process of growth of output. The capitalist hires labour and land and plays a key role in the process of economic development. Ricardo uses the term capitalist in the sense the modern economists use the term entrepreneur.

2.4.3. The Malthus theory of economic growth

In view of applicability, his theory of economic growth is more relevant to poor countries of today than the theories of other classical economists. According to Malthus, the under-developed countries are dual economies, where the agricultural sector retards the development of the industrial sector.

2.4.4. The Harrod-Domar (Neo-Keynesian) Growth Model

his model is the dynamic version of Keynes's prescription that investment is the driving force of growth. Growth can be achieved only at a higher rate of investment if the labour force and technology are exogenously determined. According to this model investment is mainly financed by local saving. An increase in saving directly leads to an increase in investment and hence growth (Domar 1946).

Though the model does not explain well the relationship between growth and inflation, Domar mentioned that a failure to save, accumulate capital and invest leads to prolonged inflation and higher unemployment. This shows that unemployment and growth goes hand in hand with the level of investment (Domar 1947).

2.4.5. The Solow-swan (neo-classical) growth model

Solow-swan growth model, a short-run production function is used where labour and capital are production inputs. if one input of production is assumed to be fixed an increase in another input of production leads to a decline in output productivity. For example, an increase in capital in the production process leads to diminishing returns of output assuming labour as a fixed input of production (Solow 1956).

2.4.6. The Romer-Lucas (Endogenous) Growth Model

In the Romer-Lucas model of growth, unlike the Solow-Swan growth model, technological change is not exogenously determined but it is derived from the capital accumulation process.

Accumulations of capital goods that are used to produce consumer goods enable workers to learn how to operate high technology machinery and modify them (Lucas 1988) Such a learning process allows technological advancement. According to this theory there will be no diminishing returns of output because of the associated technical advancement of the capital accumulation as there occurs capital deepening. Thus capital accumulation is still the important factor in achieving economic growth (Romer, 1994)

2.5. Empirical literatures

2.5.1. Global Empirical Studies

The study conducted by Chuku (2009) measuring the effects of monetary policy innovations in Nigeria they carried out a controlled experiment using a structural vector auto regression (SVAR) model to trace the effects of monetary policy shocks on output and prices in Nigeria. They made the assumption that the Central Bank cannot observe un expected changes in output and prices within the same period. They conduct the experiment using three alternative policy instruments such as broad money (M2), Minimum Rediscount Rate (MRR) and there are effective exchange rate (REER) and found evidence that monetary policy innovations carried out on the quantity-based nominal anchor (M2) has modest effects on output and prices with a very fast speed of adjustment. While, innovations on the price-based nominal anchors (MRR and REER) have neutral and fleeting effects on output. The conclusion they have drawn was that the manipulation of the quantity of money (M2) in the economy is the most influential instrument for monetary policy implementation.

Hussain and Haque (2017), researched about the empirical analysis of the relationship between money supply and per capita GDP growth rate for Bangladesh, using vector error correction model (VECM) model. They ascertain that the money supply has significant role on the growth rate. According to Kenneth and Anthony (2015) examined the dynamic impact of money supply on inflation using the panel data for Economic Commission for Western African States (ECOWAS) member states by applying the OLS regression. Their study found the positive and statistically significant impact of the current value of money supply on inflation for CoteD' Ivore, Senegal and Togo, and insignificant impact for Burkina-Faso, Gambia, Ghana and Niger. Moreover, they found positive and significant impact of the first period money supply on inflation on for Gambia and Ghana, but insignificant impact for Burkina-

Faso, Cote D'Ivoire, Niger and Nigeria. The impact in the first period was found to be negative, but insignificant in the case of Senegal and Togo.

Hameed and Amen (2011), investigated the impact of monetary policy on gross domestic product (GDP), for Pakistan and they found growth in money supply greatly affects GDP. According to Mehrizi et al. (2011) applied a VAR model to investigate the impact of GDP, domestic deposit rate, foreign interest rate, nominal exchange rate and money supply on inflation in Iran, using the time series data from 1973-2008. The study confirmed the positive and significant impact of money supply, domestic deposit rate and foreign interest rate on inflation; whereas *GDP* and nominal exchange rates were suggested to have negative influence on inflation in Iran.

According to Graade and Polan (2005) examined the link between money supply and inflation in 160 countries using 30 years data range. Although they accepted that inflation is a monetary phenomenon, they claimed that the link between inflation and money supply is much stronger only in the countries with high inflation rates. They further noted that in countries with a relatively low inflation rate the long run linkage cannot be easily identified.

According to Bruno and Easterly (1996) have analyzed the effects of inflation on long-term growth. To study this, panel data of 26 countries over a period of thirty one years from 1961 – 1992 was used. They identified countries that exhibited more than 40% inflation rate and the growth performance of these countries is assessed before, during and after the occurrence of the high inflation crisis. The finding of their analysis indicates that a higher level of inflation harms the growth and lower inflation has less cost on the economy. Their analysis also concludes that the high inflation in the 70's and 80's had affected temporarily the economic growth of the countries under study.

As Malla (1997) has studied how inflation affects the rate of economic growth using a small data sample for OECD and Asian countries. The study is undertaken independently for Asian countries and OECD countries using a growth equation explained by capital accumulation and labour force. The finding for 11 OECD countries reveals that there exists no relationship between inflation and growth which is contrary to the theories. However, for the Asian countries there exists strong negative relationship between the two variables.

As Mallick (2008) is the other study that analyzes the impact of inflation on growth for the case

of India. Annual time series data from 1960/61 to 2004/05 obtained from Reserve Bank of India (RBI) and Handbook of Statistics on Indian Economy is used. The study applies co-integration techniques, the error correction model (ECM) approach and auto-regression distributive lag model (ARDL) to see the long-run and short-run relationships between the two variables. In this setup the result of the study indicates that inflation has a significant negative impact on the growth level while investment has a positive effect on growth. Other variables such as real interest rate and government budget deficit do not have any significant impact on economic growth. The author recommends a policy that aims for macro-economic stability, i.e. price stability to attain rapid economic growth.

The study of Bittencourt (2010) has examined how higher inflation affected the growth of four Latin American countries (Bolivia, Peru, Argentina and Brazil). He used panel data for the period 1970 – 2007 obtained from the Bureaux of Census of the four countries, World Bank's World Development Indicators (WDI) and Penn World Table (PWT). To execute the study Bittencourt used a growth equation with explanatory variables: inflation, government expenditure, openness, investment, money supply, political regime and interaction between education and urbanization. Among the explanatory variables only inflation is relevant for the study. Accordingly, inflation was found to have harmful effects on the growth of these countries. To him measures taken to lower inflation were effective. Some of the measures taken were introduction of the central bank independence, inflation targeting policies and fiscal responsibility laws.

Yap (1996) analyzed the inflation and growth experience in the Philippines. He used descriptive analysis of the data to see the development of the two macro-economic variables. In this analysis, Yap indicated that 10% to 15% inflation is tolerable. He also considered the measures taken during the period of the crisis as suitable but measures taken during the time of recovery (1985-95) as short sighted. He recommends the importance of macro-economic stability that can be gained by strong fiscal performance. He also indicated that inflation in Philippines is not only caused by lack of strong fiscal performance but also by the oligopolistic nature of the economy.

According to Zapodeanu and Cociuba (2010) investigated linking money supply with the gross domestic product for Romania over 10 year's period, using Engle-Granger and ARIMA model. They ascertain money supply and gross domestic product are in a close relationship.

As Mishkin (2004) analyze this traditional mechanism based on the Keynesians view by assuming expansionary monetary policy. An increase in money supply lead to a fall in real interest rate which in turn lower the cost of capital which is a source for expansion in investment spending(including residential housing and durable expenditure), thereby, causing to a rise in aggregate demand and a rise in output.

Lupu (2012) examined the interdependence between inflation and economic growth in Romania for the period 1990–2009. The two decades are analyzed separately using a quantitative and ideological approach. During the first period, i.e. 1990 – 2000, high and volatile inflation was a major source of macro-economic instability that led to the fall of GDP. However, starting from the year 2000 Romania has taken measures to control inflation that led to positive results. From the year 2001 – 2009 the country has witnessed lower level of inflation accompanied by higher economic growth. Thus, according to the study of Lupu, there exists a negative relationship between inflation and economic growth.

Mohammad, Wasti and Hussain (2009), investigated an empirical investigation between money supply, government expenditure, output and price for Pakistan for the period of 1977 to 2007, the econometrics model used was Johans on cointegration model. They found that money supply (m2) is positively impact on economic growth

Fielding (2008) studied inflation volatility and economic development in Nigeria. The study aims to address: the determinants of inflation volatility, whether economic development brings more or less inflation volatility and what government can do to reduce this volatility further. Fielding used monthly price data of 96 specific items in the 37 states of the country for the period 2001 – 2006 obtained from Nigeria Bureau of Statistics. He preferred the disaggregated data for two reasons. First, unequal distribution of income and hence heterogeneity of consumption is the major characteristic of developing countries. Thus a more aggregated data tends to give more weight to the consumption of the rich and will not be more informative about the cost of living of the poor. Second, the majority of consumers in poor countries are producers too, thus any price volatility on a specific commodity can easily affect the welfare of society. The finding of Fielding states that better transport and communication infrastructure is associated with lower inflation volatility. More access to credit, average inflation and urbanization are associated with higher inflation volatility. Public spending on infrastructure and development are

therefore likely to reduce inflation volatility. Public spending on financial deepening such as extending credit access is likely to increase inflation volatility. According to Fielding, if government policy makers desire to lower inflation volatility the focus should not be on financial development but on communication and transport infrastructural development.

Kesvarajah and Amirthalingam, (2012) examined the nexus between money supply and inflation in Sri Lanka over a period 1978 to 2010. Johanson and Juselius multivariate cointegration test and Granger causality test to estimate the long run equilibrium relationship among the variables. The result indicates the presence of long run relationship among the variables and the Granger causality test indicates there was a significant causality from money supply to inflation in Sri Lanka. While, Gunasinghe, (2007) analyzed the causal relationship between inflation and economic growth in this country using Granger causality. The result reveals that causality runs from inflation to economic growth for the period 1960-2005.

Mallik and Chowdhury, (2001) analyzed the short-run and long-run dynamics of the link between inflation and economic growth for four South Asian economies: Bangladesh, India, Pakistan, and Sri Lanka by applying cointegration and error correction models by using annual data. The result revealed that, there is positive and statistically significant relationship between inflation and economic growth for all four countries and the sensitivity of growth to changes in inflation rates is lower than that of inflation to changes in growth rates.

Amin, (2011) studied “Quantity Theory of Money and its Applicability” in the case of Bangladesh using Johansen cointegration method; the empirical findings indicate the existence of long run cointegrating relationship between money supply and inflation. The Granger causality test, revealed a unidirectional causal relationship running from money supply to inflation which provides evidence in support for quantity theorist’s view

Ahmed and Mortaza, (2005) empirically investigated the relationship between inflation and economic growth in this country, using annual data set on real GDP and CPI for the period of 1980 to 2005, and the co-integration and error correction models. The empirical evidence indicates that there exists a statistically significant long-run negative relationship between inflation and economic growth for the country as indicated by a statistically significant long-run negative relationship between CPI and real GDP.

Chuan-Yeh, (2012) investigated the causal relationship between inflation and economic growth using a broad cross-country data from 140 countries over the period 1970-2005. The results indicated that, inflation retards growth, whereas the effect from growth to inflation is beneficial. Moreover, he divided the cross national dataset in to low income, developing, and high income countries, and the results revealed that, the negative impact of inflation on growth in low income countries is greater than in developing and high income countries. On the other hand, he exploited the difference in effect of growth on inflation in different income level countries. Higher economic growth cannot results in improvement of inflation in high and low income countries. On the contrary, rapid economic growth induces higher inflation in low income sample countries.

Aslam (2016) also investigated impact of money supply on economic for Sri Lanka over the period 1959-2013, employed multivariate econometrics variable. He found that money supply has kept positive impact on the economic growth. On the other hand, study by Tabi and Ondo, (2011) analyzed the relationship between economic growth, inflation and money in circulation in Cameroon using a VAR model for the period 1960-2007. They found that increase in money supply increases growth and that growth causes inflation; however, an increase in money supply does not necessarily increase inflation.

As Ailkaeli, (2007) studied Money and Inflation Dynamics in Tanzania. He used GARCH model on seasonally adjusted monthly data for the period 1994-2006 and the results of the study shows that, a current change in money supply would have impact on inflation rate significantly in the seventh month ahead. Additionally the effect of money supply on inflation is not a sort of one-time strike on inflation but a kind of persistent shock.

According to Munir, Mansur and Furuoka (2009) examined the relationship between inflation and economic growth in Malaysia using a threshold auto-regressive (TAR) analysis. Annual data from the period 1970 – 2005 is used. In the GDP model, inflation rate, broad money supply and gross fixed capital accumulation are used as explanatory variables together with the two regime inflation thresholds. The finding reveals that the threshold level of inflation for Malaysia is 3.89%. A rate of inflation below the threshold has a positive impact on growth and a rate of inflation above the threshold has a negative impact on the economic growth. This finding is

similar to the finding of Khan and Senhadji (2001) for developed countries.

Chude and Chude (2016), also research the impact of broad money supply and economic growth for Nigeria during 1987 to 2010 and they used ARDL model, their finding showed money supply and gross domestic product are closely related. Another study focused on food price rise of external shock by (Michal Andrie, et al, 2013) in Kenya indicates that while imported food price shocks have been an important source of inflation, both in 2008 and more recently, accommodating monetary policy has also played a role, most notably through its effect on the nominal exchange rate.

According to Okoro (2013) examined the impact monetary policy on Nigeria economic growth by testing the influence of interest rate, inflation, exchange rate, money supply and credit on GDP. Augmented Dickey Fuller (ADF) test, Philips–Perron Unit Test, Co-integration test and Error Correction Model (ECM) techniques were employed. The results show the existence of long–run equilibrium relationship

According to Chukwu's (2009), study analyzed the effect of monetary policy innovations in Nigeria. The study used a Structural Vector Auto-Regression (SVAR) approach to trace the effects monetary policy stocks on output and prices in Nigeria. The study also analyzed three alternative policy instrument, that is, broad money (M2), minimum rediscount rate (MRR), and the real effective exchange rate (REER). The study found evidence that monetary policy innovations have both real and nominal effect on economic parameter depending on the policy variable selected.

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Gatawa Abdulgafar and Olarinde (2017), investigated the impact of money supply, inflation on economic growth for Nigeria in the period 1973-2013 and they used VECM. Their findings showed broad money supply and interest rate were negatively related to economic growth.

The study of Xiaojing (2008) examined the trade-off between inflation and economic growth in China using annual time series data from 1978 – 2007. He used the Phillips curve equation to see what the relationship would look like between the two variables. The finding of his study reveals that growth can be affected differently at different steady state levels. At the socially accepted steady state of inflation, 5%, GDP growth will be 9.39%. However a rising inflation above its steady state will have a negative effect on growth and tight monetary and fiscal policies are recommended in these cases. Nevertheless, tight policies can harm the economic growth of the country if they are still adopted when the rate of inflation is below the steady state.

Ihsan and Anjum (2013) examined the impact of supply (m2) and GDP for Pakistan and they found money supply is affected by GDP. The other study by Mallick (2008) showed that the impact of inflation on growth for the case of India. Annual time series data from 1960/61 to 2004/05 obtained from Reserve Bank of India (RBI) and Handbook of Statistics on Indian Economy is used. The study applies co-integration techniques, the error correction model (ECM) approach and auto-regression distributive lag model (ARDL) to see the long-run and short-run relationships between the two variables. In this setup the result of the study indicates that inflation has a significant negative impact on the growth level while investment has a positive effect on growth. Other variables such as real interest rate and government budget deficit do not have any significant impact on economic growth. The author recommends a policy that aims for macro-economic stability, i.e. price stability to attain rapid economic growth.

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2.5.2. The relationship between monetary policy instruments and economic growth.

In Sudan, applying co-integration analysis, a study was conducted to examine the long-run relationships between real Gross Domestic Product, money supply, and price level by using annual data from 1960 to 2005, and Granger Causality test was used to examine the short-run direction of causality between the variables. Granger Causality test results showed no causality between real GDP and money supply. However, the results from co-integration analysis showed that there was an existence of long-run relationship (Ahmed & Suliman, 2011).

Similar study was conducted in order to examine the relationship between Money Supply and GDP in Nepal, using annual data M1, M2, GDP, Price level from 1980 to 2009 (Shrestha 2010). In this study, Augmented Dickey-Fuller test, the Engle-Granger co-integration test, and the Granger causality test were employed in order to examine the relationship among variables. From the results of Granger causality test, money supply was found to have a causal relationship with GDP, but from co-integration analysis, Price and GDP were no more co-integrated with M1 than M2

Moreover, Hameed (2011) conducted a study on impact of monetary policy on gross domestic product, using data of Pakistan from 1980 to 2009, applying regression model to study relationship between money supply (M2) and interest rate, and GDP. The findings of the study showed that money supply had huge impact on GDP of the country, while interest rate had a minor relationship with GDP. In USA, Feldstein & Stock (1994) studied the possibility of using M2 to target the quarterly rate of growth of nominal GDP in their paper in 1994. They applied a multiple regression model using quarterly time series data on money, output, interest rate, and prices over the period from 1959(q1) to 1992(q2). The results showed that there was a systematic relationship between M2 and nominal GDP over the period from 1959 to 1992. That is, M2 was a statistically significant predictor of nominal GDP growth at the 1 percent level of confidence (in both regressions which include M2 and M2 in conjunction with inflation and interest rates). However, correlation between money supply M2 and nominal GDP was relatively weak

The studies on growth and real interest rate are precise in their findings; such studies include D'Adda and Scorcu (1997) on examining the relationship between growth and real interest rate considering 20 industrialized countries for the period 1960-1994. The study reports a significant negative correlation between growth and real interest rate. Also, Anaripour (2011)

employed a panel data of 22 countries for the period 2004 - 2010 to test the relationship between interest rate and economic growth. The results showed that there is negative relationship between interest rate and economic growth and this relationship is a unilateral causal relationship between economic growth and interest rate. The study concludes that a fluctuation (increase or decrease) in interest rate has no effect on economic growth.

In addition, when attempting to look at the impact of money supply on economic growth, George & Warren (1995) conducted a study using data from 110 countries over a 30-year period (1960-1990). In the study, authors examined relationship between money supply with GDP, inflation, and price using statistical testing. As a result, one of the findings in their research showed that, in long run, there was no correlation between money supply and real GDP for a data set of 110 countries. However, there was a positive correlation for a sub-sample of countries in the Organization for Economic Co-operation and Development.

Adefeso and Mobolaji (2010), also investigated fiscal - monetary policy and economic growth in Nigerian by employing Johansen Maximum Likelihood Co-integration procedure. The result shows that there is a long – run relationship between economic growth, degree of openness, government expenditure and broad money supply (M2). In addition, Owolabi and Adegbite (2014) examined the impact of monetary policy on industrial growth in Nigerian economy using multiple regression analysis. They analyzed the relationship between manufacturing output, treasury bills, deposit and lending, and rediscount rate and industrial growth, and found that the variables have significant effects on the industrial growth.

African Bank of Development (2011) analyzed the dynamics of inflation in some selected East African Countries, such as Ethiopia, Tanzania, Kenya and Uganda and found different results on the main causes of inflation in each case. Their analysis revealed money supply as the main driver of inflation in Ethiopia and Uganda in the short run, whereas shocks in oil prices, to the large extent explain inflation in Tanzania and Kenya. Moreover, their justification for monetary expansion in Ethiopia was attributed to monetization of fiscal deficit; and, growth in private sector credit was reflected in monetary expansion in Uganda and Kenya. Their findings also reveal that almost one third of inflation dynamics in Tanzania was explained by shocks in domestic cereal production.

Rebecca (2014) applied the ARDL Model to investigate the behaviors of fiscal deficit, money supply and inflation both in short and the long run time horizon in the economy of Ghana. Her analysis revealed the existence of positive relationship between fiscal deficits and inflation only in the short run. However, a significant positive relationship was observed among money supply and inflation both in short and the long run. Furthermore, money supply was estimated to primarily drive inflation in Ghanaian economy in the study, which is consistent with the postulate of the quantity theory of money.

2.5.3. Empirical evidence Study in Ethiopia

As Habtamu (2013) investigated into the causes and dynamics of price inflation in Ethiopia using a time series data of CPI, agricultural supply shocks, monetary growth, cost of capital, exchange rate and others, ranging from (1980-2012) by applying the VEC and Multi-factor Single Equation Models. His findings suggest that money supply was an important factor in determining the dynamics of price level in Ethiopia, both in short and the long run. Moreover, the agricultural supply shocks and the external market conditions (particularly, the exchange rate depreciation, oil price and the intermediate goods import) were found to have considerable significant positive impact on domestic inflation in the long run and the short run. The cost of capital was found to have a positive inflationary pressure only in the short run.

Josef et al. (2008) analyzed the short run dynamics of inflation in Ethiopia, using a parsimonious ECM fitted with monthly observations using the time series data of money supply, nominal exchange rate and agricultural out puts (proxied by acereal- weighted agricultural production index). The results of their study confirmed that inflation in Ethiopia strongly of past inflation determined, with money supply being the second derive of inflation in the short term. They revealed further that inflationary expectations explain more than half of it, even after three years of a shock while, in the medium-run, the nominal exchange rate and the out put factors were found to have the positive and a greater than money supply impact on inflationary dynamics. The study argued hence that, with prevailing structural factors causing rigidities in price formation, tightening monetary policy alone to contain inflation would become in effective, and claimed rather to make.

Policy reforms bringing flexible price formation, together with the credible and transparent central bank in curbing inflationary expectations and enhancing the effectiveness of monetary policy in Ethiopia. Here, we found that, money supply variable had only a limited role in explaining inflation for the period exceeding the short run; but rather, the exchange rate (the external influence) and the output shocks together with inflationary expectations were found to be important both in short and the medium-term periods.

As Ayalew (2000) studied the trade-off between inflation and unemployment in Ethiopia. The study aims to find out if there is a trade-off between inflation and unemployment, long-run determinants of inflation in the country and whether the Ethiopian economy affords stabilization. To show the trade-off between inflation and unemployment, Ayalew has measured unemployment by estimating the potential output and taking the difference from the actual output. In other words, the output gap derived is used as a proxy for unemployment. To estimate the trade-off between unemployment and inflation, inflation is explained as a function of unemployment. The estimation result disclosed that there is no trade-off between the two variables under study. A 100% rise in the rate of unemployment increases inflation by 47%. Thus, the traditional Phillips Curve is not applicable to Ethiopia. To see the long-term determinants of inflation in the country, the explanatory variables that are used are inflation inertia, money supply, world price index, unemployment, drought and war. The estimation result has revealed that structural variables such as unemployment of resources explain inflationary pressures quite well in Ethiopia. Generally, the major finding of this study implies that as the unemployment level declines then inflation falls. This shows that in the Ethiopian context there is a positive relationship between economic growth and inflation assuming that the lower rate of unemployment is accompanied by higher economic growth

According to Teshome (2011) assessed the relationship between inflation and growth in Ethiopia. In the analysis Teshome has compared the Ethiopian situation with the other Sub-Saharan African (SSA) countries, and the author points out that on the average Ethiopia's economic growth and inflation rate are higher than the SSA countries by 4.5% and 9% respectively. After analyzing the nature of the economic growth in the country he concluded that inflation does not affect the economic growth because of the broad based nature of the growth. He then concluded that from 2004 – 2010 average economic growth in Ethiopia is 11% and average rate of inflation during the same period is 16%. The period under study has witnessed a

positive relationship between inflation and economic growth. According to the author, no matter what happens in inflation, economic growth is not an affair of choice.

As Geda and Tafere (2008) have also analyzed the forces behind the recent inflationary pressure in Ethiopia in period 1994/5 – 2007/8. In the formulation of the VAR model explanatory variables for the Ethiopian inflationary process are: exchange rate, world price index, world non-food prices, real income, excess money supply, food imports, food aid, marketed surplus, unit wage costs and the exogenously administered prices. Using the cointegration vectors for the models of food and non-food inflation, a single error correction model is estimated for both models. Among the explanatory variables of inflation income growth is the relevant variable in this case. In this study it is found out that one of the sources of food inflation is the rise of income. The reason given for this is the low level of income among households. Given the low level of income, an increase in income leads to higher food inflation because households spend their additional income on food items. These authors recommend that policy makers to cool down economic growth through fiscal and monetary conservatism. Since the main source of the recent inflation in the country is food inflation, an increase in income is found to be the major determinant of food inflation. Hence, it can be concluded that there is a negative relationship between inflation and economic growth in Ethiopia. Like the global empirical evidences, studies undertaken in Ethiopia have different findings on the relationship between inflation and economic growth.

Teshome, (2011) studied the source of inflation and economic growth in Ethiopia using statistical analysis. According to him, between the year 2004 and 2008 the higher desires to spend and higher import price with slow growth of aggregate supply contributed to inflation in the country. He states that, inflation in Ethiopia is not a monetary phenomenon, and to him controlling money supply to reduce inflation will hinder growth of the economy. In addition to this, stopping the injection of money to the economy can't stop inflation due to high velocity of money caused by growth of financial institution and economic transaction in the economy. In part of the study he mentioned that, it is difficult to specify the exact relationship between inflation and growth and one must study the structure of government spending and the nature of economic growth.

As Desta, (2009) stated that, there was an increase in broad money supply in Ethiopia and bank credit has been increased. From 2002 to 2006, Ethiopia's real GDP increased by 6.8 percent. Rather than adjusting the money stock with the change of GDP, the country's money supply grown by about 18 percent, contributing to an average 12 percent increase in the rate of inflation. He also argues that if a nation achieves full employment, it is possible to assume that economic growth is likely to precipitate an inflationary situation.

Jema and Fekadu, (2012) analyzed determinates of the recent soaring food inflation in Ethiopia and stated that, in Ethiopia food price accounts for the lion's share of the Consumer Price Index. This results in food price inflation necessitating general inflationary pressures in the economy both directly and indirectly. Moreover, food prices increased even faster than non-food items that made it the main contributor to high general inflation.

As Wolde-Rufael, (2008) investigated the causal link among inflation, money and budget deficits for the period 1964 to 2003 using the bounds test approach to cointegration and a modified version of the Granger causality test. To check the robustness of the bounds test, he also used two additional long run tests: the dynamic ordinary least squares and the fully modified ordinary least squares (FMOLS). He found that, there was a long run cointegrating relationship among the series with a unidirectional Granger causality running from money supply to inflation and from budget deficits to inflation. He concluded that, the control of the money supply is essential policy tools for the long-run macroeconomic stability of Ethiopia.

As Fekadu, (2012) analyzed the relationship between inflation and economic growth in Ethiopia for the period 1980-2011. The Vector Auto regression (VAR) model showed that, an increase in economic growth decreases inflation whereas inflation does not have significant effect on economic growth in the short run. The Granger Causality test showed that, economic growth has forecasting power about inflation while inflation does not have predicting power about economic growth. The Cointegration test indicates that, there exist a long run relationship between economic growth and inflation in Ethiopia. Vector error correction estimates indicated that, economic growth significantly reduces inflation in short run while inflation does not have any significant effect on economic growth.

A study by Anteneh (2014) tries to see the effect of shocks to monetary policy on output and price using a VAR approach and concludes that a positive shock to reserve money increases

output while it decreases the price level significantly. But this study is also not related to external shock but only analyzes the effect of monetary policy shocks to output and inflation.

As Yemane (2008) investigated the causal link amongst the time series of money supply, budget deficits and inflation in Ethiopia, applying the Granger causality test to detect the short run causality, and the bounds test approach to the long run issues, for the period ranging from 1964 to 2003. The results of the study confirmed the existence of long run cointegrating relationships among the series and only uni-directional forward Granger Causality. Furthermore, budget deficits were found to have no impact on the growth of money supply; and that both money supply and budget deficits impose positive and statistically significant impact on inflation, with the largest pressures sourcing from money supply while confirming the dominance of money in the dynamics of inflation. Here commended finally that, since both the fiscal and monetary variables were important in determining inflation, the simultaneous exercising of proper fiscal and monetary policies would be effective to achieve the national objective of maintaining low inflation in Ethiopia.

Rao and Abate (2015) analyzed the causality effect between money supply and price level in Ethiopia by applying the Granger causality and Cointegration tests, respectively for the short and long run issues; for the period covering from 1975 to 2012. Accordingly, the granger causality test suggested the existence of uni-directional causality running from money supply to inflation only, and all the variables were found to have cointegrated over the long term. They found positive but insignificant impact of money supply on inflation in the long run and suggested that it may be attributed to the offsetting effect of aggregate demand and output in the long run. In other words, the increase in money supply induces aggregate demand and causes price to rise in the short run following lags in production; but latter, the additional aggregate demand induces production and hence output increases and leads to reduction of prices in the long run. In their study, inflation expectation and imported (pass through) inflation were primarily important in driving domestic price in short and the long run. Moreover, negative and significant impact on inflation and fiscal variable (budget deficit) was found to be insignificant in determining inflation in Ethiopia.

Zerayehu (2014) has used Vector Autoregressive Error Correction (VECM) cointegration VAR models to Analyze the monetary policy and macro economic shocks in Ethiopia, estimation and

analysis of monetary policy reaction function. On the study he used the variable such as domestic credit as the most indicators of monetary policy performance, net foreign assets, Consumer price index, Real Gross Domestic Product (RGDP), Real effective exchange rate (REER) and Fiscal gap (FG) and he founded that both net foreign asset and GDP are statistically significant and positively influence domestic credit in the long run dynamics model. It is only consumer price index that that has a positive impact in the short run dynamics. All other explanatory variables negatively influence domestic credit in the short-run dynamics model. The effect of monetization of fiscal deficit on monetary policy depends on the endogeneity and exogeneity of fiscal deficits in the long run dynamics model and the speed of adjustment or feedback effect towards long run equilibrium takes many years to make a full adjustment when there is a shock to the system.

2.6. Monetary Policy Framework in Ethiopia.

The monetary framework of Ethiopia is highly shaped by the type of government regime that came to power. The history of monetary policy dates back to 1943 when the State Bank of Ethiopia was established, with two departments performing the separate functions of an issuing bank and a commercial bank before they formally separated in 1963. As the countries monetary authority, the National bank of Ethiopia, was established in 1963 by proclamation no 206/1963 and granted broad administrative autonomy and juridical personality. In addition to the responsibility of issuing paper money and coins, NBE was entrusted to regulate the supply availability and cost of money and credit, to manage and administer the country's international reserves, to license and supervise banks and hold commercial banks reserves and lend money to them, to supervise loans of commercial banks and regulate interest rates, to fix and control the foreign exchange rates. However, monetary and banking proclamation no.99 of 1976 came into action to shape the bank's role according to the socialist economic principles that the country adopted. As part of the national planning, NBE's supervisory area increased to include other financial institutions such as insurance institutions, credit cooperatives. Moreover the government introduced the new Ethiopian birr in place of the former Ethiopian dollar.

The 1976 proclamation also revised the banks relationship with the government by raising the legal limits of outstanding government domestic borrowing to 25% of the actual ordinary revenue of the government during the preceding three budget years as against the proclamation

of 1963 which set it to be 15%. Generally, in that period financial markets were abolished, the exchange rate was fixed, capital controls were absolute and price regulation was pursued. After the down fall of the socialist regime, in 1994 a new proclamation issued to reorganize the bank according to the market based economic policy so that it could foster monetary stability, a sound financial system and such other credit and exchange conditions as are conducive to the balanced growth of the economy of the country. The proclamation 83/1994 vested the bank to regulate the supply and availability of money and credit and applicable interest rates, to set limits on the net foreign exchange position and on the terms and amount of external indebtedness of banks and other financial institutions and to make short and long term refinancing facilities available . In 2008 the government amends the Establishment National Bank of Ethiopia with the Proclamation No. 591/2008. According to this proclamation the bank granted to perform the following functions:

- ❖ Coins, prints and issues the legal tender currency and Acts as banker, fiscal agent and financial advisor to the Government
- ❖ Regulates and determine the supply and availability of money and credit as well as the applicable interest rate and other cost of money charges
- ❖ Formulating implements and follows up the country's exchange rate policy, and manages and administers the international reserves of the country.
- ❖ Licenses, supervises and regulates the operations of banks, insurance companies and other financial institutions
- ❖ Sets limits on gold and foreign exchange assets, which banks, and other financial institutions authorized to deal in foreign exchange an hold in deposits
- ❖ Sets limits on the net foreign exchange positions and terms, and the amount of external indebtedness of banks and other financial institutions
- ❖ Provides short and long term refinancing facilities to banks and other financial institutions
- ❖ Accepts deposit of any kind from foreign sources
- ❖ Promotes and encourages the dissemination of banking and insurance services throughout the country
- ❖ prepares periodic economic studies, together with forecasts of the balance of payments, money supply, prices and other relevant statistical indicators of the Ethiopian economy

useful for analysis and for the formulation and determination by the Bank of monetary, saving and exchange policies

- ❖ represents the country in international monetary institutions and acts consistently with international monetary and banking agreements to which Ethiopia is a party
- ❖ Exercises and performs such other powers and activities as central banks customarily perform

2.6.1 Monetary policy Instruments

Monetary policy guides the Central Bank's supply of money in order to achieve the objectives of price stability (low inflation), full employment, and growth in aggregate income. In recent years, many countries place greater emphasis on achieving the objective of low inflation since there is a strong empirical evidence that indicate high inflation (and its associated high variability) distorts the decision making of private agents with regard to investment, savings, and production, and ultimately leads to slower economic growth (Khan,2010).

Monetary policy targets, as distinct from objectives, are proximate goals. They are not objectives in and of themselves, but if attained will work directly toward achieving the longer-term objectives of policy. Monetary policy targets are classified as either operating targets or intermediate targets. Intermediate targets are variables that affect the ultimate objectives of monetary policy, but are not controlled directly by the central bank. They include various monetary aggregates and long-term interest rates. In contrast, operating targets are tactical goals that the central bank can influence in the short run.

Although central banks cannot use monetary policy instruments directly to affect intermediate targets, they can use them to affect operating targets, such as reserve money and short-term interest rates, which influence the intermediate targets. Monetary instruments that affect operating targets are generally classified as either direct or indirect instruments. Direct instruments function according to regulations that directly affect either the interest rate or the volume of credit, for example, administratively set interest rate ceilings, individual bank credit ceilings, and directed lending. Direct instruments become increasingly ineffective as money and

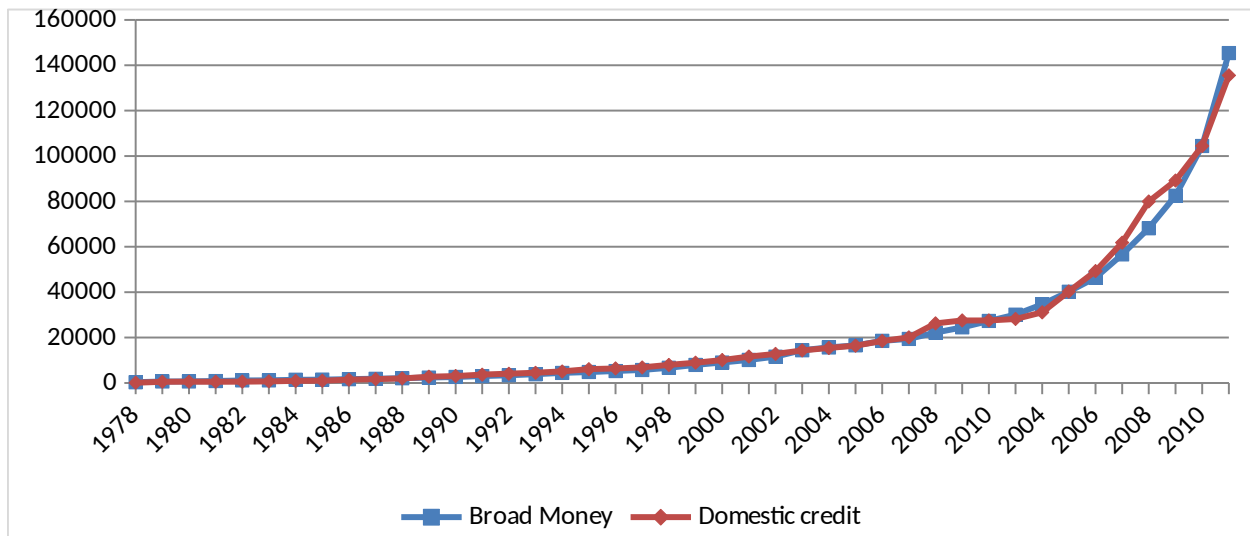
financial markets develop; besides, they create distortions, including financial repression, and promote financial disintermediation, and fiscal dominance.

Indirect instruments usually termed as market-based instruments, since their use affects the market determined price of bank reserves as the central bank engages in transactions with both financial and nonfinancial institutions. There are three main types of indirect instruments—open-market operations, central bank lending policies, and reserve requirements that are used to inject and absorb liquidity (khan, 2010).

2.6.2. Determinants of Broad Money Supply

For the last two decades before 1963 money supply was explained by balance of payments and domestic credit. The impact of domestic credit on money supply was enhanced in response to growing economic activities such as the expansion of trade, manufacturing and housing industries which demanded a huge amount of private credit. Accordingly, domestic credit came to play vital role in determining the growth rate of money supply in the 1970s and early 1990s. Domestic credit increased from Eth birr 122.9 million in 1970 to Eth birr 3,647.90 million 1983. Broad money (M2) also increased from Eth birr 328 million in 1970 to Eth birr 3,040.5 million in 1983. Money supply's share to GDP, on average, also increased from 12.3 % for 1970-1983 to 25.9% for 1984-2011. The main factor behind the expansion of money supply during that period was again the expansion of domestic credit to both the private sector and the government. The domestic deficit financing through discretionary bank borrowing also contributed for the huge increase in broad money supply (Derrese, 2001).

Broad Money can be determined by net foreign assets, domestic credit and net other items where domestic credit consists of claims on central government and other financial institutions in the review period. The significant share of claims on central government over on other financial institutions emphasized the significant role of domestic credit in the determination of Broad money comparing with net foreign assets. Through the review period, all the determinants are increased overtime but the increase in domestic credit overwhelm the other determinant. This implies a revival in the private sectors 'appetite for bank credit comparing with the preceding year. The considerable growth in net foreign assets also was partly attributed to improved performance in export, and foreign aid (Zerayehu, 2006).



Source: National bank Annual Report (1977/78--2018/19)

Figure 2.1: Determinants of Broad Money supply

Broad money supply (M2), the annual growth rate of money supply, grew by 261.5 percent and reached Birr 145,376.97 million by the end of 2018/19 compared with the same period of 2012/13 wholly driven by the expansion of domestic credit, grew by 236.3 percent and reach birr135,553.90 million by the end of 2018/19 compared with the same period 2012/13.

2.6.3 Gross Domestic Product (GDP) Growth

According to World Bank (2016), Ethiopia’s double digit growth in 2014/15 slowed down in 2015/16 due to the recent drought. Real GDP grew by 8 percent in 2015/16 compared to 10.4 percent growth in 2014/15. Still, Ethiopia’s economy was among the fastest growing in the world showing how well the economy passed through adverse shocks. The growth nevertheless falls short of the Government’s own target set out in the Growth and Transformation Plan II (GTPII), which projected at 11.4 percent. Overall, the five year GTPI period (2010/11 to 2014/15) achieved a very high growth rate of 10.1 percent per year, on average. When considering the last dozen years since 2004, real GDP growth averaged 10.5 percent. This translated into an average per capita (in dollar terms) growth of 7.9 percent, which is equivalent to the annual per capita growth rate needed for Ethiopia to reach middle-income status by 2025.

2.6.4. Interest rate development

The pre-reform period was characterized by discriminatory interest rates, foreign exchange as well as credit allocation policies. The interest rate was deliberately set at a very low level and depending on the degree of socialization; different sectors did face different interest rates. However, after 1998 reform interest rates assumed to be determined by the inter-play of the market forces. Consequently, the interest rate is fairly liberalized and the NBE has set only a floor for deposit rate, leaving all other rates to be determined by market forces. Moreover, pursuant to the strategy of gradualism, the NBE has implemented this policy step by step.

Accordingly the average interest rate on time and saving became 6.0 & 6.29 percent while the nominal lending rate by the Banks ranged between 10.5% and 13%, with some private Banks charging more. The development in differentiated interest rates, associated with the expansion of private banks, indicated the slow but growing competition among banks. During the period between 2002 and 2005, no significant changes have been observed in the interest rate structure of the banking system. This was mainly due to the prevalence of excess liquidity in commercial banks. As a result, the simple average savings deposits rate remained at 3.08 percent per annum just 0.08 percentage points above the 3 percent minimum set by the NBE. Interest rate on time deposits, however, ranged between 3.62 percent for a maturity period of less than one year to 3.71 percent for those loans extending above two years. In 2010/11, the saving deposit rate and time deposit grow to 5.4 and 5.49 respectively while the nominal lending rate by the Banks ranged between 7.5% and 16%.

It is true that in a market economy interest rates could play a significant role in serving as a transmission mechanism of monetary policy. In Ethiopia, NBE refrained from changing interest rate to counter the negative real rate of interest in deposits and/ or yields of Treasury bills because such an intervention was regarded to have no desirable effect on output and imported inflation(NBE,2011)

2.6.5. Financial Sector Development in Ethiopia

In Ethiopia the financial system is highly dominated by the banking system. In 1963 the commercial bank of Ethiopia established along with the National bank of Ethiopia. After the

1963 law, some other banks also established which was owned by foreigners. Before 1992 the financial sector was dominated entirely by the government. Although there were few banks owned by foreigners before 1975, all privately owned banks were nationalized and concentrated into Commercial Bank of Ethiopia. Afterward, the main financial sector reform was to direct the government banks to finance greatly increased public sector. In terms of the financial sector, the 1992 reform brought in private sector players. The government not only began to serve the private sector, which previously had been demonized, but it also allowed the establishment of new private financial institutions. Equally, the role of Ethiopia's central bank needed to be reformulated. In undertaking this task, after 1992 the government adopted a strategy which allow gradual opening up of private banks and insurance companies alongside public ones and gradual liberalization of the foreign exchange market. In contrast, it follows a strategy that restricts the sector to Ethiopian nationals in order to strength domestic competitive capacity before full liberalization (Alemayehu, 2005).

The main financial institutions operating in Ethiopia are banks, insurance companies and microfinance institutions although banking sector dominates the financial system. The number of banks operating in the country during the fiscal year reached 17 in 2011. In terms of ownership, fourteen were private commercial banks and the remaining three state-owned. Unlike their number the privately owned commercial banks have a very small size compared to the public banks, especially the commercial bank of Ethiopia (CBE). In addition, all the private banks are domestically owned. There is a gradual but encouraging entry of private banks to the system though the larger share of the banking market still goes to CBE. In terms of capital ownership, in 2003/04 the public banks had 2.17 billion birr which is 66.6 % of the total banking capital while the private had only 33.2% share which is 1.04 billion birr. In 2010, from the total capital of the banking system, the share of private banks rose to 43.6 percent (7.23 billion birr) from 33.2 percent seven years ago. In terms of disbursement of loans, the share of private banks has increased from 17 percent in 1997/98 to 48 percent in 2010/11. The available data also shows that the share of credit extended to the private sector has jumped to 73 percent between 1997/98 and 2002/03, while that of the public sector has declined from 15 to 5.5 percent during the same period. This implies the effectiveness of financial liberalization policy pursued by the government. In spite of this; the banking sector in general has excess liquidity. This may relate to

the problems of access to credit that may relate to risky avert nature of the banking sector in the face of the growing level of nonperforming loans.

Beside the banking sector, the role of insurance companies and micro finance institutions become an important mix of the financial sector. By the end of 2010/11, the number of microfinance institutions operating in the country reached 31. Their total capital increased by 24 percent to Birr 2.9 billion and their assets rose by 27.6 percent to Birr 10.2 billion mirroring their ever growing rose in the economy. Meanwhile, the number of insurance companies reached to 14 and registered a total capital of Birr 955.7 million. Private insurance companies accounted for 69.5 percent of the total capital, while the 51 remaining share was taken up by the single public owned enterprise, the Ethiopian Insurance Corporation (NBE, 2011).

The contribution of central bank to economic growth is very low. The transmission process can be expressed through the ISLM model. For example, if the central bank uses expansionary monetary policy by open market leads to right ward shift in LM curve, it is meaning that interest rate decreases and the gross domestic product goes up. However, these consequences is considered as the immediate short-run effect of monetary policy , then the price level would increase, thus the LM curve snapping back gain.

2.6.6. CONCEPTUAL FRAMEWORK

The conceptual framework is intended to develop how the monetary policy would affect economic growth in Ethiopia. Awareness Creation and understanding of the situation under scrutiny is very important to ease communication on effect transmission mechanism. In other words, conceptual framework involves forming ideas about relationships between variables in the study. Hence, the conclusion is drawn depending on existing relationship between variables identified. This study will adopt the conceptual framework shown in as shown below in diagram

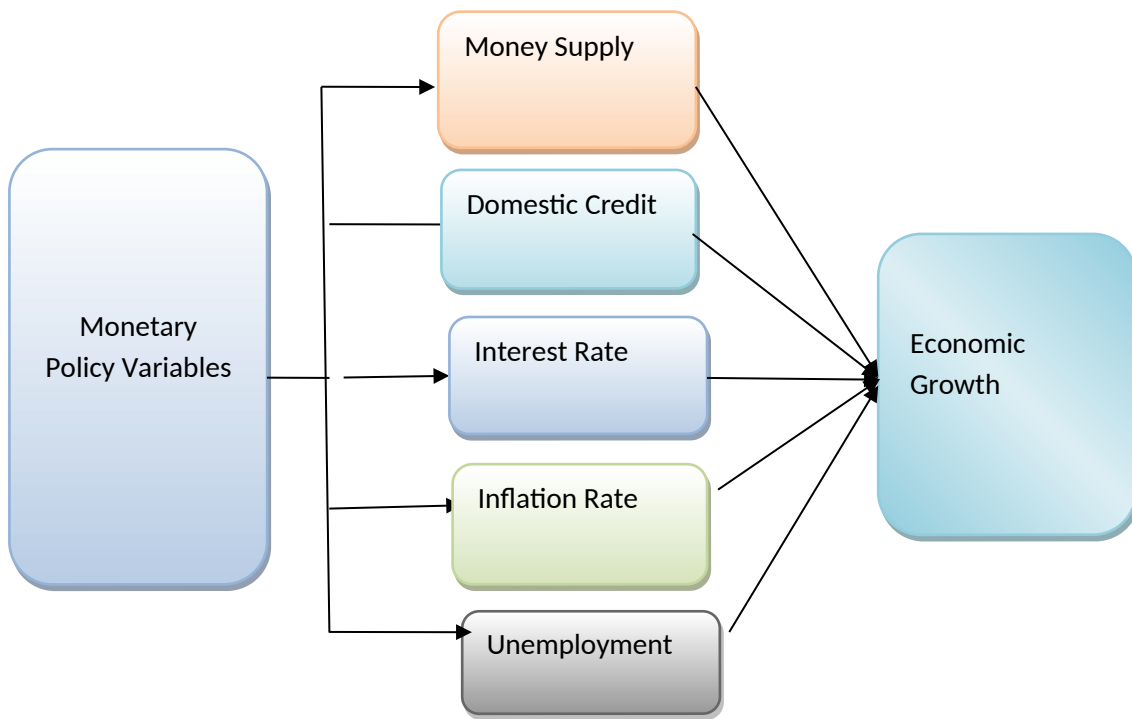


Figure 2.2: Conceptual Framework

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1. Research Design

The study uses quantitative research approach to investigate the effect of monetary policy on economic growth. The study employed secondary data obtained from National Bank of Ethiopia and MOFEC.

In terms of research design, the study employed time series (ARDL Model) research Design in order to achieve its objectives. It is considered as an appropriate design for analyzing effects of monetary policy impact on economic growth of Ethiopia.

3.2. Data Types and Sources

The annual time series data were collected ranging from 1970 to 2011 E.C. The data were collected on the identified macroeconomic variables such as Real Gross Domestic Product (RGDP), broad Money Supply (M2), Interest Rate (IR), Domestic Credit (DC), Unemployment rate (Unemp), and Inflation Rate (INFR). Data on these variables were collected principally from annual reports of National Bank of Ethiopia, and Ministry of Finance and cooperation (MOFEC).

3.3. Method of Data Analysis

Both descriptive and econometric analyses of estimation technique are employed in this study to determine the impact of monetary policy on the economic growth of Ethiopia. The descriptive analysis depicts the graphical visual of relations between variables. Whereas, the econometric analysis shows the statistical relationship, effects or impacts between or among dependent and independent variables, essential for economic analysis.

3.3.1. Descriptive Analysis

As stated above descriptive analysis overviews the trends of economic growth rate and trends of determinant variables of monetary policy graphically. The trends of monetary policy variables

such as Money Supply (M2), Interest Rate (IR), Domestic Credit (DC), unemployment trade (Unemp), and Inflation Rate (INFR) are analyzed against real GDP growth overtime.

3.3.2. Econometric Analysis

The second powerful statistical estimation technique is the econometric analysis of the data in which the effect of monetary policy on economic growth is numerically examined. The general specification of the econometric model is guided by a review of the existing theoretical and empirical literature. The potential impacts that are considered to have an effect on economic growth include money supply, domestic credit, inflation rate, interest rate and unemployment rate.

3.3.2.1. Model Specification

Based on theoretical literature and empirical of various studies are the input of the model of this study has specified to examine how the monetary policy affect the economic growth in Ethiopia. The monetary policy variables considered in this model are money supply, domestic credit, inflation, interest rate and unemployment. Study conducted by Tamirat&Indejeet(2019) how the monetary policies affect the industrial growth in Ethiopia where he used the ARDL model to show the effect of the relationship between the identified variables. In addition, Enock N. and Nicholas.M (2017) used the ARDL model to show how Monetary Policy drive economic growth in Tanzania.

In this study, the model is customized to the objective of the study so that it would explain the effect of monetary policy on economic growth. The explanatory variables are taken from empirical and theoretical literatures.

In geneal,this model is to capture the dynamic effect of monetary policy on economic growth indicating variable (RGDP growth rate) is stated below with the independent variables as Money supply(M2), Inflation rate(INFR), Interest Rate(IR), Domestic credit(DC), and unemployment rate(UNEMP) while the dependent Variable is real Gross Domestic product growth rate. The functional form of the model can be as follows:-

$$RGDP_t=(M2_t,Infr_t,IR_t,DC_t,UR_t)------(1)$$

In variables diagnosis and test some variables transform into log forms are often useful to stabilize the variance of a series. This is done in order to avoid or eliminate the problem of heteroscedasticity. In addition, it helps us to arrive at the elasticities of the variables. Hence the

study uses the log form of the above variables. Accordingly, the log linear and differenced forms of the models are written as follows

$$RGDP_t = \beta_0 + \beta_1 M2_t + \beta_2 INFR_t + \beta_3 IR_t + \beta_4 DC_t + \beta_5 UNEMP_t + \varepsilon_t \text{-----(2)}$$

Where,

RGDP=Real gross domestic product growth rate

M2= Broad Money Supply

INFR=inflation Rate

IR= Interest rate

DC=Domestic Credit

UNEMP=Unemployment

Based on the above conception, the theoretical framework of the a model that likely to address the impact of monetary policy on economic growth is examined. The Autoregressive Distributed Lag (ARDL) is found to an appropriate model to analyze the effect. The ARDL approach to co integration involves estimating the unrestricted error correction model version of the ARDL model. This ARDL model deals with single co integration and it was introduced by Pesaran and Shin(1999) and further explained by Pesaran et al.(2001).

The autoregressive distributed lag model (ARDL) model shows the relationship among monetary policy variables and the real gross domestic product growth through long-run effect.

The general form of ARDL(p,q) is as:

$$Y_t = \beta_0 + \sum_{i=0}^p \beta_i L^i X_t + \sum_{j=0}^q \delta_j L^j Y_t + \varepsilon_t \text{-----Eq(3)}$$

Where L= stands for lag operator

$L^i = X_{t-i}$ is a dynamic model in the level of the variable and their lags

ARDL approach to co-integration provides the error correction version of ARDL model. Thus the model is given as:

$$RGDGR_t = \beta_0 + \sum_{i=1}^p RGDPGR_{t-i} + \sum_{i=0}^q \ln M2_{t-i} + \sum_{i=0}^q \phi_i \ln DC + \sum_{i=0}^q \mu_i \Delta UNEMP_{t-i} + \sum_{i=0}^q \psi_i Infr_{t-i} + \sum_{i=0}^q \rho_i \Delta IR_{t-i} + \varepsilon_t \dots$$

Eq(4)

Where $\Theta, \alpha, \phi, \mu, \psi, \rho \wedge \eta$ shows short run dynamics of the model and all β 's shows the long run relationship. The ARDL approach consists of two steps for estimation of the long run relationship among variables. In the first step F-statistics is employed to check whether co-integration exists or not. F-statistics is compared with critical value of F-tabulated by pesaran (1997) or pesaran et al. (2001).

The error correction equation will be applied to find the adjustment speed to the equilibrium. Thus, the ECM equation is as follows:

$$\Delta \ln RGDP_t = \beta_0 + \sum \alpha_i \Delta \ln M2_{t-i} + \sum \phi_i \Delta \ln DC_{t-i} + \sum \mu_i \Delta \ln UNEMP_{t-i} + \sum \psi_i \Delta \ln \pi_{t-i} + \sum \rho_i \Delta \ln IR_{t-i} + \lambda ECM_{t-1} + \varepsilon_t$$

..... **Eq(5)**

In the above equation money supply, domestic credit and ECM are to have negative relationship with RGDP. Thus the values of their coefficients ($\alpha, \phi, \psi_i, \rho_i$) are all expected to be positive. However, unemployment, inflation and interest rate are expected to have a positive impact on RGDP growth rate, so $\mu, \lambda < 0$ *the coefficient of ECM, is the speed of adjustment.*

3.4. Model Estimation Procedures

3.4.1. Unit Root Test (Stationarity Test)

Even though the classical regression model assumes that both the dependent and independent variables are to be stationary over time, most economic variables exhibit long-run trend movement and only become stationary after they are differenced (Alemayehu, Daniel and Ndung'u, 2009). Thus, empirical literature for unit root shows that almost all macro variables are non-stationary in level while their difference is stationary. Applying the standard regression techniques to the levels of variables leads to a spurious correlation, which may give very high R^2 value and significant t-ratio even without true relationship among the variables. Therefore, Ordinary Least Squares (OLS) may lead to inconsistent and less efficient parameters as they may show that there is a strong relationship whilst in actual there is no relationship at all and hence the results obtained from such regressions will not have a meaningful economic interpretation. Hence, prior to estimation of the long run models the time series properties of the variables, unit root test, should be conducted.

Some commonly tests which are usually employed to test whether time series variables are stationary or non-stationary are the Augmented Dick-Fuller (ADF) test. The ADF test determines

the existence of a unit root. Basically this test has been chosen for its reliability, accuracy and resourcefulness. The ADF test is a particular series say, Y_t , such that;

$$Y_t = \alpha + \delta_t + \rho Y_{t-1} + \beta \sum_{i=0}^n \varphi \Delta Y_{t-i} + U_t \text{-----}(6)$$

Where Δ is a first difference operator and n is the lag length. The parameter of interest here is ρ that indicates the stationarity and non-stationarity of the data. The unit root test helps us to conclude whether the variable under study could be relied to use it as it is or it needs further integration to render it stationary.

3.4.2. Selecting Optimal Lag Length

The optimal lag length of time series data should be taken into account during modeling the data. We have to be care full also in determining the lag length of each variable because too few lags will leave autocorrelation in the errors and distort the test results and too many lags, on the other hand, will reduce the power of the test. Economists suggest the use of information criteria such as Akaike Information Criteria, Schwarz Bayesian Criteria and Hanan-Quinn Criteria (HQC) are used to determine the optimal lag length. A time series is said to be integrated of order zero, $I(0)$, if it is stationary in levels. Some series needs to be differenced several times before becoming stationary. The number of times a series needs to be differenced before being stationary is the order of integration. So if a time series is said to be integrated of order n , $I(n)$, it means that it has to be differenced n times before the series become stationary.

3.4.3. Diagnostic Tests

In order to select appropriate model, we must go through certain steps such as Pre-estimation test including Unit root test using Augmented Dickey Fuller Test and other tests, maximum lag length, etc and Post estimation test which include stability test (Ramsey's Reset Test as well as recursive test) residual and coefficient diagnostic test. The residual diagnostic test includes normality, serial correlation and heteroscedasticity. To identify the long run relationship between variables coefficient diagnostic test such as Bound Test, ARDL co integrating and long run or error correction model would be conducted

3.4.4. Co-integration Test

The credible means of avoiding spurious regression is to use cointegration technique which allows the estimation of correct regression with non-stationary data. Any equilibrium relationship among a set of non-stationary variables implies that their stochastic trends must be linked. After all, the equilibrium relationship means that the variables can't move independently of each other. This linkage among the stochastic trends necessitates that the variables are to be cointegrated (Brooks, 2002). The co integration technique is based on the assumption of an equilibrium relationship among the variables, which implies that two or more variables that are individually non-stationary but are integrated of the same order possess a linear combination of a one-degree lower order of integration. Therefore, if all the variables are $I(1)$ and are cointegrated, then their co integrating equation would yield a composite variable of order $I(0)$, i.e. it would be stationary (Handa, 2009). Thus, Cointegration among the variables reflects the presence of long run relationship in the system.

Therefore, there is a need to test for Cointegration because differencing the variables to attain stationarity generates a model that does not show the long run behavior of the variables. It gives only the short run dynamics, in which case valuable information concerning the long run equilibrium properties of the data could be lost (Kennedy, 1992). Hence, testing for Cointegration is the same as testing for long-run relationship carried out. In general, if variables that are integrated of order ' n ' produce a linear combination which is integrated of order less than ' n ' then the variables are cointegrated and hence have stable long run equilibrium relationship (Gujarati, 1995).

CHAPTER FOUR

4. RESULTS AND DISCUSSIONS

4.1. Descriptive analysis Results

4.1.1. Money supply and Economic Growth

Real GDP is referring to an inflation-adjusted measure of GDP. Its relationship with the money supply is not clearly known. Real GDP tends to be more influenced by the productivity of economic agents and businesses. Recently, Ethiopia has experienced strong economic growth. The economic growth had been near double digit levels since 2003/04, when the country has consistently outperformed all other countries in Africa. The real GDP growth averaged 11.2% per annum during the 2003/04 and 2008/09 period (The African Development Bank Group, 2010). The growth rate of real GDP has been moving up and down. As indicated below the growth trend has quiet changed, enter in double digit growth since 2003/04.(NBE 2003/04-2015/16

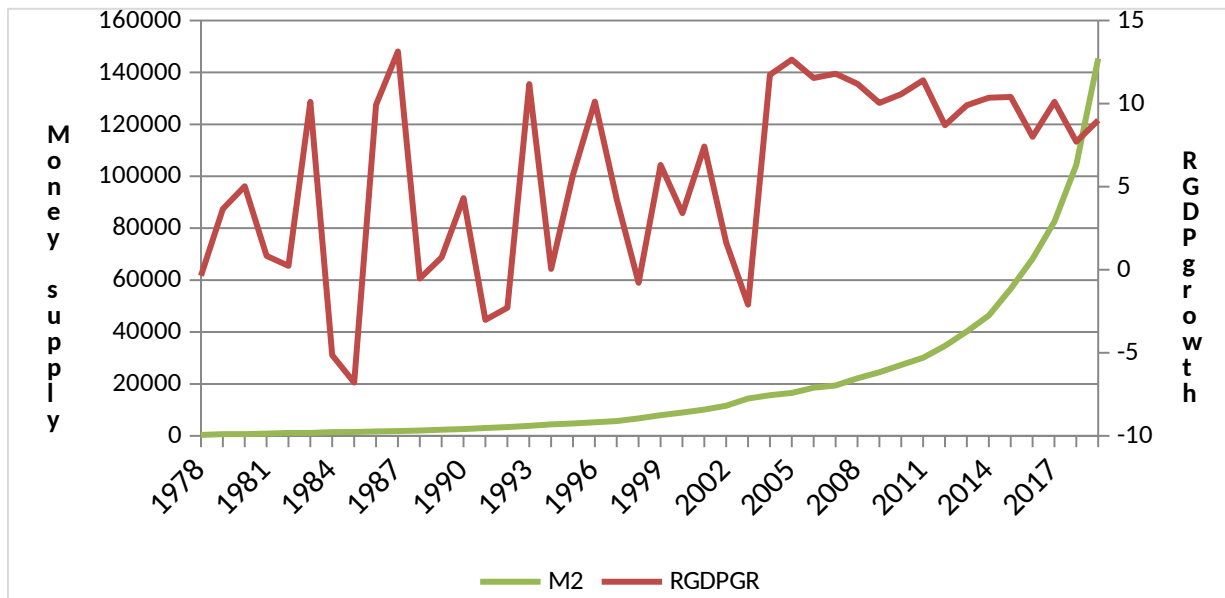


Figure 4.1. Money supply and RGDP growth rates

Source: own computation using National Bank of Ethiopia data

In addition, money has been injected extensively in the economy due to various reasons such as private and public investments expansion. Moreover, consumption expenditures increase as employments increase along with investment. In relation to the increase investment and consumption expenditure, money supply has also increased tremendously since 2003/04

4.1.2. Domestic credit and Economic Growth

Domestic credit has a vital role to promote economic advancement of private sector through encouraging domestic investment. Finance is one of factors that influence private sector investment and it is a backbone of every firms. A growing investment needs a source of finance to assist its operational and non-operational activities. Banks are a crucial source of credit for many investors. Commercial banks provide a lending service (grant loans and advances) to individuals, firms and public enterprises. Accordingly, in Ethiopia financial reform has been made during ERDF regime in Ethiopia in order to satisfy ever increasing demand for credit by private sector. The growth of domestic credit is also sharply increasing since 2003/04 just like that of money supply. Hence, as indicate below the growth of domestic credit is quiet similar to that of money supply.

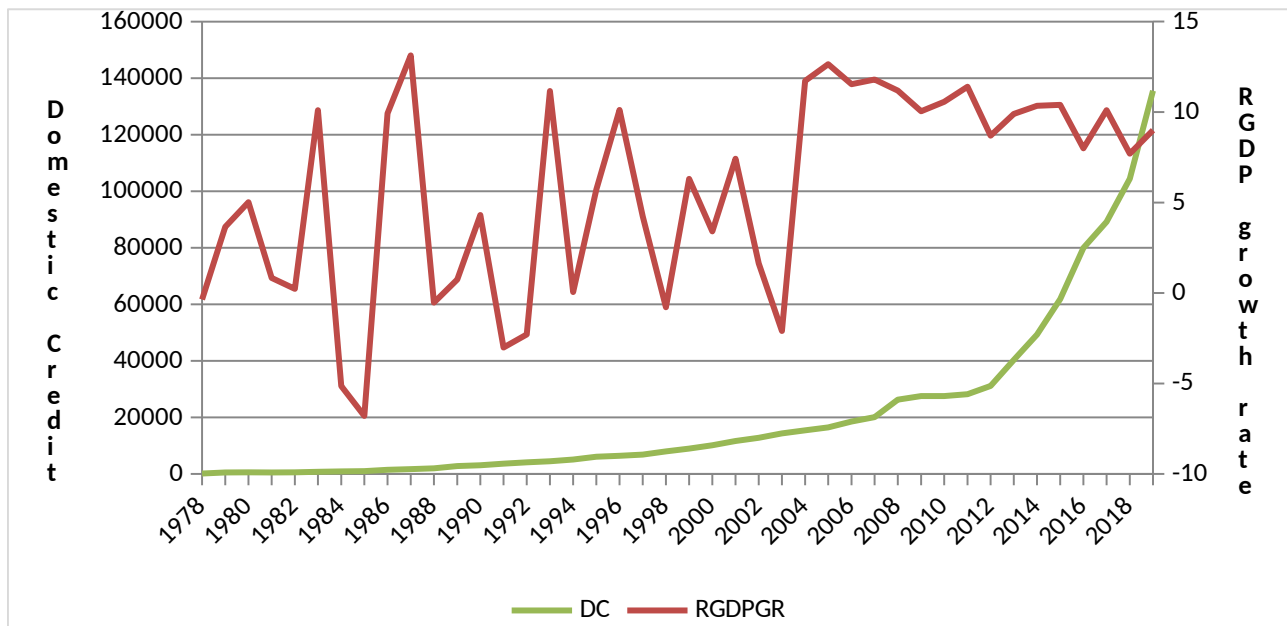
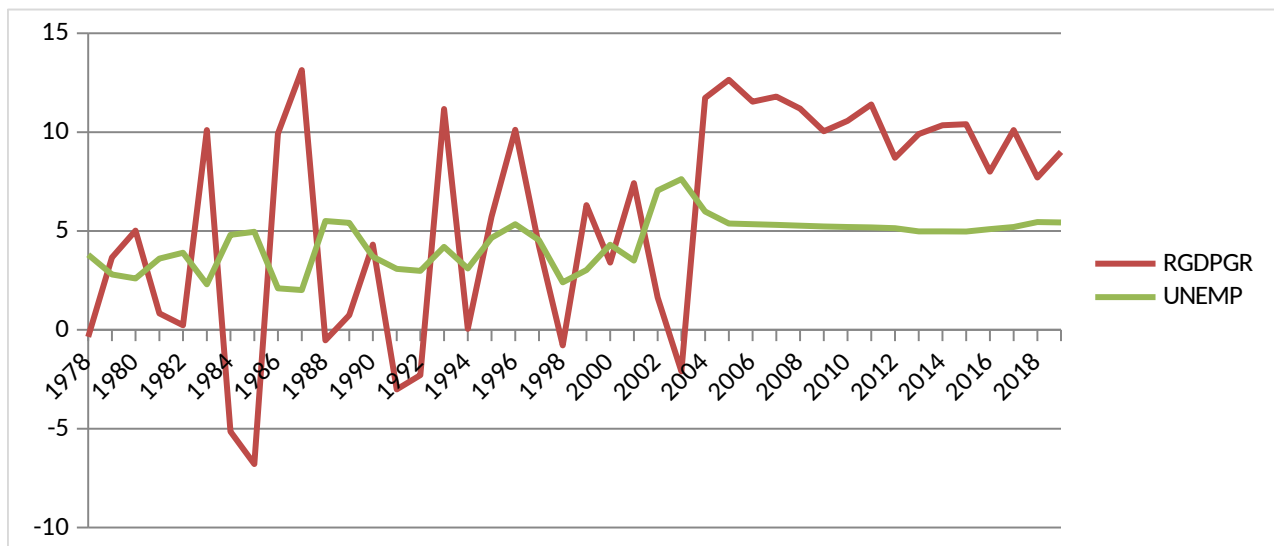


Figure 4.2. Domestic Credit and Economic growth

Source: own computation using National Bank of Ethiopia data

4.1.3. The Unemployment rate and Growth in Ethiopia

Ethiopia is one of Africa countries that registered rapid economic growth rate for the last decade. Growth of economy contributes for employment as investments require manpower. Labour is an indispensable resource, if properly mobilized and used efficiently and effectively. So, when economy of a country grows, the unemployment rates decreases. Thus, unemployment and economic growth have negative relationship.



Source: Own Computation using national bank of Ethiopia data

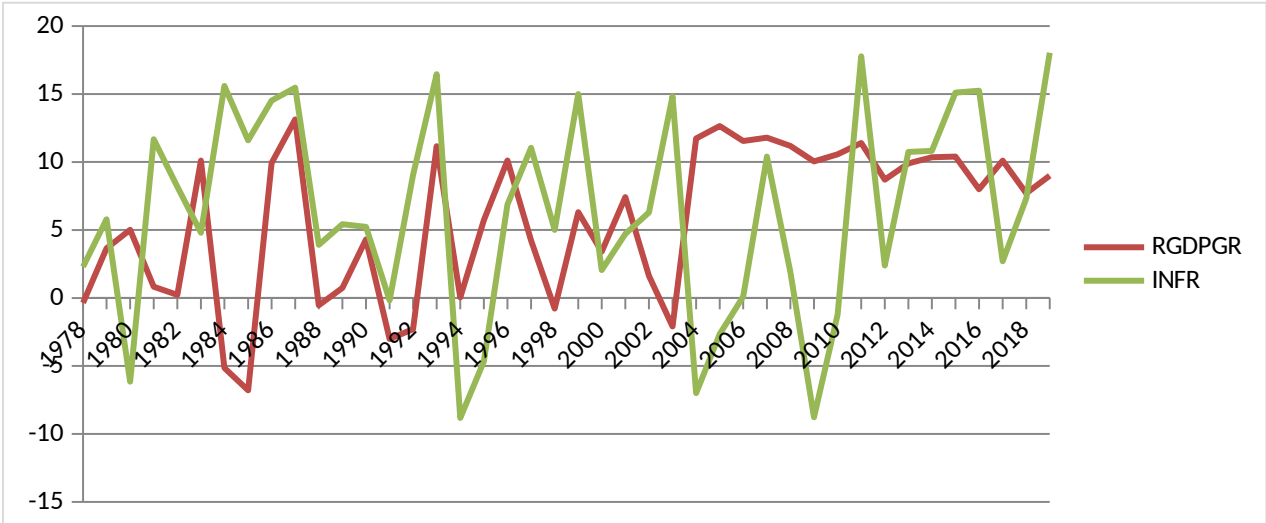
Figure 4.3. Unemployment and RGDP growth rates

Currently, employment is decreasing due to COVID-19 pandemic in the world and in Ethiopia as well. Unemployment rate in Ethiopia will dramatically increase as many investment sectors are becoming weak. So, the contributions of private and public sectors in employment of labour forces are decreasing. The number of educated unemployment rate, in the country is ever increasing. In addition, in Ethiopia agricultural sector could not absorb unskilled labours and nor did the industrial sector.

4.1.4. Inflation Rate and Economic Growth

The inflation rate plays an important role in determining the health of an economy. Extremely high inflation rates (hyperinflation) could collapse the economy of a country. Even moderate

inflation can rapidly erode purchasing power and creates uncertainty as businesses have more difficulty in estimating future costs. Inflation rate is the percentage increase or decrease in prices during a specified period. Price decrease or increase corresponds to money supply that is affected by other factors such as investment. In addition, high inflation rates correspond to high interest rates as lenders need to compensate for the decline in purchasing power of future interest and principal repayments. This results in higher costs of doing business and place an overall drag on the economy. As indicated below when real GDP growth increases, inflation increases. Hence, during the last one decade the inflation has been high in relation to money supply, investment and other factors such as hoarding.



Source: Own computation using national bank of Ethiopia data

Figure 4.4: Inflation and Economic growth

4.1.5. Interest Rate and Economic Growth

Interest rate is among the factors that ambiguously affect the growth of real gross domestic product, that is, the net impact of change in interest rate on GDP can be positive or negative. Decrease in interest rate encourages investment and increases output. However, it may discourage saving and result in short of supply of funds for the investors. Therefore, decrease in interest rate encourages investment and increases output only if it is not lowered to the extent that discourage suppliers of this fund for the borrowers. If it is lowered below the level of interests of the lenders, the investors cannot get sufficient funds for investment. In this case, decrease in real interest rate may reduce economic growth. As depicted in below figure, the

interest rate and economic growth have slight same trend since the ERDF regime. However, economic growth is negative in 1995 when the interest rate was positive.

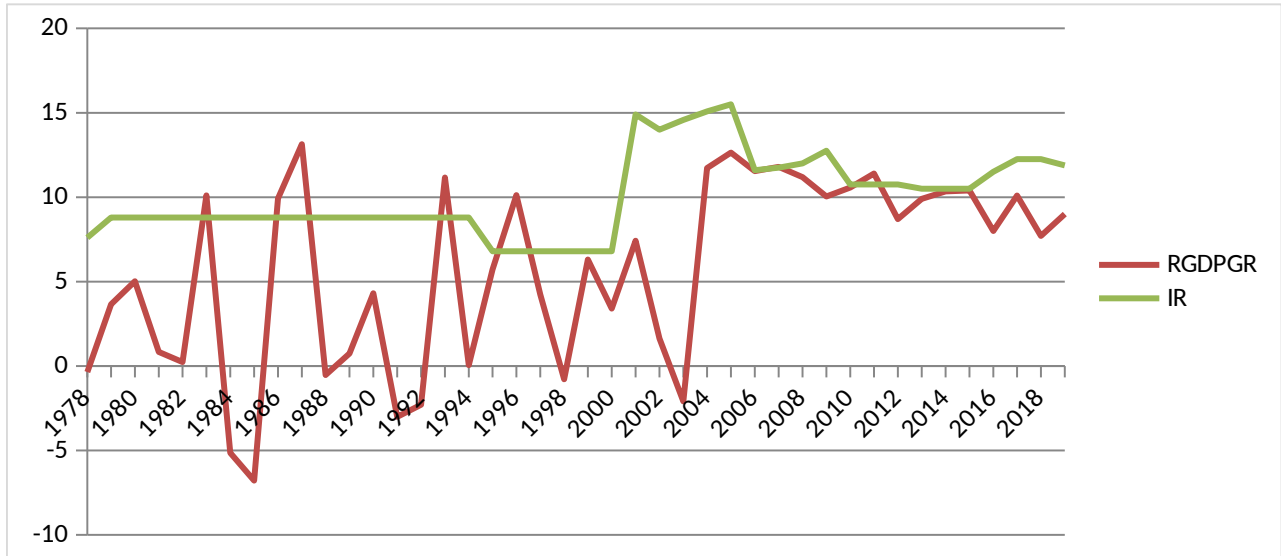


Figure 4.5: Interest Rate and RGDP growth rate

Source: own computation using national bank of Ethiopia data

In summary, after the transformation of some variables such as money supply and domestic credit, the relationship among variables in graphical visual are presented below.

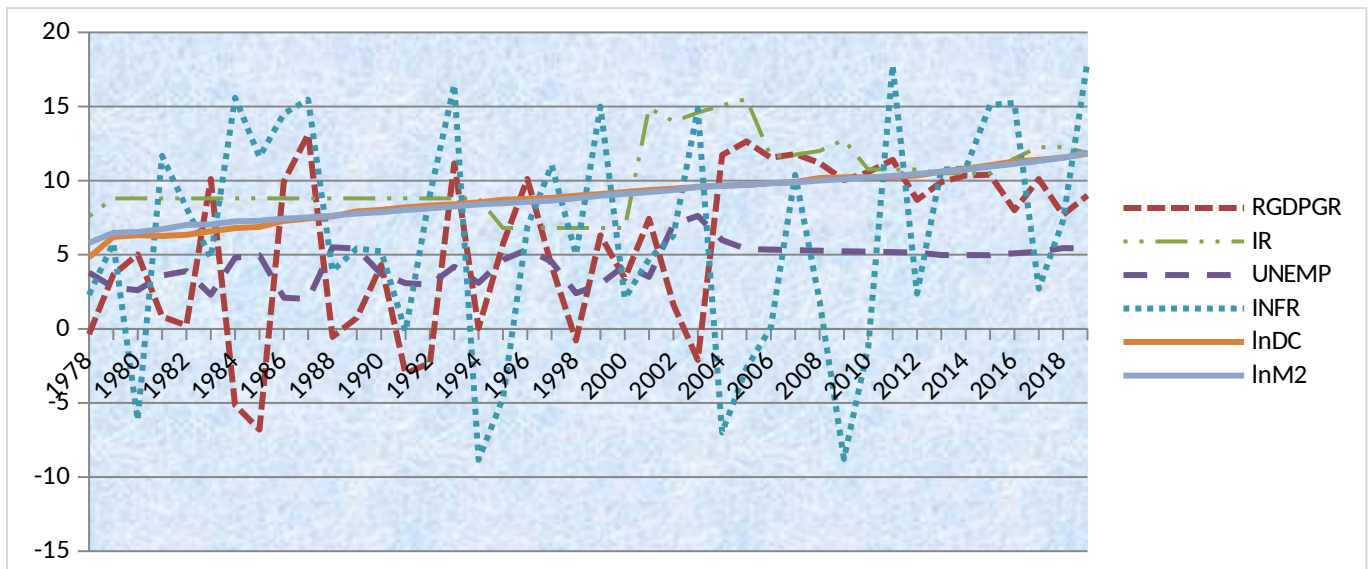


Figure 4.6: Graphical visual for variables in combination

Source: Own computation using national Bank of Ethiopia data

4.2. Econometric Results

4.2.1. Pre-Estimation Test

There are a number of diagnostic test will be conducted for Stationarity (unit root), normality of data, autocorrelation between error terms, omitted variables or functional forms, as well as the stability between dependent and independent variables.

4.2.1.1. Stationary Properties /Unit Root Test of the Variables

A time series variable is said to be covariance (weakly) stationary if it has constant mean, time invariant variance and a covariance between any two time period that depends only on the lag between them (Gujarati, 2004). Whereas, a non-stationary series has a different mean at different points in time and its variance increases with the sample size. So, the primary task in an econometric work is to check whether a series is stationary or not. Because using the classical estimation methods to estimate relationships with non-stationary variables results in spurious regression (Wooldridge, 2004 Gujarati, 2004)

The well-known Augmented Dickey- Fuller (1981) is applied to test the existence of unit root (stationarity) and to ascertain their order of integration. The primary interest of this tests is to determine whether the variables are stationary or not at levels, and first differenced. The unit root tests is undertaken both at the intercept and intercept plus trend regression forms, and the results of Augmented Dickey- Fuller (ADF) tests are given in Tables 4.1 below.

Table 4.1: Summary of ADF Unit Root Test Result

Variable	Augmented Dickey-Fuller(ADF) Test							
	Level				First Difference			
	Intercept	P-value	Trend & Intercept	P-value	Intercept	P-value	Trend & Intercept	P-value
RGDPGR	-1.7754	0.3868	-5.9494	0.0001				
UNEMP	-2.3732	0.1555	-2.3688	0.3894	-5.0964	0.0001		
IR	-2.1296	0.2346	-2.4921	0.3302	-6.9312	0.0000		
LNM ₂	1.7164	0.9995	-4.4063	0.0058				
LNDC	-2.2967	0.1778	-6.6485	0.0000				
INFR	-6.5049	0.0000						

Source: Model result

When data is stationary at level, simple OLS regression is applicable, whereas when the data are both stationary at level and at first difference or at first difference we can use ARDL model. As indicated in the above table, RGDGR, LNM2, LNDC and INFR are stationary at level, while UNEMP and IR are stationary at first differenced. Thus, variables are stationary both at level, $I(0)$, and at first difference, $I(1)$, and hence, Autoregressive Distributive Lag (ARDL) model is applicable for the estimation of the impact of monetary policy.

4.2.1.2. Maximum Lag Selection

The maximum lag length determination in vector autoregressive (VAR) model precedes the task of testing co-integration relationship. The maximum lag length variables are selected by different criteria used all together. The common criteria are in Hannan-Quinn information criteria (HQC), the Schwarz information criteria (SC) and the Akaike information criteria (AIC). In selecting the optimal lag length of a model, we have to consider the results of these criteria. Empirical literature often suggests the use of the Hannan-Quinn criterion (HQC), Akaike Information Criterion (AIC) and the Schwarz Bayesian Criterion (SBC) to select the lag length of the VAR system especially for small sample size i.e up to 60 or less (Asghar and Abid 2005). The maximum lag length of the variables used in this study have been presented the below table.

The three information criteria used to identify maximum lag are Akaike information criterion (AIC), Schwarz information criterion (SC) and Hannan-Quinn information criterion (HQ), at the values indicated by astring (*) that shows lag order that are selected by criterion at 5% level of significance. As indicated in the above table the optimal lag length according to the VAR lag order selection criteria is 1 and 4. However, as the majority of the information criteria indicated 4, the maximum lag length of variables in this study becomes 4.

4.2.1.3. Estimation of Econometric Model

This study uses the Autoregressive Distributive lag (ARDL) to estimate the impacts of monetary policy on economic growth in Ethiopia. In this model, macroeconomic variables such as broad money supply, domestic credit, inflation rate, unemployment rate and interest rate are employed for estimation. Two explanatory variables, money supply and domestic credit, are transformed in log form. The estimation result of these determinants is shown in table below which is estimated

As indicated in table 4.2 below, Insignificant variables in over parameterized model have been avoided and variables in parsimonious model have been used to develop ARDL model.

Table 4.2: Maximum Lag Length Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-388.55	NA	73.70	21.33	21.59	21.42
1	-212.88	284.87	0.04	13.78	15.61*	14.42
2	-169.30	56.54	0.03	13.37	16.76	14.57
3	-128.02	40.17	0.04	13.08	18.05	14.83
4	-20.53	69.72*	0.00*	9.22*	15.75	11.52*
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Source: Model result

As indicated in the Table 4.2 above, the variables have both positive and negative impacts on economic growth. The monetary policy variables considered in this study are significantly explained RGDP growth except interest rate. The log of money supply and inflation have negative impact, whereas, unemployment, interest rate and log of domestic credit have positive impacts on economic growth at level. However, money supply has positive impact on economic growth at lags one and two. Similarly, unemployment has positive impact at lag one and negative at lag two. The others inflation, interest rate and domestic credit have negative relation with economic growth at one and next lags. The value of R-square of the model is 0.978819 which indicates about 97.88% variation in the dependent variable is explained by explanatory variables that are incorporated in to the model. The value of F-statistics is also significant at 1% level of significance which implies the model is good fit as a whole.

Table- 4.3: ARDL Estimation (4, 4, 4, 4,4) based on AIC

Regressors	Coefficient	Std. Error	t-statistic	Prob.
RGDPGR(-1)	-0.536475	0.129790	-4.133398	0.0020
RGDPGR(-2)	-0.665817	0.091724	-7.258949	0.0000
RGDPGR(-3)	-0.636035	0.128038	-4.967543	0.0006
RGDPGR(-4)	0.334783	0.108703	3.079797	0.0116
LN2	-70.06381	14.81029	-4.730753	0.0008
LN2(-1)	43.08769	13.21744	3.259911	0.0086
LN2(-2)	49.72307	20.64016	2.409045	0.0367
LN2(-3)	-54.73919	14.39934	-3.801506	0.0035
LN2(-4)	61.99221	9.609209	6.451333	0.0001
DUNEMP	5.780795	1.135568	5.090664	0.0005
DUNEMP(-1)	4.464599	0.978326	4.563508	0.0010
DUNEMP(-2)	-7.703712	1.057973	-7.281575	0.0000
DUNEMP(-3)	1.653229	0.681241	2.426791	0.0356
DUNEMP(-4)	5.640602	1.467741	3.843051	0.0032
INFR	-0.504156	0.097321	-5.180343	0.0004
INFR(-1)	-0.472416	0.084208	-5.610094	0.0002
INFR(-3)	-0.148219	0.094738	-1.564520	0.1488
INFR(-4)	0.347049	0.063365	5.476958	0.0003
DIR	0.108344	0.291541	0.371625	0.7179
DIR(-2)	-0.767546	0.272223	-2.819544	0.0182
DIR(-4)	-1.186936	0.277174	-4.282275	0.0016
LNDC	46.37075	9.542191	4.859550	0.0007
LNDC(-1)	-36.12485	12.68564	-2.847698	0.0173
LNDC(-2)	-62.02745	14.82266	-4.184637	0.0019
LNDC(-3)	70.57401	11.73500	6.013978	0.0001
LNDC(-4)	-38.58185	7.098973	-5.434849	0.0003
C	-59.41140	7.767324	-7.648889	0.0000
R-Squared	0.978819	Adjusted R ²	0.923750	
AIC	3.871351	SC	5.046886	
HQ	4.285782	F-Statistics	17.77416	
DW stat	1.769545	prob(F-statistic)	0.000021	

Source: Model result

4.2.2. Long Run Co-integration Test: ARDL Bound Test

To test for the presence of co-integration for long run form, bound test is a useful instrument of testing statistics. The F-statistics value is used to check for the existence of long-run co integration of the model. The value of F-statistics is either less than the lower bound (I_0) or between the lower or greater than the upper bound (I_1). When the value of F-statistic is below lower bound (I_0), we fail to reject the null hypothesis and inconclusive when it is between the lower and upper bounds. However, we reject the null hypothesis when it is above the upper bound (I_1).

Table 4-4: Bound Test Result for Co-integration

Test Statistic	Value	K
F-statistic	32.73193	5
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

Source: Model test result

As indicated in Table-4.4, the F- statistic value is estimated to be 32.73193 which is evidently greater than the upper bound, (I_1). Thus, we clearly reject the null hypothesis in favor of the alternative. Therefore, it shows that there are long run relationship (cointegration) between dependent and independents.

4.2.3. Post-Estimation Diagnostic Test

1) Essential statistics

To accept this model as a good one, it has to meet the required criteria of the post estimation test such as normality, serial correlation, heteroscedasticity and stability tests. The post-Estimation diagnostic test results are presented in the following below table.

Table.4.5. Summary of Diagnostic Tests

Type of Test	Type of Test Applied	Statistics Value		Prob.	Significance	Reject/ Accept H ₀
Normality	Jarque-Bera	---	1.752138	0.416417	Insignificant	Accept
Serial correlation	Lagrange multiplier test	F-stat	0.201313	0.8217	insignificant	Accept
		Ob*R Square	1.772915	0.4121		
Heteroscedasticity	Breusch-Pagan – Godfrey	F-stat	0.638878	0.8271	insignificant	Accept
		Ob*R Square	23.09589	0.6275		
Stability	Ramsey’s reset test	F-stat	0.052767	0.8235	insignificant	Accept
		Likelihood	0.216296	0.6419		
		Ratio				

Source: Model test result

As shown in Table 4.5, the statistical value of Jarque-Bera is 1.752138 indicating the distribution of residuals approaches to normal as the Jarque-Bera is less than 5.99 which indicates that it is insignificant and hence we fail to reject the null hypothesis. The serial correlation is tested by Lagrange multiplier test (LM) and its F- statistic and p-value are 0.201313 and 0.8217, respectively. It is statistically insignificant which leads us to accept the null hypothesis, hence residuals are not correlated. Similarly the existence of homoscedasticity is checked using Breusch-Pagan Godfrey test. The test result shows that there is no heteroscedasticity. The stability of functional form also tested using Ramsey’s reset test of p-value of F-static is 0.8235 which leads to fail to reject the null hypothesis that indicates stable functional form. Ramsey test is used to check whether there is an omitted variable or not in the model besides, the specification error of incorrect functional form and correlation between explanatory variables and error term will be tested (Spara, 2005).

In addition, the stability of the coefficients will be tested by using CUSUM test or CUSUM square Test. The CUSUM test result indicates that the model is stable (annexed). In addition, the Wald F-Statistic in ARDL bound test approach will be applied to examine the existence of long run relationship in unrestricted equilibrium correction model using equation. In this case, we need to examine existence of long run relationship in unrestricted equilibrium correction model.

Table 4.5: Wald test result

Test Statistic	Value	Df	Probability
F-statistic	3.192114	(5, 36)	0.0174
Chi-square	15.96057	5	0.0070
Null Hypothesis: C(1)=0,C(2)=0,C(3)=0,C(4)=0,C(5)=0			
Null Hypothesis Summary:			
Normalized Restriction (= 0)	Value	Std. Err.	
C(1)	-12.42976	5.045208	
C(2)	2.904803	3.961986	
C(3)	-0.550599	3.475280	
C(4)	-0.031068	0.102171	
C(5)	-1.736947	0.735153	
Restrictions are linear in coefficients			

Source: Model test result

The wald test statistical result shows that the coefficients of the model are statistically different from zero. In other words, each coefficient affects the dependent variable. We also test for the significance of coefficients of over parameterized model. The model contains many lags the need to check the significance of each variable. The insignificant coefficients of variables are identified to be coefficient C (17), C (21), and C (23). So it is essential to check the coefficients of these variables are really statistically approaches to zero.

Table 4-6: Wald Test

Test statistic	Value	Df	Probability
F-statistic	2.530709	(3, 7)	0.1406
Chi-square	7.592128	3	0.0552
Null Hypothesis: C(17)=0, C(21)=0, C(23)=0			
Null Hypothesis Summary:			
Normalized Restriction (= 0)	Value	Std. Err.	
C(17)	0.043157	0.072491	
C(21)	-0.329072	0.226097	
C(23)	0.456958	0.223344	
Restrictions are linear in coefficients.			

Source: Model test result

As indicated in the above table, the probability values of both F-statistics and chi-square are statistically insignificant at 5%. Therefore, we fail to reject the null hypothesis in favor of the alternative hypothesis. The values of the coefficients of C (17), C(21), & C(23) are indeed zero. So, it implies that the rest coefficients are statistically significant that enable us to measure their impact on economic growth.

4.2.4. ARDL Short run (ECM) and Long-run Dynamics

4.2.4.1. Short Run Dynamics (Error Correction Model Estimation)

The error correction model, however, is particularly powerful since it allows an analyst to estimate both short term and long run effects of explanatory time series variables. Since the model is co-integrated in this study, it implies that the existence of long run relationship between variables. It is important to estimate the speed of adjustment between short run and long run dynamics using error correction model (ECM).

The error correction model is estimated using the above equation eq.3(in chapter -3). ARDL short run dynamics of macroeconomic variable in explaining RGDP growth rate is shown in the following table below.

Table 4-6 ECM Estimation

Variables	Coefficient	Std. Error	t-statistic	Prob.
D(RGDPGR(-1))	0.423657	0.155555	2.723513	0.0114
D(LNM2)	-29.19056	12.47212	-2.340465	0.0272
D(LNM2(-1))	12.00869	15.51104	0.774203	0.4458
D(LNDC)	12.00255	8.838067	1.358051	0.1861
D(LNDC(-1))	-9.645453	9.037910	-1.067222	0.2957
D(DUNEMP)	2.061960	1.173518	1.757077	0.0907
D(DUNEMP(-1))	1.209047	1.206042	1.002492	0.3253
D(DIR)	0.498406	0.391048	1.274538	0.2137
D(DIR(-1))	0.346807	0.409000	0.847940	0.4042
D(INFR)	0.044620	0.092425	0.482767	0.6333
D(INFR(-1))	0.002553	0.084317	0.030277	0.9761
C	2.128782	2.650707	0.803100	0.4292
ECM(-1)	-0.727309	0.228347	-5.812671	0.0000
R-Squared	0.781715	Adjusted R-Square	0.764045	
AIC	6.043713	DW-Statistic	1.698885	
SC	6.598234			
HQC	6.242671			

Source: Model result

The Error Correction Model (ECM) can be derived from ARDL model through a simple linear transformation, which integrates short run adjustments with long run equilibrium without losing long run information. Error correction coefficient shows the short run dynamics of relationship between monetary policy macro-variables and RGDP growth. The ECM model based on Autoregressive distributive lag (ARDL) method establishes that changes in real gross domestic product growth with money supply is statistically significant at 5% level, while changes in other explanatory variables are statistically significant in short run effect at 10% level.

The model provides estimates of short run estimates while the ECM coefficients show the speed with which the system converges to equilibrium. The coefficient of the ECM (-1) is 0.727309. It the entire variables have a long run equilibrium relationship. The negative sign further indicates that the adjustment portrays the direction to restore the long-run relationship. The magnitude of the ECM (- 1) coefficient, which is significant, indicate that the speed of adjustment is quiet high. The speed of adjustment is about 72.73% is shows that last year disequilibrium in the dependent variable from its equilibrium path will be corrected in the current year.

In the short run, money supply is significant in explaining that it affects economic growth rate negatively at level whereas positively at lag one. The variables unemployment, interest rate and inflation affect RGDP growth rate positively; but insignificant. A one percent increase in money supply decreases economic growth rate by 2919 % as it causes inflation in economy in the short run. The other variables affect economic growth positively; but they are insignificant to explain the dependent variable.

The ECM equation is shown below.

$$\text{ECM} = 0.4236\text{RGDPGR} - (29.190 * \text{M2} - 12.002 * \ln\text{DC} - 2.0629 * \ln\text{UNEMP} - 0.0446 * \text{INFR} - 0.4984 * \text{IR} - 2.1287)$$

4.2.4.2. Long run Coefficients

Money supply and unemployment affect economic growth positively. In long-run the impact of money supply changes to positive, while the impact of unemployment in short-run and long-run is the same.

Table-4.7: Estimated Long-Run Coefficients

Independent Variables	Coefficient	Std. error	t-statistic	Prob.
LNM2	11.867848	0.905172	13.111152	0.0000
LNDC	-7.578980	0.878342	-8.628735	0.0001
DUNEMP	4.874603	0.716081	6.807331	0.0003
DIR	-0.823272	0.242991	-3.388082	0.0116
INFR	-0.385505	0.090059	-4.280570	0.0037
C	-25.889529	1.828754	-14.156922	0.0000

Source: Model result

As indicated above, the absolute values of the long run elasticities are higher than the short run elasticities in the case of money supply, unemployment, interest rate and inflation, but it is less

than for the domestic credit. This indicates that more variables give higher responses in the long run than in short-run.

The long run equation of the estimation is presented as follows:

$$\ln RGDPGR = 25.889 + 11.867 * \ln M2 - 7.578 * \ln DC + 4.874 * \ln UNEMP - 0.823 * IR - 0.3855 * INFR$$

CHAPTER FIVE

5. SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS

5.1. Summary and conclusions

Economic growth is vital challenges of many developed and developing countries. In Ethiopia, poverty problem is being manifested in various social problems, such as migration. The aim of this study is to examine some major monetary policy macroeconomic determinants of economic growth in Ethiopia. The macroeconomic determinant variables real gross domestic product (RGDP), broad money supply (M2), Domestic Credit (DC), Unemployment rate (Unemp), inflation rate (INFR) and interest rate (IR).

To examine the impact of monetary macroeconomic variables that determine GDP growth in Ethiopia, secondary data of 41 years are collected. To analyze the data descriptive and econometric analyses were employed. In addition, econometric analysis with ARDL model was used. In order to specify this model for estimation; unit root test and maximum lag selection were tested. Augmented Dickey Fuller (ADF) for unit root test is applied to verify the stationarity of the data of each variable. As indicated in Table---, all variables are stationary at level I (0) and after first difference, I(1). This clearly indicates the model of estimation, which was proposed by Pesaran and Shin et al (1999), called Autoregressive Distributive lag (ARDL) is an appropriate model for the estimation. Post estimation diagnostic tests were also conducted, as indicated, in which all post estimation tests are failed to reject the null hypothesis. It clearly shows that there is no normality, serial correlation, heteroscedasticity and instability problems in functional form. Thus, the model (ARDL) is applied to estimate the macroeconomic determinants of economic growth.

In the finding, the ARDL estimation model reveals that the overall macroeconomic variables explain the dependent variable (real GDP growth) and significant at 5%. All variables, except interest rate, are statistically significant at 5% level. In the short-run, unemployment at level has negative impact while positive impact at lag 1. The remaining variables have positive impact on real GDP growth both at level and at lag 1, except domestic credit. This indicates that the previous credit has negative impact on the current credit.

The bound test for the existence of co-integration showed that the existence of long run relationship between dependent and independent variables. In the short run, lnM2, lnDC,

Unemp,IR and IFR negatively affect real GDP growth by the value of -2919%, 1200%, 2.06, 0.49 and 0.04, respectively and they are statistically insignificant at 5% level except money supply. In addition, the coefficient of error correction model (ECM) indicates the speed of adjustment from the short run to long run is by the speed of 132.7%.

In the long run, lnM2 and Unemp have positive while ln DC, IR and IFR have negative impacts on real GDP growth of the country. A one percent increase in money supply leads to 11.86% real GDP growth. As the unemployment rate increases by one unit, economic growth increases by 4.87 units. When the domestic credit increases by 1%, however; the real GDP growth declines by -7.57 units. In addition, as unemployment and inflation increase by 1 unit, the output decreases by 0.82 and 0.38 units respectively.

5.2.CONCLUSSIONS

Based on the findings of this study the following conclusions are suggested. The relationship between economic growth and money supply is negative in the short run and positive in the long run. This confirms that money supply in short-run causes inflation that impaired the growth; but in the long run money supply creates asset that boost economic growth. Similarly, domestic credit has negative impact on economic growth in the short-run; but it has positive impact in the long run. This is because investment does not have influence in the short-run; but in the long-run the investments enter into production that account for GDP growth. However, the interest rate and inflation have both positive impacts on growth in short-run and negative impact in the long-run. The economic effect both variables manifest in economic growth in the long-run due to the fact that, for instance, medium level inflation does not harm the economic growth. But when it surpasses the desired level it starts disrupting the growth. In the long-run when inflation becomes high it reacts against economic growth. Similarly, the interest rate in short-run does not react immediately as it requires time for customer responses. The long run coefficients are higher than the short run coefficients that imply that regressors are more responsive in the long run than in the short run.

5.3. POLICY RECOMMENDATIONS

The objective of monetary policy is, thus, price stability, reflected in low and non-volatile rates of inflation, sustainable economic growth and development policy, keeping unemployment rate low and interest rates, etc and in general attaining stable and well-functioning macro-economic environment. On this study the dynamic impact of monetary policy in the long run are proved to be existing and constitutes a satisfactory frame work for the discussion of anti –inflationary policies in Ethiopia.

In Ethiopia, Policies adopted should be limited to the absorptive capacity of the economy. This will create jobs, promote export and revive industries that are currently far below installed capacity. More so, adequate and result oriented instrument should be injected in the policies adopted at any given time. Finally, government should direct effort towards improving the level of development of both the money and capital market. This is because a well-developed money and capital market with wide range of both short and long-term finance are necessary for efficiency of the monetary system.

an increase in the general price level (inflation) has been detrimental to sustainable economic growth in Ethiopia these results have important policy implications for both domestic policy makers and development partners, implying that controlling inflation is a necessary condition for promoting economic growth. Thus, policy makers should focus on maintaining inflation at a low rate (single digit).

Since money and capital markets are still at rudimentary stages with very few securities and given the lack of short-term money markets, interest rate policies are almost unemployed in the conduct of monetary policy in Ethiopia. It is, therefore, recommended that monetary authorities target monetary aggregate as a policy variable for effective monetary policy implementation. In addition, Monetary authorities should be put much effort to move towards more market based monetary and financial sector policies. Besides, to the broad money and it is also important to the researcher suggests further study on the area to come up with more comprehensive and concrete evidences

A falling unemployment rate generally occurs alongside rising gross domestic product (GDP), higher wages, and higher industrial production. The government can generally achieve a lower

unemployment rate using expansionary fiscal or monetary policy, so it might be assumed that policy makers would consistently target a lower unemployment rate using these policies.

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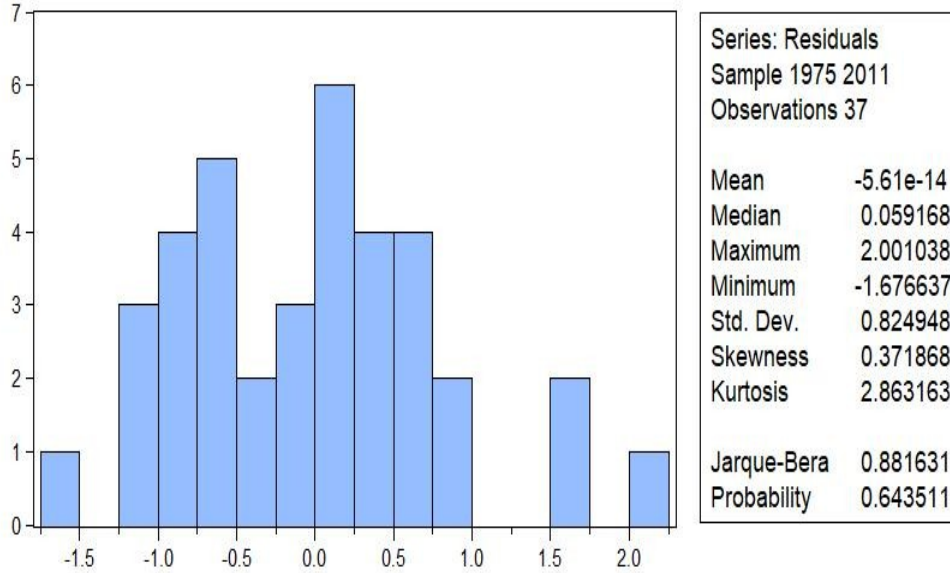
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APPENDICES

Statistical Result

APPENDIX 1. Normality Test



APPENDIX 2. SERIAL CORRELATION TEST

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.039532	Prob. F(2,9)	0.9614
Obs*R-squared	0.322213	Prob. Chi-Square(2)	0.8512

HETEROSKEDACITICITY

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.509232	Prob. F(25,11)	0.9212
Obs*R-squared	19.84929	Prob. Chi-Square(25)	0.7547
Scaled explained SS	1.634360	Prob. Chi-Square(25)	1.0000

APPENDIX 3. STABILITY TEST

Ramsey RESET Test
Equation: UNTITLED
Specification: RGDPGR RGDPGR(-1) RGDPGR(-2)
RGDPGR(-3)
RGDPGR(-4) LNM2 LNM2(-1) LNM2(-2) LNM2(-3)
LNM2(-4)
DUNEMP DUNEMP(-1) DUNEMP(-2) DUNEMP(-3)
DUNEMP(-4)
INFR INFR(-1) INFR(-3) INFR(-4) DIR(-2) DIR(-4)
LNDC
LNDC(-1) LNDC(-2) LNDC(-3) LNDC(-4) C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.233090	10	0.8204
F-statistic	0.054331	(1, 10)	0.8204
Likelihood ratio	0.200481	1	0.6543

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.132388	1	0.132388
Restricted SSR	24.49941	11	2.227219
Unrestricted SSR	24.36702	10	2.436702

LR test summary:

	Value	df
Restricted LogL	-44.87375	11
Unrestricted LogL	-44.77351	10

Unrestricted Test Equation:
Dependent Variable: RGDPGR
Method: Least Squares
Date: 05/10/20 Time: 13:12
Sample: 1975 2011
Included observations: 37

Variable	Coefficien t	Std. Error	t-Statistic	Prob.
RGDPGR(-1)	-0.604333	0.223960	-2.698396	0.0224
RGDPGR(-2)	-0.704905	0.197060	-3.577107	0.0050
RGDPGR(-3)	-0.712797	0.264127	-2.698695	0.0224
RGDPGR(-4)	0.350503	0.125173	2.800142	0.0188
LNM2	-75.88456	19.22407	-3.947372	0.0027
LNM2(-1)	44.17061	13.20575	3.344801	0.0074
LNM2(-2)	60.76427	31.06374	1.956116	0.0789
LNM2(-3)	-62.02304	24.28578	-2.553883	0.0287
LNM2(-4)	66.05897	21.23219	3.111265	0.0110
DUNEMP	5.899513	1.219832	4.836334	0.0007
DUNEMP(-1)	5.078000	2.132476	2.381270	0.0385

DUNEMP(-2)	-8.275686	2.405201	-3.440746	0.0063
DUNEMP(-3)	1.622573	0.682463	2.377525	0.0388
DUNEMP(-4)	6.243812	1.772022	3.523551	0.0055
INFR	-0.529867	0.121776	-4.351160	0.0014
INFR(-1)	-0.521600	0.186752	-2.793018	0.0190
INFR(-3)	-0.188229	0.110164	-1.708628	0.1183
INFR(-4)	0.355102	0.070983	5.002650	0.0005
DIR(-2)	-0.842835	0.395075	-2.133352	0.0587
DIR(-4)	-1.296240	0.438963	-2.952960	0.0145
LNDC	48.08336	9.982049	4.816983	0.0007
LNDC(-1)	-33.46870	12.90824	-2.592817	0.0268
LNDC(-2)	-71.46511	28.79703	-2.481684	0.0324
LNDC(-3)	77.82345	24.21245	3.214192	0.0093
LNDC(-4)	-42.92374	14.76402	-2.907320	0.0156
C	-65.11326	17.95004	-3.627471	0.0046
FITTED^2	-0.007653	0.032833	-0.233090	0.8204
<hr/>				
R-squared	0.978643	Mean dependent var	6.288091	
Adjusted R-squared	0.923114	S.D. dependent var	5.629607	
S.E. of regression	1.560994	Akaike info criterion	3.879649	
Sum squared resid	24.36702	Schwarz criterion	5.055184	
		Hannan-Quinn		
Log likelihood	-44.77351	crit.	4.294080	
F-statistic	17.62411	Durbin-Watson stat	1.917523	
Prob(F-statistic)	0.000022			

APPENDIX 4. REDUNDANCY TEST

Redundant Variables Test

Null hypothesis: INFR(-2) DIR DIR(-1) DIR(-3) are jointly insignificant

Equation: UNTITLED

Specification: RGDPGR RGDPGR(-1) RGDPGR(-2) RGDPGR(-3)

RGDPGR(-4) LNM2 LNM2(-1) LNM2(-2) LNM2(-3) LNM2(-4)

DUNEMP DUNEMP(-1) DUNEMP(-2) DUNEMP(-3)

DUNEMP(-4)

INFR INFR(-1) INFR(-2) INFR(-3) INFR(-4) DIR DIR(-1)

DIR(-2)

DIR(-3) DIR(-4) LNDC LNDC(-1) LNDC(-2) LNDC(-3)

LNDC(-4) C

Redundant Variables: INFR(-2) DIR DIR(-1) DIR(-3)

	Value	df	Probability
F-statistic	1.948413	(4, 7)	0.2072

F-test summary:

Sum of	df	Mean
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	Sq.		Squares
Test SSR	12.90688	4	3.226720
Restricted SSR	24.49941	11	2.227219
Unrestricted SSR	11.59253	7	1.656075

Restricted Test Equation:

Dependent Variable: RGDPGR

Method: Least Squares

Date: 05/10/20 Time: 13:28

Sample: 1975 2011

Included observations: 37

Variable	Coefficien t	Std. Error	t-Statistic	Prob.
RGDPGR(-1)	-0.559476	0.109521	-5.108377	0.0003
RGDPGR(-2)	-0.664287	0.087968	-7.551452	0.0000
RGDPGR(-3)	-0.657366	0.109876	-5.982769	0.0001
RGDPGR(-4)	0.336195	0.104294	3.223536	0.0081
LNM2	-72.62036	12.59129	-5.767510	0.0001
LNM2(-1)	43.82475	12.54540	3.493293	0.0050
LNM2(-2)	54.56763	15.36264	3.551970	0.0045
LNM2(-3)	-57.21503	12.25513	-4.668658	0.0007
LNM2(-4)	61.64513	9.181396	6.714135	0.0000
DUNEMP	5.797945	1.089272	5.322770	0.0002
DUNEMP(-1)	4.625358	0.842413	5.490605	0.0002
DUNEMP(-2)	-7.770931	1.000726	-7.765297	0.0000
DUNEMP(-3)	1.631158	0.651517	2.503629	0.0293
DUNEMP(-4)	5.944939	1.169343	5.083999	0.0004
INFR	-0.512191	0.091095	-5.622576	0.0002
INFR(-1)	-0.482293	0.076710	-6.287223	0.0001
INFR(-3)	-0.169564	0.072330	-2.344300	0.0389
INFR(-4)	0.347755	0.060805	5.719196	0.0001
DIR(-2)	-0.776129	0.260399	-2.980542	0.0125
DIR(-4)	-1.215148	0.255919	-4.748182	0.0006
LNDC	47.23418	8.885034	5.316151	0.0002
LNDC(-1)	-34.56500	11.49255	-3.007602	0.0119
LNDC(-2)	-65.34980	11.35049	-5.757445	0.0001
LNDC(-3)	72.71257	9.818312	7.405812	0.0000
LNDC(-4)	-39.81208	6.028816	-6.603632	0.0000
C	-61.18316	5.886867	-10.39316	0.0000
R-squared	0.978527	Mean dependent var	6.288091	
Adjusted R-squared	0.929724	S.D. dependent var	5.629607	
S.E. of regression	1.492387	Akaike info criterion	3.831013	
Sum squared resid	24.49941	Schwarz criterion	4.963010	
		Hannan-Quinn		
Log likelihood	-44.87375	crit.	4.230095	
F-statistic	20.05065	Durbin-Watson stat	1.915801	
Prob(F-statistic)	0.000005			

APPENDIX5. CUSUM TEST

